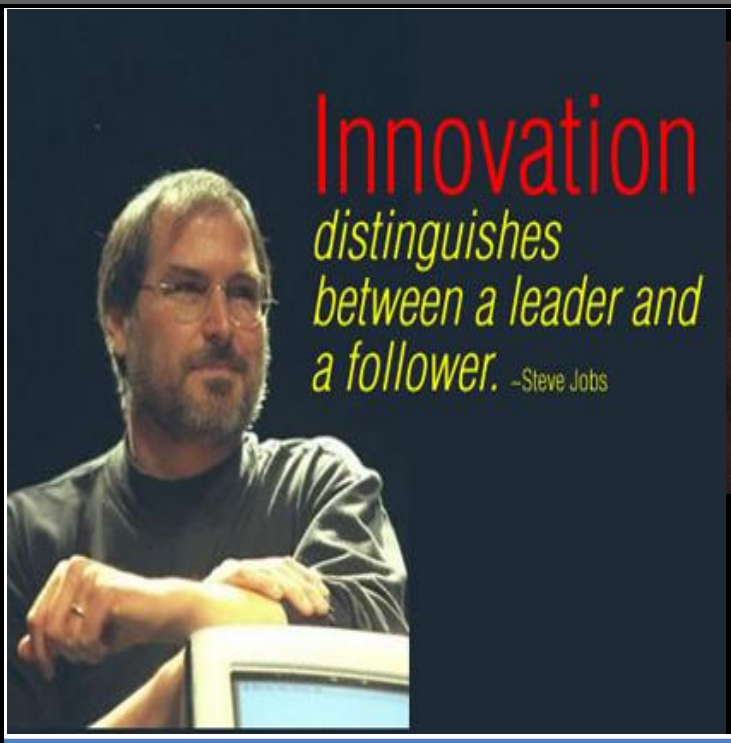

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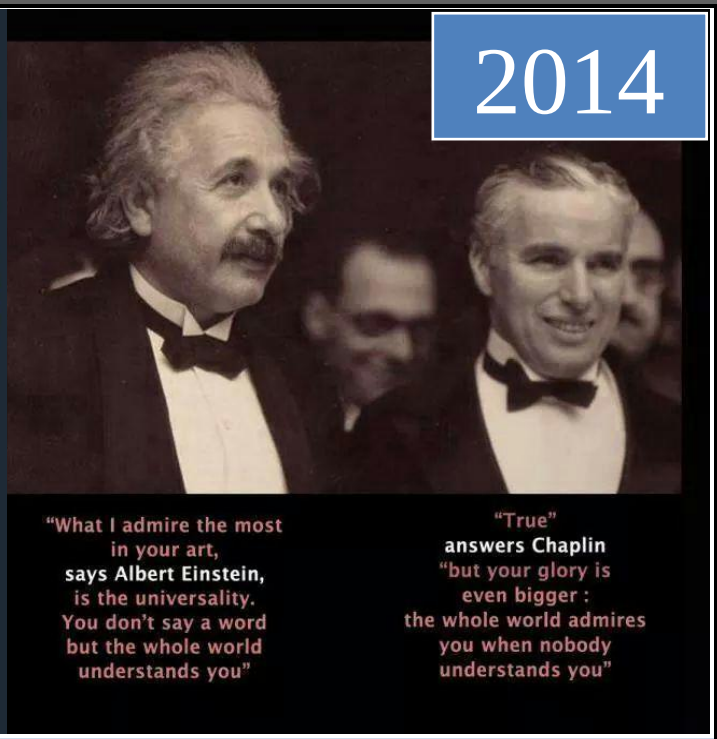
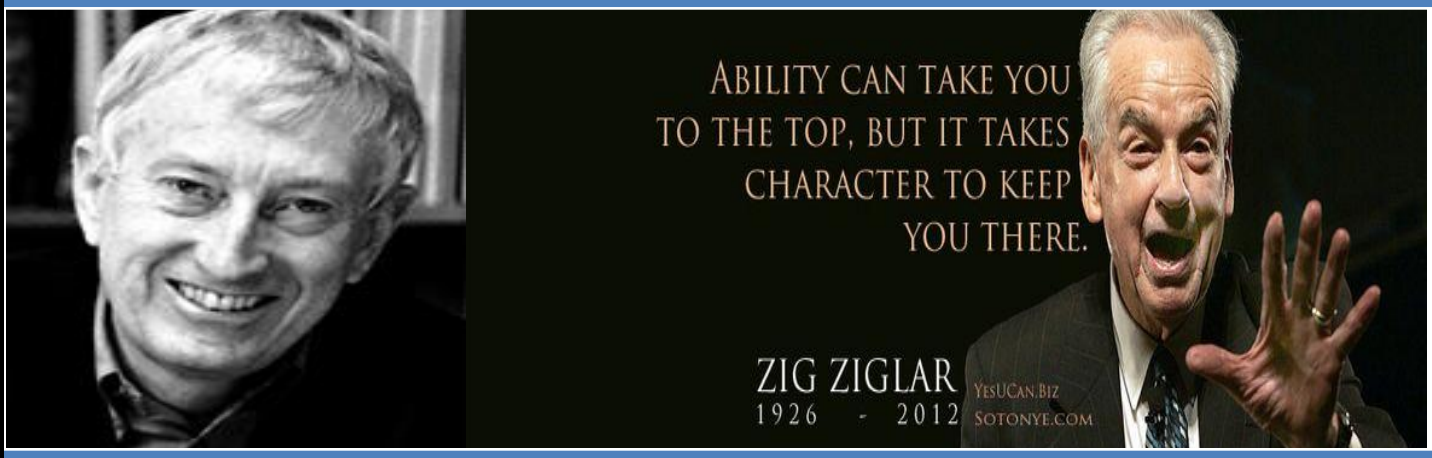


QUESTION BANK



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Don't Struggle with
Past Change the Future

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- Volume of semen in boar - **250 ml**
- Drug of choice for theileriosis – **Buparvaquone**
- Most effective drug for cestodiasis – **Praziquntal**
- Lambert suture not applied in which of the following organ a) rumen b) uterus c) stomach d**) esophagus(answer**)
- Anti nutritional factor present in cotton seed – **Gossypol**
- Drug which prevent platelet aggregation – **Aspirin**
- Range of rumen ph – **5-7**
- Number of lumbar vertebrae in dog – **7**
- Longest muscle in the body – **Longissmus dorsi**
- Organism which causes aflatoxicosis **-Penicillium leberi** (aspergillus flavus not found in the answer choices)
- Organism causing brooder pneumonia - **Aspergillus fumigatus**
- Gnrh secreted from – **Hypothalamus**
- Hormone that is released in high amount in 2 nd stage of labour – **Oxytocin**
- Dilated pupil and fish eye appearance seen in which stage of anesthesia – **Stage iv**
- Heart of bovine is attached to – **Pericardio sternal ligament**
- Largest antibody type **- Ig M**
- Antibody which is lining in the mucosal surface – **Ig A**
- Viral genome contain a) RNA b) DNA c) **Either RNA or DNA (answer)**
- Virus which contain reverse trascriptase enzyme – **Retroviridae**
- For closing of uterine incision sutures should be started from a) cervical end **b) ovarian end (answer)**
- Catgut obtained from sub-mucosa of – **Sheep**
- Horse is which type of animal – **Seasonally polyestrous**
- Purkinje cells present a) myocardium b)cerebrum c) **cerebellum (answer)**
- Drug inhibiting cell wall synthesis – **Penicillin**
- Organism devoid of cell wall – **Mycoplasma**
- Microscopic lesion in bse - **Vacuolation of neurons**
- Cyclozoonosis related to – **Ecchinococcosis**
- Long acting local anesthetic – **Bupivaquone**

- Which dose is related to highly toxic drugs **– 1-50 mg / kg body weight**
- Accepted fluoride content in water – **1mg / lit water**
- Vector for leishmaniasis **– Phlebotomus**
- Stomach fluke of bovine **– Paramphistomiasis**
- Pipe stem liver is caused by **- Fasciola hepatica**
- Organism not having filaments – **Mycobacterium**
- Irritable non ionic drug should be administered in which route – **Intravenous**
- Example of brachiocephalic breed – **Pug**
- Acute gangrenos myositis associated with – **Black quarter**
- Organism causing interstitial nephritis – **Leptospira**
- Most abundant leukocytes type in bovines **– Lymphocyte**
- Blood cells containing granules toxic to parasite – **Eosinophils**
- Nucleated thrombocytes seen in – **Fowl**
- Camel is which type of animal **– Induced ovulator**
- Diffused pus in the connective tissue is known – **Phlegmon**
- Bilateral tubular inpatency causes a) anestrous **b) Repeat breeding(answer)** c) early embryonic mortality
- Reference test for rabies – **FAT**
- Rabies is which type of virus – **Neurotrophic**
- Gasping observed in which disease – **Infectous laryngeo tracheitis**
- Immuno deficiency in IBD is due to destruction of **- B-Lymphocytes**
- T-cell maturation occurs in – **Thymus**

- Infective stage of schistosoma – **Cercaria**
- Cuboni test for pregnancy diagnosis done in which animal – **Mare**
- Duration of spermatogenesis in buffalo – **64 days**
- Drainage of middle ear provided through – **Zepps operation**
- Feline distemper is known as – **Feline panleukopenia**
- Ketone bodies in the urine is due to – **Hypoglycemia**
- Smallest virus – **FMD virus**
- Which one of the following is a live vaccine –**Brucella s-19 vaccine**
- Breech presentation is also known as – **Posterior longitudinal**
- Diagnosis of camphylobactor is done by – **Vaginal mucous agglutination test**
- Dolphins and whales breath through a) gills **b) Lungs(answer)** c)spiracles
- Agar contains - a) protein b) lipid c) **Carbohydrates** d) all the above
- Raw egg feeding in dogs causes deficiency of **– Biotin**
- Paralysis of hind quarters is known as – **Paraplegia**
- Garlic odour of food content is seen in **-Phosphorus poisonining**
- Antidote for lead poisoning – **Ca-Na EDTA**
- Bronze coloured liver is seen in **a)Fowl typhoid** b) pullorum disease c)fowl cholera
- Ulcers in abomasum is seen in –**Theileriosis**
- Caecal coccidiosis is caused by – **Eimeria tenella**
- Sugar needed for multiplication of brucella – **Erythrital**
- Brucella ovis in sheep causes – a) orchitis b) prosthitis c)**Epididymitis**
- Ovulation occurs after end of estrous in which species of animal – **bovine**
- Largest deer species in india a) sambar b) spotted deer c) **Barasinga**
- Route of infection in anchylostoma species – **Skin penetration**
- Vagus nerve is a a)sensory b)motor **c) mixed**
- Pearls is seen in a) **Squamous cell carcinoma** b) basal cell carcinoma
- Ingestion of lantana plant associated with **– Photosensitivity**
- Motility of bacteria is due to a) plasmid b) pili c**) Fimbriae**
- Which one of the following is an extracellular organism a) babesia b)anaplasma **c) Trypanasoma**
- Diabetes insipidus is due to deficiency of – **Antidiuretic hormone**
- Recent out break in avian influenza is due to – **H5N1**
- Thawing temperature of semen- **37C for 30 sec**
- Hjarres disease is caused by – **E coli**
- Chemical used for control of snail population – **Copper sulphate**
- Agent for blister **- Bin iodine of mercury**
- Dry matter feeding of cattle a**) 3% of body weight** b) 3% of metabolic body weight
- In right side torsion animal should be casted on **a) right side** b) left side
- Nerve block done for examination of penis and prepuce **– Pudental block**
- Destruction of free radicals associated with which vitamin – **Vitamin-E**
- Example for angiotensin converting enzyme inhibitor – **Captopril**
- For horn surgery in goat nerve to be blocked a) cornual nerve b) infratrochlear nerve c**) cornual nerve &infratrochlear nerve**
- For preventing radiation hazard wear a apron made of **– Lead**
- Spermatid is basically – **Haploid**
- Epsilon toxin is associated with – **Enterotoxaemia**
- Which ligament should be cut in CLP – **Median patellar ligament**
- Navicular bone is the name of – **Distal sesamoid bone**
- Vitamin administered in dicoumarol poisoning – **Vitamin-K**
- 'Bioterrorism' associated with which disease – **Anthrax**
- Visceral larva migrants is caused by – **Toxocara canis**
- Organism present in pulmonary artery – **Dirofilaria immitis**
- Programmed cell death is known as **– Apoptosis**
- Gestation period of horse **– 11months 11days**

- Organ to be examined in post mortem examination of trichinella spiralis a) lung b) liver c) intestine d**) Diaphragm**
- Glial cells present in **- Brain**
- Calcitonin secreted from **- a) Thyroid gland** b) parathyroid gland
- Which one is not related to mycoplasma – a)CCPP b) CBPP c) CRD **d) BSE**
- Liver develops from – a) ectoderm b**) Endoderm** c) mesoderm
- Which one of the following is called as endogenous antigen **a) MHC I** b) MHC II c) MHC III
- Inflammation of hoof is known as – a) bursitis b) synovitis c) **laminitis**
- Lung is distinctly lobulated in a**) cattle** b)fowl

CLINICAL MEDICINE

1. Methods of physical examination in cattle
   a. **Inspection-** observing through eyes.
   b. **Palpation** - feeling through hands.
   c. **Percussion** - tapping through fingers.
   d. **Auscultation** - listening through stethoscope.
2. The **phonendoscope** is used for auscultation purpose in case of ruminants.
3. **Sites of recording pulse rate**.
   a. **Cow &Buffalo** - Coccygeal artery, Maxillary artery, facial artery.
   b. **Calf**- femoral artery.
   c. **Dog & cat** - femoral artery.
   d. **Sheep & goat** - femoral artery.
   e. **Horse, donkey& mule** - External maxillary artery, median artery, facial artery.
4. **Types of respiration**
   a. **Costal (**Thoracic) - dog and cat.
   b. **Abdominal** - cattle, buffalo, sheep and goat.
   c. **Costo-abdominal** - Horse, mule, donkey and Ass.
5. **Normal parameters**

Species	Respiratory rate	Normal temperature	Pulse rate
Cattle	10-30/minute	38.5ºC(101.5ºF)	60-80/minute
Horse	8-10/minute	38.0ºC(100.5ºF)	
Sheep	10-20/minute	39.0ºC(102.0ºF)	70-90/minute
Goat	25-35/minute	39.5ºC(103.0ºF)	70-90/minute
Pig	10-20/minute	39.0ºC(102.0ºF)	
Dog	14-30/minute	Large-37.5-38ºC (99.5-101.5ºF)	Large-70-90/minute
		Small-38.5-39.5ºC (101.5-102.5ºF)	Small-90-120/minute

6. Normal rumen fluid pH - **6.2-7.2.**

7. Rumen fluid pH in acid indigestion - **4-5.**
8. Rumen fluid pH in protein putrefaction/alkaline indigestion-**8-10**.
9. Pulse is characterized by **rate, rhythm and quality or volume**.
10. **Site of blood collection**
    a. **Cattle, Buffalo, sheep & goat** - Jugular vein, ear vein.
    b. **Horse** - Jugular vein
    c. **Dog** - Recurrent tarsal vein, cephalic vein.
    d. **Pig** - Ear vein, anterior vena cava.
11. **Site of CSF collection**:
    a. **Cattle & Buffalo**- lumbo sacral or 1^{st}, 2^{nd} coccygeal region
    b. **Horse** - Sub occipital or lumbo sacral region.
    c. **Dog** - cisternal puncture.
    d. **Sheep & goat** - suboccipital or lumbo-sacral region.
12. Normal pulse and respiration ratio - **4:1**
13. Bloat - **Drum like sound**(on percussion)
14. Left abomasal displacement - simultaneous auscultation and percussion over an area between the upper third of the 9^{th} and 12^{th} ribs of abomasal wall - sounds heard are; **Ping sound/metallic sound/ penny dropping sound/ tinkling sound/ splashing sound/ pebble in well sound.**
15. **William's auscultation** is the simultaneous auscultation of reticulum and palpation of rumen in Traumatic reticulo peritonitis.
16. Recording and Measurement of heart sounds is done by **Phonocardiography.**
17. CSF pressure is measured by **Manometer.**
18. The **2^{nd} to 5^{th} intercostals** space is the site for the auscultation of heart.
19. **Somnolence** is the state when animal is depressed to the point that it is unable to hold its head.
20. Dorsal bending of spinal column is known as **Kyphosis.**
21. Ventral bending of spinal column is known as **Lardosis.**
22. Lateral bending of spinal column is known as **Scoliosis.**
23. A cow sits on the sternum and rests on the flank in **Milk fever**.
24. In **downer cow syndrome**, a cow has no defect in eating, defecation or urination but will be unable to stand and remains in sternal recumbancy.
25. **Amaurosis** is total blindness.
26. **Amylopia** is partial blindness.
27. Abducted elbow with extension of head and neck in a cow with brisket edema and jugular pulsation is seen in **traumatic pericarditis.**
28. A male dog urinating like a bitch in **cystitis** and **urolithiosis.**
29. A horse adopting a dog sitting posture with kicking at the belly is seen in **acute gastric dilatation.**
30. Goose stepping gait in pigs is due to the deficiency of **pantothenic acid.**
31. High stepping gait with rigidity of limbs is seen in **tetany.**
32. Knuckling of fetlock is seen in **neuritis and nerve paralysis**.
33. A pulse which is brief, small and hard in nature is called the **wiry pulse.**
34. When the pulse wave is small,weak and prolonged it is termed as **thready pulse.**
35. The respiratory centre is located in the **medulla oblongata**.
36. **Euphoea** is the normal quiet breathing with usual respiratory rate in an animal.
37. **Hyperpnoea** is the increased rate of respiration with an increased or decreased depth of respiration.
38. **Polypnoea** is the increased rate of respiration with reduction in depth.
39. **Oligopnoea** is the decreased rate of respiration.
40. **Apnnoea** is the complete cessation of breathing.
41. **Cheyne-strokes respiration** is the gradual decrease in the depth of respiration in a renal and cardiac disease.
42. **Biot's respiration** is characterised by altering periods of **Hyperpnoea** and **apnea** (in meningitis).
43. **Kussmaul's respiration** or air hunger is the respiration which is forceful and regular but expiration is unaffected (in uremia, diabetic ketoacidosis).
44. Chronic pulmonary obstructive disease/**heaves** in horse is characterized by double expiration.
45. Septic shock occurs predominantly due to **Gram positive** organism.

46. Depraved or perverted appetite is known as **pica/ allotriophagia**.
47. **Coprophagia** is the eating of its own or other animal's faeces.
48. **Pilophagia** is the licking of hair and body coat.
49. Normal rumen motility is **7-12/5 minutes**.
50. The interval between two rumen motility **should not be more than 2 minutes**.
51. **Rumen hypermotility** is seen in conditions like bloat, acidosis, simple indigestion, TRP.
52. **Grunting** can be heard on auscultation of **traumatic reticulo- peritonitis.**
53. **Pole or Bamboo test** is the raising of Animal forcefully by placing the pole on the xiphoid cartilage of sternum in lower third of the chest. It will make the animal to grunt. Used in **TRP.**
54. In dogs the liver enzyme **SGPT** is measured.
55. In large animals the liver enyzme **SGOT** is measured.
56. Diaphragmatic hernia is common in **Buffaloes.**
57. Liptak test is used for the diagnosis of **LDA.**
58. Abomasal pH is **2-4.**
59. ECG means **atrial depolarization and ventricular repolarization.**
60. In ECG, **prolongation of P wave** indicates left atrial enlargement.
61. In ECG, **increased P wave** amplitude indicates right atrial enlargement.
62. In ECG, **tall R wave** and prolongation of QRS complex indicates left ventricular enlargement.
63. In ECG, **deepening of S wave** indicates Right ventricular enlargement.
64. In ECG, **peaked T wave** indicates hyperkalemia.
65. The **predominant bacteria in rumen** fluid are gram negative. In case of **acidosis** it is gram positive.
66. **Acid indigestion** due to ingestion of large amounts of highly fermentable carbohydrates.
67. Diagnostic tests used for simple indigestion are **sediment activity test and cellulose digestion test**.
68. **Acute pancreatitis** in dogs leads to a praying stance.
69. **TRP** is characterised by leucocytosis with neutrophilia -**left shift**.
70. **Vagus indigestion** has **papple shaped abdomen** that is pear shaped in the right side and apple shaped in right side.
71. Normal blood calcium level is **9-11mg/dl** in a cows
72. Time of occurrence of milk fever is **within 48 hours**.
73. The rectal temperature in case of milk fever is **36-38ºC**.
74. **CPK and ALT** liver enzyme levels are increased in downer cow syndrome.
75. **Ketosis** in cows mainly due to **negative energy balance**.
76. **Pregnancy toxaemia** in sheep is **ketosis** and in cattle is called **fatty liver syndrome**.
77. Lactation tetany in horse is due to **hypocalcemia**.
78. Lactation tetany in cattle is due to **hypomagnesemia**.
79. **Eclampsia** in bitches is due to hypocalcemia and hypoglycaemia.
80. Nervous signs of ketosis due to production of **isopropyl alcohol** which is a breakdown product of acetoacetic acid in the rumen.
81. Blood glucose level in case of ketosis is **20-40mg/dl**.
82. The normal blood ketone body level is **50mg/dl.**
83. Diagnostic choice for fatty liver syndrome is **liver biopsy**.
84. Time of occurrence of bovine ketosis is **60 days after parturition**.
85. Time of occurrence of post parturient haemoglobinuria is **2-4 weeks after parturition.**
86. Low milk fat syndrome due to a decreased formation of acetate in rumen is due to **low fibre diets.**
87. Milk is a poor source of **copper and iron**. It is a rich source of calcium and phosphorus.
88. **Sulkowich test** is used for the estimation of calcium in the urine during hypocalcemia.
89. **Xylidill test** used for estimation of magnesium in urine in hypomagnesemia.
90. Occurrence of post parturient haemoglobinuria is due to feeding of **cruciferous plants**.
91. **Myoglobinuria** and muscle degeneration are the pathological changes seen in the case of **azoturia** in horses.
92. The normal ratio of Calcium and Magnesium in blood is **6:1.**
93. Prepartum diet containing high amount of sulphur and chloride**(anions) reduces** the chances of milk fever.

94. The prepartum diet contains high amount of sodium and potassium (**cations) which increases** the chance of milk fever.
95. **Eclampsia in bitches** is characterised by clinical signs like opisthotonus arch, tonoclonic conulsion, high rise in temperature (108ºC).
96. **Phosphorus deficiency** may reduce glucose utilization leading to reduced production of ATP which is essential to maintain the integrity of RBC.
97. **Phosphorus deficiency** may cause reduction of red cell glycolysis and decrease in ATP synthesis.
98. Normal level of phosphorus is **4-7mg/dl**. In case of deficiency it decreases to 0.5 to 3 mg/dl.
99. In horse **azoturia t**he serum **creatinine phospho kinase(CPK)** level is highest in skeletal and cardiac muscle degeneration. The AST level is also increased.
100. Normal serum magnesium level is **1.7 to 3 mg/dl**. In hypomagnesaemia it reduces to 0.5mg/dl.
101. Fatty liver syndrome is treated by administering **choline chloride** (which facilitates the transportation of fatty acids from liver to fat deposits) and vitamin B12.
102. **Baby pig disease** due to **hypoglycaemia.**
103. **Thiamine hydrochloride** helps in lactate metabolism and is given for acid indigestion.
104. TRP is also called as **hardware disease**.
105. Vagus indigestion is also called as **Hoflund syndrome**.
106. In vagus indigestion **constipation** is an important clinical sign.
107. In vagus indigestion failure of two sites is seen;
    a. Omasal transport failure
    b. Pyloric outflow failure-causes hypochloric metabolic alkalosis
108. Bradycardia can be considered as a diagnostic factor for vagal indigestion.(**ATROPINE test:** given 30 mg of atropine sulphate s/c and heart beat is monitored for every 2 to 5 minutes)
109. **LDA** is common in high yielding dairy cows rather than RDA.
110. **Ping sound** (high-pitched) is heard in case ofLDA,RDA, cecal dilatation and tortion, intestinal tympany associated with acute obstruction or paralytic ileus, pneumoperitonium, tortion of the coile colon.
111. **Pung**(low pitched ping) is heard in gas filled rumen.
112. The **etiology for secondary bloat** is oesophageal obstruction,vagus indigestion, diaphragmatic hernia, tetanus, TRP, tumors, hypocalcemia, hydatid cyst, worm infestation(amphistomosis)
113. Treatment of choice for acid indigestion is **5% sodium Bicarbonate.**
114. Treatment of choice for milk fever is **25% calcium borogluconate.**
115. Treatment of choice for eclampsia in bitches is **10% calcium borogluconate.**
116. Treatment for ovine ketosis is **5% dextrose**
117. Treatment of choice in bovine ketosis is **50% dextrose** (replacement therapy). As hormonal therapy it is **dexamethasone.**
118. Treatment of hypomagnesaemia is with **25% calcium borogluconate and 5% magnesium hypophosphate.**
119. Milk fever is common in **Jersey cows**.
120. Ketosis is common in **Guernsy cows**.
121. Downer cow syndrome is common in **Holstein Friesian.**

2.NUTRITION

PROXIMATE COMPOSITION OF FEEDS (Weende analysis)	
Moisture	Drying at 100-105^{o}C
Total Protein	Estimated indirectly by estimation of N_2 and Multiplying by 6.25 (i.e.100 units of protein contains 16 units of Nitrogen) **Protein= $N_2 * 6.25$**
Ether extract (fat)	Extraction with petroleum ether in **soxhlet** apparatus
Crude fiber	Done with ether extracted sample. Boiling with weak acid (HCl) & weak alkali (NaOH). Residue left represents CF.
Ash	Ignite at 500^{o}C to 600^{o}C in muffle furnace.
NFE (Nitrogen Free Extract)	100 - Sum of other fractions. (Not estimated by analysis) calculated by difference
• ***None of the proximate principles is a chemical compound***	

Order of priority for nutrients

Water, Energy, protein, Minerals, Vitamins (***Water is also a nutrient***.)

ANTI NUTRITIONAL FACTORS

Anti nutritional factor	**Source**	**Remarks**	**Methods of removal**
Substances decreasing metabolic utilization of protein			
Protease inhibitors Trypsin inhibitors (Kunitz inhibitors &Bowman Brick inhibitors)	Seeds of legumes Soya bean		Heat treatment

Lectins or Ricin(**haemagglutinins**)	Castor bean		Heat treatment
Saponin	Lucerne Soyabean	Bloat in ruminants Poultry- depression of growth	
Poly phenolic compounds Tannins	Sal seed meal Sorghum		Physical–soaking & working Chemical – Poly ethylene glycol (PEG),Polyvinyl pyroldone (PVP) Alkali (NaOH)Formaldehyde, Methanol
Substances interfering with mineral utilization			
Phytic acid	Soya bean, Cotton seed meal	Forms Zn-phytate complex. Ruminants can hydrolyse using phytase enzyme	
Oxalic acid	Beet Spinach	Forming insoluble calcium oxalate complex.Causes hypocalcaemia	
Glucosinolates	**Brassica sp –** cabbage , turnips mustard seed	Depress Synthesis of thyroid hormone. Ruminants appear to be less susceptible. Toxic to pigs & poultry	Cooking
Gossypol	Cotton seed	Forms complex with Iron. Pigs & rabbits more susceptible.	Toxic effect can be overcome by supplementing ferrous sulphate

		Horses& Ruminants more resistant.	
Anti vitamins			
Anti vitamin A (Lipoxygenase)	Raw soya beans	Lowering of vit A carotene in Blood plasma	Heating in steam
Anti vitamin D	Isolated soya protein		Autoclaving
Anti vitamin E	Raw kidney bean	Muscular dystrophy	Autoclaving
Anti vitamin K (Dicoumarol)	Sweet clover	Sweet clover disease	
Anti Pyridoxine (Linatine)	Linseed meal		Autoclaving
Anti Biotin	Raw egg white	Avidin binds with biotin.	Heating

Cyanogens - Cyanogenics glycosides.

- Converted to prussic acid or hydrocyanic acid.
- Produce anoxia of the central nervous system.
- Ruminants are more susceptible especially cattle.
- Immature sorghum green fodder/ tapioca leaves feeding should be avoided.
- **Rx**- Cattle 3g sodium nitrate & 15g sodium thiosulaphate in 200ml H_2O
  Sheep 1g sodium nitrate & 2.5g sodium thiosulaphate in 50ml H_2O

  (Injected intravenously)

Fodder

- The ensiling process requires **2-3 weeks** for converting forage into silage.
- Chief acid of silage is **Lactic acid**
- **Flieg index** is a commonly used method for evaluation of Silage quality
- **Zero grazing or soiling** is a method in which herbage is cut each day and brought to animals in containment.
- The central fodder seed production farm is located at **Hesserghata**
- Oat and Berseem are **rabi crops**
- Sorghum maize and soya bean are **kharif crops**
- **Molasses Brix** is a term used to refer the amount of sugar content in molasses
- Molasses can be used upto**10-15% in ruminant ration** and **25% in poulty feed.**
- Dry matter consumption in cattle's about **2-2.5** kg for every 100 by of live weight.
- Domesticated ruminant with high dry matter consumption is **goat (5-7%).**

- Moisture content of Haylage is **40-45%**
- Moisture percentage of hay should **not exceed 15%**
- Hay prepared from mixed crops of legumes and non-legumes is known as **mixed hay.**
- The **best time for cutting a crop for hay** making is when it is ***one third to a half in blossom.***
- The loss of nutrients in hay making occurs through **bleaching, leaching and shattering**.
- Which feed supplies both by pass protein and by pass fat? **cotton seed meal**.
- Feeding schedule of animal should be based on **body weight**
- **Feed additive** is a non – nutritive product that affect the feed utilization or performance of animal
- **Oyster shell and lime stones** are used as grit in poultry feeds.
- Antibiotics as feed additives is recommended only in **pigs & poultry**
- **Kernel** is a dehulled seed.
- A uniform mixture of one or more micro ingredients and a carrier used in the introduction of micro ingredients into a larger mixture is known as **pre-mix**
- Alkaloid in legume which predispose bloat is **Saponin**
- In a digestibility trial, the causal faecal collection period for ruminants is about **10 days**
- The dry matter of plant origin according to Van-Soest method consists of **cell wall contents and cell contents**

Rumen

- The **urease activity** of rumen bacteria converts urea to ammonia in rumen.
- The unsaturated fatty acids under go **Biohydrogentaion** reaction inside the rumen.
- The temperature of rumen varies from **38-42 ^{o}C** with an average of 39^{o}C
- The main gases inside reticulo-rumen CO_2, CH_4 and N_2 occurs in **65%, 25% and 7% respectively**.
- Ruminal gas production **30 lit /hr** after feeding of animals
- Ruminal gases **CO_2, CH_4, H_2, N_2.**
- **4.5 gms** of CH_4 Produced from **100 gms** of carbohydrates
- Most of the rumen protozoa are **ciliated**
- Ruminal fermentation by **anaerobic bacteria and protozoa's**
- Starch provides **carbon skeleton** for better utilization urea
- Methane production require **8% of gross energy** intake
- **Average number of micro-organisms in rumen liquor/ ml**
  - Total bacterial count - 1×10^{10}
  - Protozoa - 1×10^{6}
  - Oscilospira - 1×10^{4}
  - Yeast - 1×10^{3}
- Buytric acid converted to **ketone bodies** by the the ruminal epithelium.
- Urea toxicity results when the rumen ammonia level exceeds **80 mg/100ml**.
- Under normal conditions the calf rumen becomes functional in about **six to eight** weeks
- E.coli produces **panthothenic acid**

Water

- The bulk of the water in extracellular and intracellular fluids which acts as solvent for inorganic and organic compounds is known as **free water**.
- The water available to the animal body by biochemical reaction is known as **metabolic water.**
- Water bound with proteins in colloidal system or water present inside cells as hydrated ions is **bound water**.
- Approximately loss of **more than 10%** of water may result in death
- Water content in the boby of new born calf is about **80%**

Energy

- Which nutrient is considered first while formulating ration? **Energy**
- **1 kg of TDN is equivalent to 4400 Kcal of DE and 3520 Kcal of ME**
- **Bomb calorimeter is used to estimate Gross energy of feed.**
- Reference standard in a Bomb calorimeter is **Benzoic acid**
- **Digestible energy** is represented by portion of feed energy consumed which is not excreted in faeces.
- **Net energy** is the ideal method of expressing the nutritive energy of feed.
- Any surplus in the concentration of ATP favours formation of **phosphocreatine**, a major storage form in all domestic animals
- The calorific value of glucose is **673 kcal**
- In glycogenesis 2 ATP are used in incorporation of glucose into glycogen
- Muscle glylogen serve as **ATP or fuel reserve** where as liver serve as **glucose reserve.**
- Calorific value of fat is **9.3 kcal/ gram**
- The net gain of ATP from oxidation of mole of a palmitic acid is **130**
- In glycogen molecule straight chain bonding is of **alpha 1, 6 glucosidic bond** and branching takes place at **alpha 1,6 glucosidic bond**.
- Gluconeogenesis is almost reverse of **glycolsis**
- Gluconeogenesis differs form glycolysis by **four** enzymes.
- Glucose is also known as **Grape Sugar or Dextrose.**
- **D-Glucose** is the sugar of the body.
- Only naturally occurring ketohexose is **fructose**
- Sweetest of all sugar is **fructose.**
- Cow milk contains about **4.5% lactose** (milk sugar)
- In terms of structure glycogen is similar to **amylopectin**
- Break down of glycogen is catalyzed by **phosphorylase enzyme**
- Complete hydrolysis of cellulose yields only **D-glucose** while partial hydrolysis yields **cellobiose.**
- In horse VFA is are absorbed through **Caecum & colon**
- Carbohydrate provides **more than 50%** of the energy value of the diet.
- **Ketosis and acidosis** are the result of imbalances between input and output of energy in ruminant animals.
- Ketosis is said to be developed if the ketone concentration of blood **50mg/100ml** or more
- The branching enzyme of glycogen synthesis is **Glulosyl 4,6 transferase** and the de branching enzyme is **Glucosidase**
- VFA having maximum absorption rate is **Butyrate**
- Starch digestibility in rumen ranges from **63-70%.**
- Chief cellulose degrading bacteria of rumen is **Fibrobacter succinogens**
- Only VFA present in appreciable quantity in peripheral blood as an important energy source is **Acetate**
- The products of CHO fermentation in ruminants supply energy and carbon skeleton for the synthesis of **amino acid for microbial protein synthesis**

Protein

- Rice bran must have **14% CP** and less than **14% crude fiber**
- Microbial yield of protein ranges from **90g- 230g** for kg of organic matter digested.
- Iodinated casein has the same physiological effect as **thyroxine**.
- $\frac{\text{DTP + CP}}{2} = \text{protein equivalent}$
- The conversion factor for converting milk's nitrogen to CP is **6.38** instead of 6.25
- **Stutzer's reagent** is used for the determination of true protein.
- The net protein utilisation of bacterial protein is about **0.59**

- Biological value of microbial protein is about **80**
- The great demand of undegradable protein is in the diet of **high yielders and young ruminants** (rumen not developed.)
- **Methionine hydroxyl Analogue (MHA)** is an amino acid analogue used in by pass protein principle.
- Absorption of amino acid occurs mostly in **proximal jejunum** of SI.
- The amino acids which give rise to **Acetyl Co-A** and consequently the potential fatty acid producers are called as **ketogenic aa** .
- **Leucine** is the only true ketogenic amino acid.
- More than 80% of the urinay nitrogen is excreted in the form of **urea**
- The approx metabolic faecal nitrogen in ruminants is **5 gram**
- **Uric acid** is a catabolite of purine.
- For the conversion of uric acid to allantoin **uricase** enzyme is required.
- Chief end product of purine metabolism in ruminants is **Allantoin**
- The minimum nitrogen excretion from a animal on a protein free diet through faeces and urine is known as **MFN** and **EUN** respectively.
- The excess body amino acids are disposed by **transamination** & **oxidative deamination** process.
- Citrulline is an amino acid produced in the **urea** cycle
- Protein does not store as a reserve like **fat, CH_2O**
- Sequence of protein depletion **Liver>kidney>heart>skeletal muscles**

Fat

- The referral temp at which lipid (fat) is a solid & lipid (oil) is a liquid is **25^oC**
- The diff in melting point of lipid reflects the **degree of unsaturation** of fatty acid constituents.
- In the body linoleic acid is converted to **Arachidonic acid**.
- Phosphatidyl choline is commonly known as **lecithin**
- Phosphatidyl ethanolamine is commonly known as **cephalin**.
- The simplest glycolipid is **cerebroside** and the complex one is **ganglioside**
- **Low density lipoproteins** are the chief carries of cholesterol.
- HMP shunt or pentose phosphate pathway is an important way to produce **NADPH** for fat synthesis.
- Dietary fatty acids apperars in the lymph as **chylomicrons** .
- In ruminants glucose cannot be converted in to fat as it lacks **ATP citrate lyase** and **NADP malate dehydrogenase**
- Fatty acid synthase complex contains **seven number** of enzymes.
- Mitrochondrial elongation of fatty acid starts usually with **palmitic acid**
- The catabolism of fatty acids to Co_2 & H_20 occurs by sequential combination of **beta- oxidation cycle and TCA cycle**
- **Fatty liver syndrome** due to feeding of cereal grains – deficiency of **BIOTIN**
- Nervous form ketosis is caused by **Isoproponol**
- Biosynthesis of fatty acids **pigs – adipose tissue Birds- liver, cattle, sheep – liver and adipose tissue**

Minerals

- Enzootic neonatal ataxia is caused due to the deficiency of **copper** in young animals.
- The animal feed mostly contains iron as **ferric (Fe^{+++})** which is converted to **ferrous** by the acid medium of stomach.
- Deficiency of iron causes **Microcytic hypochromic anaemia in pigs and chicks**, but in calves it causes **microcytic normochromic** anaemia.
- **Enzootic marasmus** is a deficiency disease of cobalt.
- Phosphorus content of bran is **1.2-1.5%**
- Transport form of copper **Ceruloplasmin** with α2 globulin in blood and plasma

Vitamins

- **Vitamin D_3** is cholecalciferol

Rhodopsin is also known as visual purple.

- If no green is fed to ruminants the concentrate mixture should have Vitamin A at the rate of **5000 IU/Kg**
- Fatal syncope in calves and pigs is due to deficiency of **Vitamin E**

Others

- Growth rate of male and female calves is similar up to **age of 3 months**
- In Camels, Llamas, Alpacas and Vicunas which are also ruminants but **omasum** is missing, so may be called as **pseudo ruminants**
- Maximum permitted level of aflatoxin in animal feeds (as per prevention of food adulteration act is about **30 ppb (0.03 ppm)**
- N: S ratio of wool is **5 :1**
- Richest source of Prostaglandins is seminal fluid of **sheep**
- Synthetic analogues of naturally occurring prostaglandins are called **prostanoids**.

TRUE/FALSE

- Animals yielding as high as 10 liters of milk can be maintained solely on green fodders **T**/F
- Most of the rumen bacteria are non-spore forming gram positive anaerobes T/**F**
- Considering energy yield to cell and anaerobic glycolysis is the more efficient mechanism. T/ **F**
- Glycolysis may proceed in the presence or absence of oxygen -**T** /F.
- Glucose and sucrose have same calorific value but glucose less sweetest than sucrose. **T**/F
- Insulin secretion in the ruminant is stimulated by a rise in VFA concentration -**T**/F
- If blood glucose falls milk yield tends to fall in parallel- **T**/F
- The digestibility of protozoa protein is lower than the bacterial protein T/**F**
- In denaturation hydrolysis of peptide bonds of proteins occur T/**F**
- While formulating a ration single protein source is always recommended- T/ **F**(Only combination of protein source is recommended.)
- Each amino acid has its own characteristic isoelectric P_H **T**/F
- Bile juice contains no enzymes **T**/F
- Chylomicrons do not enter the portal blood directly but enter body primarily through lymph system- **T**/F
- Chemical substances that increase bile secretion are called choleretics.-T/**F**
- Body doesn't excrete iron **T**/F
- Alkali disease is due to the deficiency of selenium T/**F**

Questions

- Rumen degradable protein content is highest for ?
    a. Soybean meal
    b. Coconut cake
    c. Groundnut cake
    d. Fish meal
- Which of the following is most important in inhibiting the digestibility of paddy straw ?
    a. Lignin
    b. Silica
    c. Hemicellulose
    d. Oxalate
- Concentration of Ammonia and Total VFA in rumen is highest for?
    a. Goat
    b. Buffalo

c. Sheep
d. Cattle

- Most promising initial symptomof Vitamin A deficiency in cows and horses?
  a. Copius lacrymation
  b. Copius salivation
  c. Xeropthalmiia
  d. Night blindness
- …….% NDF in total ration is critical for maintenance of normal milk fat
  a. 66%
  b. 18%
  c. 73%
  d. 36%
- Urea supplement is not recommended if CP content of ruminant diet is above ?
  a. 18%
  b. 25%
  c. 7%
  d. 13%

DAIRY SCIENCE

COMPOSITION OF MILK

	Water	Fat	SNF	Protein	Lactose	Ash
Cow	86.6%	4.6	9.25	3.4	4.9	0.7
Buffalo	84.2%	6.6	9.86	3.9	5.2	0.8
Goat	86.5%	4.5	7.75	3.5	4.7	0.8
Ewe	79.4%	**8.6**	11.39	**6.6**	4.3	1.0
Sow	89.6%	4.8	5.86	1.3	3.4	0.9
Human	87.7%	3.6	8.82	1.8	6.8	0.1
Ass	90.0%	1.3	8.44	1.7	6.5	0.5

- Milk – clean lacteal secretion with SNF not less that 8.5% and fat not less than 3.5% after 72 hours of calving or free from colostrum.
- Water act as carrier for other constituents

FAT:

- Fat is the **most variable factor**
- Size of fat globule become smaller and more in number as lactation in advance.
- Larger size of fat leads to quicker rise to cream and easy to churn
- **Small fat globules are best suited for cheese making** since less fat is lost in whey.
- Melting point of fat is $33 – 33.5^0C$
- Milk fat is rich in vitamin A and D

MILK PROTEIN:

- Casein, α-lactalbumin, β-lactoglobulin
- **Rich in lysine and valine**
- Casein constitutes 80% of total protein
- Casein exist as Ca-caseinate phosphate
- **α-lactalbumin is not coagulated by rennet** and acids but by heat
- lactoferritin and lysozyme have **bioprotective effect**

LACTOSE:

- Whey is the rich source of lactose
- Lactose is **least variable factor**
- Important factor for cheese, dahi, and buttermilk

MINERALS:

- Buffalo milk have more of Ca and less of inorganic P than cow milk
- **In mastitis milk chloride : lactose ration is high**

VITAMINS:

- Good source of thiamine & riboflavin
- Poor source of Vit C & D

PIGMENTS:

- Fat soluble - carotene & xanthophylls
- Water soluble - riboflavin

FLAVOUR:

- Growth of bacteria – fruity, malty ,acid
- Lipase – rancid
- Processed milk – cooked flavour due to **sulphydrl group**
- Oxidation – cardboard flavour
- Dried milk – tallowy
- Other products – metallic or paint

PHYSICAL PROPERTIES OF MILK:

- PH -6.5-6.7
- **Alkaline PH - Mastitis milk**
- Acidic PH - Added colostrums or bacterial deterioration
- Natural acidity is due to casein, acid phosphatase and citrate
- **Developed acidity is due to lactose**

SPECIFIC GRAVITY:

- Specific gravity of **Cow milk is 1.028-1.032**
- Specific gravity of **Buffalo milk is 1.030-1.034**
- **Determined by lactometer at 15.6^0C**
- More fat content leads to low SG and vice versa
- Addition of water decreases SG
- Addition of solids increases SG

FREEZING POINT:

- Cow milk = -0.512 to -0.572
- Buffalo milk = -0.521 to -0.575
- **Determined by Cryoscopy**

BOILING POINT:

- Boilingt point of milk - 100.17^{0}C to 101^{0}C

BACTERIA IN MILK:

- **Pscyrophillic**: 3 - 20 ^{0}C eg*: Pseudomonas fragi, P.flourescens*
  (Optimum is 7 ^{0}C)

- **Mesophillic**: 20 - 50 ^{0}C eg*: Streptococcus cremoris, S.lactis*
  (Optimum is 37 ^{0}C)

- **Thermophillic**: Above 50 ^{0}C eg*: Lactobacillus thermophillus, Bacillus calidolactis*

- **Lactose fermenters** – Homofermentative - *Strep.cremoris, S.lactis*
  Heterofermentative - *Lactobacillus sp, Leuconostoc sp,*

- **Proteolytic bacteria**: *B.subtilis, B.cremori, Pseudomonas putrifaciens*
- **Lipolytic**: *P.fragi, P.flouresence*

CHANGE IN COLOUR OF MILK:

- **Blue** – *Pseudomonas syncyanea (Bluish Gray), S.lactis (Dark Blue)*
- **Yellow** – *P synxanthia, Flavobacterium*
- **Red** - *Serratia macescans, Brevibacterium erythrogenes, Micrococcus rosenes*
- **Brown** - *P.putreafaciens, P.flourescens*

ADULTERATION:

- **Water up to 3% allowed**
- Presence of **neutralizers** is identified by **Rosalic acid test**
- In Rosalic acid test appearance of pink color - NaOH, KOH,CaOH
- In Rosalic acid test appearance of rose red color – sodium carbonate or sodium bi carbonate
- In Rosalic acid test appearance of brown color – Absence of any neutralizers
- Presence of **starch** is identified by **Iodine test**. Blue color indicates positive.
- **Gelatin** is identified by **Picric acid test**. Yellow precipitate is positive.
- **Cane sugar** is identified by **Resorcinol test**. Red color is positive
- **Glucose** is identified by **Barfoed test**. Red precipitate is positive.
- **Buffalo milk in cow's** mild is identified by **Hansa test.**
- **Skin milk powder** is identified by **Nitric acid test**. Orange color is positive. Yellow color is normal milk.
- **Vanaspathi** in milk is identified by **Baudoin test.** This is because vanaspathi contains sesame oil.
- **Delvotest kit** detects **Anti biotics and sulpha residues**.

PASTEURIZATION :

- Holding and continuous
- LTLT - 63 ^{0}C for 30 min
- HTST – 72 ^{0}C for 15 sec
- UHT – 135 to 150 ^{0}C for fraction of seconds / with no hold.
- **Glycol is used as coolant in HTST.**

THERMISATION:

- Heating below pasteurization temperature to temporally inhibit bacterial growth.
- 63 to 65 ^{0}C for 15 sec

ULTRA PASTEURIZATION :

- 115- 130 ^{0}C for 2 to 4 seconds and cooling below 4 ^{0}C.

- Extend milk to 15 to 30 days

HOMO GENISATION :

- Reducing fat globule size to 1 micron or less.
- Disintegration of fat globule is achieved by turbulence and cavitations
- Raw milk upon homogenisation before pasteurization results in rancidity due to activation of lipase activity.

CREAM:

Water	Fat	Protein	Lactose	Ash	Total solid	SNF
68.2%	25%	2.54%	3.71%	0.56%	31.8%	6.8%

- Not less than 25% fat.
- Pasteurization temperature for cream by LTLT is 71 ^{0}C for 20 mts
- Pasteurization temperature for cream by HTST is 95 -100 ^{0}C for 15–16 sec
- **Cream separator works by strokes law (centrifugal force).**
- If fat screw IN – More fat in cream
- If skim milk screw OUT – more fat in cream

Types of cream:

- Table Cream, Light Cream, Coffee Cream – **20 – 25 % milk fat**
- Whipping Cream, Heavy Cream – **30 – 40 % milk fat**
- Plastic Cream - **65 -80 % milk fat**

BUTTER :

Moisture	16.2%
Fat	80.2%
Curd	1.1%
Salt	2.5%

- Not less than 80% fat not more than 16% moisture and not more than 3 % salt
- Flavouring agent for butter is **Diacetyl.** It must not exceed 4 ppm.
- Cream for butter making should contain 30 – 40 % fat and pasteurized at 63^{0}C for 1 hour or 88 C for 10 mins
- Churning is done at 10 ^{0}C not exceeding 30 – 40 min, lose in butter milk should not exceed fat of 0.2 %
- Sweat cream butter have acidity with in limit of 0.2 % if it exceeds 0.2 % then it is sour cream butter.
- Neutralizers for butter is soda (sodium carbonate and sodium bicarbonate) and lime (CaOH, CaO)

GHEE:

- Clarified milk fat
- 99% or more of fat, moisture not more than 0.5%

- Potential source of energy - 9.3 cal/g
- Melting point 28 to 44 ^{0}C specific gravity is 0.93 to 0.94
- Antioxidants like ethyl gallate and hydroquinine is used

CHEESE:

	Water	Fat	Protein	Ash
Cheddar	36.8	33.8	23.7	5.6
Cottage	69.8	1.0	23.3	1.9

- By coagulating casein
- Hard cheese not more than 43% moisture not less than 42 % fat
- Freezing done at – 4.5 C for fresh cheese and -14.5 C for one year old cheese
- **Cottage cheese is prepared from pasteurized skim milk**
- **Mozzarella cheese is best suited for pizza making**

ICE CREAM:

	Fat	SNF	Sugar	Total solid
Economy	10-12	10-11	13-15	35-37
Good ice cream	12-14	8-9	13-16	37-39
Deluxe	16-20	5-9	13-17	40-41

- Not less than 10% fat
- Rapid freezing of pasteurized milk with agitation to in corporate air
- Emulsifiers not more than 0.5 %
- Over run in ice cream not exceeding 80 %
- **Phosphatase test negative**

MILK POWDER:

- Drying under low temperature
- Moisture less than 5 %
- Fat not less than 26%

	Whole milk powder	Skim milk powder
Moisture	3.5%	3.5%
Fat	27.5%	0.8%(not more than 1.5%)
Protein	26.4%	35.4%
Lactose	37.7%	52.3%
Ash	5.9%	8.0%

	Standardized milk	Toned milk	Double toned milk	Skin milk	Recombined milk
Fat	4.5	3.0	1.5	0.5	3.0
SNF	8.5	8.5	9.0	8.7	8.5

PASTEURIZATION TEMPERATURE

	Batch method	Continuous method
Milk	63 ^{0}C for 30 min	72 ^{0}C for 15 sec
Ice cream	68 ^{0}C for 30 min	80 ^{0}C for 25 sec
Cream	71 ^{0}C for 20 min	95 – 100 ^{0}C for 20 sec

IMPORTANT TEMPERATURES

PROCESS	TEMPERATURE
Crystallization of condensed milk	35-40^{0}C
Bactofugation	55-60^{0}C
Homogenization	60-65^{0}C
LTLT	63^{0}C(15 mts)
Thermization	68^{0}C(15 sec)
HTST	72^{0}C(15 sec)
Stassanization	74^{0}C (7 sec)
Clarification of ghee	110^{0}C
Pilot sterilization	117^{0}C(15 mts)
Ultra pasteurization	130^{0}C(2-4 sec)
UHT milk	135-150^{0}C
Freezing points	

Milk	-0.525 to -0.565^{0}C
Evaporated milk	-1.3^{0}C
Condensed milk	-14. 9^{0}C
Cheddar cheese	-4.5^{0}C
Meat	-1 to -1.5^{0}C

PFA STANDERDS

PRODUCT	MORE THAN(>)	LESS THAN(<)	STORAGE TEMP
Cream	25% Fat		5-10 ^{0}C
Butter	80% Fat	1.5% Curd 3% Salt	-23 to -28^{0}C
Ice cream	10% Fat	3.5% protein 36% Total solids 0.5% Stabilizers& Emulsifiers	-23 to -28^{0}C
Hard cheese	42% Fat	43% Moisture	Cold curing(0-4^{0}C) Warm curing(10-16^{0}C)
Whole milk powder	26% Fat	5% Moisture 1.2% Acidity	24^{0}C
Skim milk powder		5%Moisture 1.5%Fat 1.5%Acidity	24^{0}C
Unsweetened condensed milk(Evoporated milk)	8% Fat 26% Milk solids		5-16^{0}C
Sweetened condensed milk	9% Fat 31% Milk solids 40% Cane sugar		10^{0}C
Ghee	99% Fat	0.5% Moisture	21^{0}C

ANESTHESIOLOGY

1. The action of opiates can be reversed with

A. Butarphanol B. Naloxone C. Yohimbine D. Glycopyrrolate

2. Which of the following is Neuroleptanalgesic?

A. Ketamine & Xylazine B. Fentanyl & Morphine

C. Fentanyl & Droperidol D. Oxymorphone & Atropine

3. The following is ultra short acting barbiturates

A. Phenobarbitone B. Pentobarbital C. Methohexital D. Oxybarbiturate

4. The surgical plane of anesthesia is generally considered to be

A. Stage II B. Stage III Plane I

C. Stage III Plane II D. Stage III Plane III

5. The term ***Atelectasis*** refers to

A. Increased fluid in alveoli B. Hyperinflation of alveoli

C. Collapsing of alveoli D. A decrease in blood perfusion around alveoli

6. The barbiturate used as anticonvulsant is

A. Phenobarbitone B. Pentobarbital C. Methohexital D. Thiamylal

7. 'Second Gas effect' is seen in anesthesia using

A. Ether B. Nitrous Oxide C. Halothane D. Isoflurane

8. Which of the following can be delivered using the same precision Vaporizer?

A. Ether & Methylflurane B. Nitrous Oxide & Halothane

C. Halothane & Isoflurane D. Isoflurane & Seviflurane

9. The dose rate of atropine used as preanaesthetic is

A. 0.1-0.2 mg/kg B. 0.01-0.02 mg/kg C 0.2-0.4 mg/kg D. 0.02-0.04 mg/kg

10. The site for epidural anesthesia in horses is

A. Lumbo-Sacral B. Sacro-Coccygeal C. InterCoccygeal1-2 D. Thoraco-Lumbar

11. Local anesthetic agents works well when applied

i. Topically on epidermis ii. Topically on Cornea iii. Topically on Mucous Membrane

iv. By injection.

A. Above all B. ii, iii & iv only C. i & iii only D. iv only

12. IVRRA is used in which of the following surgical procedure

A. Amputation of Horn B. Evisceration C. Laprotomy D. Distal limb surgery

13. The effect of Local anesthetic can be prolonged by addition of

A. Ether B. Hyaluronidase C. Epinephrine D. Dexamethasone

14. Amputation of horn requires blocking of cornual branch of both lacrimal and infra trochlear nerve b in which species

A. Sheep B. Goat C. Ox D. Buffalo

15. The depolarizing muscle relaxant is

A. Succinyl Choline B. Atracurium C. Pancuronium D. Gallamine

16. IPPV is not required during Thoracotomy in which species

A. Bovine B. Equine C. Feline D. Canine

17. Triple mixture for anesthesia in Ruminants contains

A. Xylazine, Ketamine & Guaifenesin B. Xylazine, Ketamine & Atropine

C. Ketamine, Diazepam & Guaifenesin D. Xylazine, Diazepam & Atropine

18. The pleural pressure of an animal required for initiation of inspiration is

A. – 5 cm of H_20 B. – 4 cm of H_20 C. – 3 cm of H_20 D. – 2 cm of H_20

19. The local analgesic may affect

A. Sensory Neuron B. Motor Neuron C. Both A & B D. None of the above

20. Which of the following is/are dissociative anesthetic?

i. Tiletamine ii. Profopol iii. Thipental iv. Ketamine.

A. iv only B. ii, iii & iv C. i & iv D. i, ii & iv

21. In controlled ventilation the inspiration expiration time ratio should be maintained at

A.1:2- 1-3 B. 1:1 C. 2:3 D. 1:4

22. Local anesthetic will have direct effect on the

A. Peripheral nervous system B. Central nervous system

C. Both A & B D. None of the above

23. The colour of oxygen cylinder is

A. Blue B. White C. Yellow D. Black

24. The centrally acting muscle relaxant is

A. Succinyl Choline B. Guaifenesin C. Tubocurium D. Diazepam

25. The paravertebral block in cattle aims which of the following spinal nerves

A.T12,T13, L1 B. T13, L1, L2 C. L1,L2,L3 D. None of the above.

1	B	6	A	11	B	16	A	21	A
2	C	7	B	12	D	17	A	22	A
3	C	8	C	13	C	18	A	23	B
4	C	9	D	14	B	19	C	24	B
5	C	10	C	15	A	20	C	25	B

NATIONAL INSTITUTES

Central institute for research on **Buffaloes** – Hissar, Hariyana

National **Equine** research centre – Hissar, Hariyana

National bureau of animal **Genetic resources** – karnal, Hariyana (NDRI)

Central **Sheep & Wool** research institute – Avikanagar, Rajasthan

National **Camel** research institute – Bikaner, Rajasthan

Central institute for reseach on **Goats** – Mukdoom, UP

Indian **Grassland** & forage research institute – Jansi, UP

Central **Avian** research institute – Izatnagar, Utranchal

Vector control research centre – Pondycherry

Institute of **Cytology & Preventive Oncology** – New Delhi

National research center on **Yak** – Dirang,Arunachal pradesh

VIROLOGY

FAMILY	GENUS	DISEASE	SYNONYMS
Negative (-) sense RNA viruses			
Order – Mono Nega Virales			
Paramyxoviridae	Avula virus	New castle disease	Avian distemper Avian pest Black eye Doyles disease
	Morbili virus	Rinder pest	**Cattle plaque** Bovine typhus

		PPR	**Goat plaque** Pseudo rinder pest Goat catarrhal fever
		Canine distemper	Hard pad disease Canine influenza Carre's disease
Orthomyxoviridae	Type A influenza virus	Avian influenza	**Fowl plaque**
		Swine influenza	
		Equine influenza	Equine distemper Pink eye Stable pneumonia
Rhabdoviridae	Lyssa virus	Rabies	Mad dog disease Hydrophobia (in man) Lyssa.
	Ephemero virus	Ephimeral fever	3 Day sickness Dragon boat disease Bovine epizootic fever
	Rhabdo virus	Vesicular stomatitis	Pseudo FMD Sore mouth Sore nose
Positive (+) sense RNA viruses			
Order – Nidovirales (*nested viruses*)			
Coronoviridae	Coronovirus	Infectious bronchitis(IB)	
		Transmissible gastero enteritis(TGE)	
Flaviviridae	Pestivirus	Classical swine fever	Hog cholera
		Bovine viral diarrhea	Mucosal disease
		Border disease	Hairy shaker's disease
		Equine viral arteritis	
Picornaviridae	Aphthovirus	FMD	Aphthus fever
	Enterovirus	Duck viral hepatitis I	
		Avian encephalomyelitis	Epidemic tremor New England Disease
Asteroviridae	Asterovirus	Duck viral hepatitis II	
Togoviridae	Alphavirus	Equine encephalomyelitis	Blind staggers
		Ovine encephalomyelitis	Louping ill
Double Stranded RNA viruses			
Reoviridae	Orbivirus	Blue tongue	Muzzle disease Pseudo FMD Sore mouth Sore muzzle
		African horse sickness	**Horse plaque**
		Rota viral diarrhea	
Birnaviridae	Avibirna virus	IBD	Gumboro disease Infectious nephrosis
Reverse transcribing RNA viruses			
Retroviridae	Lentivirus	Equine infectious anemia (EIA)	Swamp fever

		Maedi / Visna	
		Lymphoid leucosis	Big liver disease Avian sarcoma
Ambisense RNA virus			
Bunyaviridae		Rift valley fever	
		Nairobi sheep disease	
Double Stranded DNA viruses			
Herpesviridae	Varicellovirus	Pseudo rabies	Mad itch Aujeskey's disease Infectious bulbar paralysis
	Mardivirus	Marek's disease	Fowl paralysis Range paralysis Grey eye Pearl eye
	Gallid herpes I	ILT	Avian diphtheria, Hemorrhagic tracheitis
	Bovine herpes virus I	IBRT	Red nose Infectious pustular vulvovaginitis Necrotic rhinitis
	Bovine herpes virus III	Malignant catarrhal fever	Gangrenous coryza
Adenoviridae	Adenovirus	Egg drop syndrome	
	Mast adenovirus	Infectious canine hepatitis (ICH)	Rubarth's disease Blue eye
Poxviridae	Parapoxvirus	Orf	Contagious ecthema Scabby mouth
	Vaccinia virus	Cow pox	
	Capripox virus	Lumpy skin disease	Pseudo urticaria
Double Stranded linear DNA virus			
	Irido virus	African swine fever	Wart hog disease
Single Stranded DNA virus			
Para poxviridae	Parvovirus	Canine parvo virus	
		Chicken anemia virus	
		Feline panleukopenia	Fading kitten syndrome Feline distemper

BACTRIOLOGY

ORGANISM	GENUS	DISEASE

Staphylococcus	S.aureus	Tick pyemia – lambs
		Botryiomycosis/scirrous cord - horse
		Bumble foot – poultry
		Ritters disease/expoliative skin disease – children
		Toxic shock syndrome
	S.intermedius	Canine pyoderma
	S.Hyicus	Greasy pig disease/expoliative epidermitis
Streptococcus	S.pyogenes	Scarlet fever/septic sore throat
	S.Equi	Strangles/infectious adenitis
	S.dysagalactiae	Acute mastitis
	S.agalactiae	Chronic mastitis
	S.uberis	Dry cow mastitis
Corynebacterium	C.diphtheria	diphtheria
	C.pseudotuberculosis	Ulcerative lymphangitis
		Caseous lymphadenitis
	C.renale	Ulcerative balanoposthitis/pizzle rot
		Bovine pyelonephritis
	C.equi (Rhodococcus equi)	Suppurative bronchopneumonia
	C.pyogenes(aracanobacterium pyogenes)	Summer mastitis
Actinomycosis	A.bovis	Lumpy jaw
	A.viscosis	Canine actinomycosis
Actinobaculum	A.suis	Porcine pyelonephritis
Nocardia	N.farcinica	Bovine farcy
	A.asteroides	Canine nocardiosis
Dermatophilus	D.congolensis	Strawberry foot rot/lumpy wool/cutaneous streptothricosis
Listera	L.monocytogenes	Circling disease/silage disease/meningo encephalitis
Erysipelothrix	E.rhusiopathiae	Diamond skin disease/vegetative endocarditis
Bacillus	B.anthracis	Wool sorters disease/charbon/spleenic fever/malignant pustule
Clostridium	C.tetani	Lock jaw/wooden horse/saw horse stance
	C.botulinum	Lamsiekte/bulbar paralysis/loin disease
		Duck sickness
		Limber neck - poultry
		Shaker foal syndrome
	C.chauvoei	Black quarter/symptomatic anthrax
	C.septicum	Malignant edema – cattles
		Braxy/Bradsot – sheep
		Para anthrax - pigs
	C.novyi - Type A	Big head
	Type B	Black disease/infectious necrotic hepatitis

	C.hemolyticum	Bacillary hemoglobinuria
	C.perfringens Type- A	Gas gangrene
	Type – B	Lamb dysentery
	Type – C	Struck
	Type – D	Pulpy kidney disease/over eating disease/enero toxemia
	Type - E	Hemorrhagic enteritis
	C.piliformae	Tyzzer disease - mice
	C.colinum	Quail disease
Mycobacterium	M. Tuberculosis	Pearls disease/king of disease/white disease
	M.paratuberculosis	Crohn's disease/johne's disease/chronic bacillary dysentery
Escherichia	E .coli	Calf scour/white scour/neonatal diarrhoea - calves
		Honeymoon cystitis –calves
		Watery mouth – lambs
		Edema disease – pigs
		Coli granuloma/hjarres disease
		Mushy chick disease/yolk sac infection
Salmonella	S.pullorum	Bacillary white diarrhoea
	S.gallinarum	Fowl typhoid
	S.typhimurium	Paratyphoid
	S.arizonae	Para colon infection
	S.anayum	Keel disease
Klebsiella	K.pneumoniae	Atrophic rhinitis - pigs
Shigella	S.marcescens	Human bacillary dysentery
Yersinia	Y.pestis	Black death/bubonic plaque
	Y.pseudo tuberculosis	Pseudotuberculosis
Pseudomonas	P.aeruginosa	Fleece rot- sheep
Burkholderia	B.mallei	Glanders/farcy
	B.pseudomallei	Melioidosis
Actinobacillus	A.ligneresii	Wooden tongue/timber tongue
	A.suis	Pleuropneumonia – pigs
	A.equuli	Sleepy foal disease
Pasturella	P.multocida Type - A	Shipping fever– cattle
		Fowl cholera – poultry
		Snuffles - rabbits
	Type - B	Hemorrhagic septisemia/stockyardis disease/barbone
	Type - D	Atropic rhinitis
	P.hemolytica	Gangrenous mastitis - cattle
Haemophilus	H.parasuis	Glassers disease
	H.paragallinarum	Infectious coryza
	H.somnus	Sleeping syndrome
Brucella	B.abortus	Contagious abortion/enzootic abortion
Campylobacter	C.jejuni	Winter dysentery
	C.coli	Swine dysentery
Leptospira	L.icterohemorrhagia	Weils diseae – human
Borrelia	B.anserina	Avian spirochetosis

	B.burgdorferi	Lyme disease
Bortodella	B.avium	Turkey coryza
	B.parapertusus	Wooping cough – children
	B.bronchiceptica	Kennal cough/atropic rhinitis
Morexella	M.bovis	Infectious kerato conjunctivitis/Pink eye/new forest disease
Fusobacterium	F.necrophorum	Bull nose – pigs
		Thrush – horse
		Bush foot – pigs
		Black pox/black spot
Bacterioides	B.nodosus	Foot rot - sheep
Mycoplasma	M.mycoides	CBPP
		CCPP
	M.agalactiae	Contagious agalactiae
	M.gallicepticum	Chronic respiratory disease
		Infectious sinusitis - turkey
	M.hypopneumonia	Enzootic pneumonia/endemic pneumonia - pigs
	M.meleagridis	Air sacculitis - turkey

GOLD STANDERD TEST

Glanders	Compliment fixation test(CFT)
Leptospira	Microscopic agglutination test
Rinder pest	Virus neutralization test
Rinder pest (confirmatory test)	Compliment fixation test(CFT)
PPR	Virus neutralization test
Influenza	Haemagglutination inhibition test (HI)
Rabies	Fluorescent antibody test(FAT), Fluorescent antibody virus neutralization test (FAVN)
Swine fever	FAVN
FMD	Competitive ELISA
Blue tongue	Competitive ELISA, AGID, PCR
African horse sickness	Indirect ELISA, CFT
IBD	Quantitative AGID
Equine infectious anemia	Coggins test

DON'T CONFUSE

Fowl coryza	Hemophilsalis gallinarum
Turkey coryza	Bartodella avium
Gangrenous coryza	Malignant catarrhal fever
Nutritional coryza	Vitamin A deficiency
Mad dog disease	Rabies
Mad cow disease	Bovine spongiform encephalopathy

Kennel sickness	Salmonella
Kennel cough	Bartodella bronchiceptica
Sweet itch/Queensland itch	Culicoides
Dairy man itch	Sarcoptic mange
Bush foot	Fusiformis necrophorus
Bush disease	Chlamydia psittaci
Bush sickness	Cobalt deficiency
Liver rot	Fasciola
Fleece rot	Pseudomonas
Foot rot(sheep)	Bacterioides nodosus
Foot rot (cattle)	Fusiformis necrophorus
Wool rot	Dermatophilus congolensis
Shipping fever (Cattle)	Pasturella
Shipping fever (Horse)	Equine influenza
Thrush (horse)	Fusobacterium
Thrush (poultry)	Candidiasis
Pink eye (cattle)	Moraxella bovis
Pink eye (horse)	Equine influenza
Blue eye	Infectious canine hepatitis
Grey eye/pearl eye	Marek’s disease
Black eye	New castle disease
Atrophic rhinitis	Pasturella ,Bartonella
Necrotic rhinitis	IBRT
Enzootic abortion (cattle)	Brucella
Enzootic abortion(ovines)	Chlamydia
Epizootic abortion(cattle)	Campylobacter
Infectious jaundice	Leptospira
Malignant jaundice	Clostridium novyi type - B
Red water disease	Clostridium hemoglobinuria
Red water fever	Babesia
Spleenic fever	Anthrax
Malta fever/undulent fever	Brucella
Q fever	Coxiella burnetti
Black tongue	Niacin deficiency
Red tongue	Biotin deficiency
Vitamin A sparer	Vitamin E
Vitamin E sparer	Selenium

ATP sparer	Creatine phosphate
Fat sparer	Insulin
Protein sparer	Growth hormone
Deadly night shade	Atropa belladona
Golden/black night shade	Solanum nigrum
Woody night shade	Solanum dulcamera

TOTAL CONTROL

BRAIN PART	FUNCTIONS
Cerebrum	Memory, initiative, volition, intelligence
	Sensory impulses like sight, smell, taste, etc.,
	Fear, anger, emotion
	Voluntary control of skeletal muscle
Cerebellum	Unconscious control
	Balance
	Co-ordination
Hypothalamus	Hunger
	Thirst
	Body temperature
	Sleep
Thalamus	Relay center between sensory nerves& cerebral cortex
Basal ganglia	Control muscular activity
Medulla oblongata	Involuntary reflex actions like, respiration, coughing, vomiting,
	Salivary secretion
	Heart beat rate
	Reflex part of swallowing
Amygdala	Social ranking
Limbic system	Aggressive behavior

FATHERS

Veterinary science	Salihotra
Anatomy	Cladius galon
Bacteriology	Robert koch
Cellular & modern pathology	Rudolph virchow
Chemotherapy	Paul ehrlich
Experimental pathology	John hunter
Immunology	Edwerd jenner
Microbiology	Louis pasteur
Medicine	Hippocrates
Vet medicine	Ranatus vegetius
Vet pharmacology	Rudolph bucheu
Parasitology	Fraucisco redi
Surgery	Sasruta
Modern toxicology	M.J.B.Orfila
Vet protozoology	leukart
Vet radiology	Richerd
Sociology	August comte
Economics	Adam smith
Nutrition	Lavoisier
Modern embryology	Karl ernst van baer
Meat inspection	Ostertag
Animal breeding	Robert bakewell
Marketing	Philip kotler

PLAQUES	
Cattle plaque	Rinder pest
Equine plaque	African horse sickness
Goat plaque	PPR
Fowl plaque	Avian influenza

Cat plaque	Feline panleukopenia
Rabbit plaque	Tularensis
Duck plaque	Duck viral enteritis
Bubonic plaque	Yersinia pestis
Lung plaque	CBPP
White plaque	Mycobacterium tuberculosis
BLACKS	
Black quarter	Clostridium chauvoei
Black leg	Clostridium chauvoei
Black head	Histomonas meleagridis
Black disease	Clostridium novyi - Type B
Black flies	Simulium indicum
Black death	Yersinia pestis
Black tongue	Niacin deficiency
PSEUDOS	
Pseudo FMD	Blue tongue
Pseudo cow pox	Milkers nodule
Pseudo rinder pest	PPR
Pseudo tuberculosis	Yersinia pseudotuberculosis
Pseudo rabies	Aujeskeys disease/infectious bulbar paralysis
Pseudo fowl plaque	New castle disease
Pseudo glanders	Equine epizootic lymphangitis
BODIES	
Bollinger bodies	Fowl pox
Joset bodies	Borna disese
Dohle's bodies	Aggregates of ribosomes in neutrophils
Koch blue bodies	Theileriosis
Councilman bodies	Yellow fever in man
Negri bodies	Rabies
Guarnieri bodies	Cow pox

ORIGINS

ECTODERM	ENDODERM	MESODERM
Nervous system	Skeletal system	Digestive system
Pituitary gland	Muscular system	Respiratory system
Salivary gland	Urinary system	Liver
Sweat gland	Genital system	Pancreas
Mammary gland	Blood vessels	
Stomodium (mouth)	Spleen	
Enamel	kidney	
Skin - Epidermis	Skin – Dermis & Corium	
Sense organs(Ear&Eye) External ear Internal ear		Middle ear
Nasal cavity		
Anus		
Tongue & palate		
Nail, hoof, horn &hair		

ANTIBIOTICS	MICRO-ORGANISM
Bacillus colistinus	Colistin(polymyxin E)
Bacillus polymyxa	Polymixin B
Bacillus subtilis(B.lichniformis)	Bacitracin
Chromobacterium violaceum	Monobactam
Micromonospora purpuria	Gentamicin
Penicillium notatum	Penicillin G
Penicillin griseofulvin	Griseofulvin
Streptomyces cattleya	Carbapenam
Streptomyces erythreus	Erythromycin
Streptomyces fradiae	Neomycin/tylosin
Streptomyces griseus	Streptomycin
Streptomyces kanamyceticus	Kanamycin
Streptomyces lincolnensis	Lincomycin
Streptomyces medeterranei	Rifamycin
Streptomyces nodosus	Amphotericin B
Streptomyces orientalis	Vancomycin
Streptomyces venezuelae	Chloramphenical
Streptomyces spectabilis	Spectinomycin
Streptomyces tenebrans	Apramycin
Streptomyces rimosus	Oxytetracycline
Streptomyces aureofaciens	Chlortetracycline

OIE RECOMMENDED QUARANTINE DAYS (ICAR BOOK)

DISEASE	DAYS
Cattle	
Rinder pest	21 days
HS & Theileriosis	28 days
Infectious bovine rhinotracheitis	30 days
Tuberculosis	90 days
Anaplasmosis	100 days
CBPP	180 days
Sheep & Goat	
pox	21 days
Brucellosis	30 days
Blue tongue	40 days
CCPP	180 days
Swine	
TGE	28 days
Aujesky's disease	30 days
Swine fever	40 days
Equine	
Glanders	28 days
Dourine	28 days
Equine influenza	28 days
Contagious equine metritis	30 days
Birds	
Fowl cholera	14 days
ND & fowl plaque	21 days
Fowl typhoid	28 days
Infectious bronchitis	28 days
Aspergillosis	45 days
Canines	
Rabies	4 months

PRESERVATIVE FOR VETEROLEGAL SPECIMANS

SPECIMAN	PURPOSE	PRESERVATIVE
Faeces	Helminthic eggs	4-10% formalin
	Coccidial oocyst	2.5% potassium dichromate
Pasitological	Ticks & mites	70% alcohol

specimans		
	Insects, fleas, lice	70% alcohol or 50% formalin
Urine	Chemical analysis	Toluene or 40% formalin
	Ammonia, Creatine	Thymol(0.1 gm /100ml of urine)
	Calcium& phosphorous	Conc Hcl
	ketosteroids	Chloroform
	Cytological studies	40% ethanol
	Hormones	No preservatives
	Bacteriological examination	No preservatives
Blood		
Blood smears	Bacteria	Heat fixation
	Protozoa & DLC	Methyl alcohol & absolute alcohol
Blood samples	Bacterial culture	No preservative
	Virus isolation	Buffered glycerine
Biochemical analysis	Blood urea	Potassium oxalate
	Blood sugar	Sodium fluoride or potassium oxalate
	Calcium	Heparinized blood
	Ketones	Oxalate or sodium fluoride
	Pyruvate	Citrate /10% Trichloro acetic acid/3% perchloric acid
Serum	Serological test	Phenol/methiolate/unpreserved
CSF	Electrolyte	EDTA
	Glucose	Sodium fluoride
Milk	Bacteriological	Unpreserved in ice
	TB organism	0.1% Boric acid
Biopsy samples		10% formalin
Tissues	Bacteriological studies	Unpreserved in ice
	Viral studies	5% glycerine
	Histopathology	10% formalin
Synovial fluid		EDTA/sodium citrate

TEST FOR YOU

Milk fever	Sulkowitch test(Ca in urine)
Hypomagnesemia	Xylidil test(Mg in urine)
Simple indigestion	Sedimentation activity test
Ketosis	Rothra's test(ketone bodies in urine) Ross test/Cow side test(ketone bodies in milk)
LDA	Liptak test
TRP	Pole or Bamboo test
Cyanide poisoning	Picrate test
Nitrate poisoning	Diphenylamine blue test Starch iodine test
Hematuria	Benzedine test(RBC in urine)
Glycosuria	Benedicts test(Glucose in urine)
Proteinuria	Hellers test Biuret test

Bile pigment in urine	Pouchet test Gmelins test
Bile salt in urine	Hay's test
Casoni's test	Hydatidosis
Tricin test	Trichomoniasis
Mucous agglutination test	Trichomoniasis
Capillary agglutination test	Anaplasma & Babesia
Sabin & Feldman dye test	Toxoplasma
Farmal gel test	Trypanasomiasis
Stilbamidine test	
Mercuric chloride test	
Coggins test	Equine infectious anemia
Cuboni's test	Pregnancy diagnosis mare(estrogen in urine)
Ascheim zondek test(AZ Test)	Pregnancy diagnosis mare(PMSG in serum)
Malachite green test	Test for imperfect bleeding of meat
Hotis test	Streptococcus agalactiae
Dick test	Streptococcus pyogens
Bacitracin test	Streptococcus pyogens
Elek's test	Corynebacterium
Antons test	Listeria
Ascoli's test	Anthrax
String of pearls test	Anthrax
Stormont test	Tuberculosis
Spoligo test	Paratuberculosis
Eijkman test	E.coli
Ames test	Salmonella
Card test	Brucella
Rivanol/Mercaptoethanol test	
Abortus bang ring test	
Rose Bengal test	
Kanagawa test	Vibriosis
Coomb's test	Brucellosis &Auto hemolytic anemia
Halothane test	Porcine stress syndrome
COFAL test	Lymphoid leucosis
Mcfadean reaction	Bacillus anthracis
Nagler reaction	Clostridium perfringens
Stormy clot reaction	Clostridium perfringens
Weilfelix reaction	Ricketsia
Quelling/swelling reaction	Klebsiella
Caslicks operation	Pneumovagina in horse
Whipples operation	Vaginal prolapse in dog
Mules operation	For prevention of blow fly strike
Hobday operation	Roaring in horse
ADULTERATION OF MILK	
Storch test/Guaicol test	Heated milk with fresh milk
Freezing point depression	Water in milk
Rozalic acid test	Alkali neutralizers in milk
Iodine test	Starch
Picric acid test	Gelatin
Barfoed's test	Glucose

Hansa test	Buffalo milk in cow milk
Nitric acid test	Skim milk powder in milk
Baudoin test	Sesame oil in ghee
Pytosterol acetate test	Vegetable oil in ghee
Phosphorous test	Pasteurization efficiency

VITAMINS

VITAMIN	DEFICIENCY	REMARKS
Vitamin A (Retinol)	Night blindness Xerophthalmia Nutritional roup - chicken	Anti infectious vitamin Rods –dim light-rhodopsin Cons – bright light - iodopsin
Vitamin D(calciferol)	Rickets – young Osteomalacia –adults Rickety rosary -chickens	Anti rachitic factor Calcifediol –circulatory form Calcitriol –active form
VitaminE(tocopherols)	Crazy chick disease/encephalomalacia-chicks Exudative diathesis-chicks Nutritional muscular dystrophy – chicks Stiff lamb disease – lamb White muscle disease-calf Mulberry heart disease-pig	Anti sterility factor Vitamin A sparer Potent antioxident
Vitamin K	Haemorrhagic blemishes Sweet clover disease	Dicumerol – Anti vitamin K Treatment of sweet clover poisoning
Vitamin C(Ascorbic acid/hexuronic acid)	Haemorrhagic diathesis Scurvy	Stored in adrenal & pituitary gland Enzyme L-gluconolactone oxidase necessary for its synthesis
Vitamin B1(Thiamin)	Beri – beri/peripheral neuritis Star gazing attitude Chastek paralysis Wernick's encephalopathy	Energy releasing vitamin Raw fish contain thiaminase enzyme
Vitamin B2(riboflavin)	Curled toe paralysis –chicks Clubbed down condition Cheilosis - man	
Vitamin B3(Niacin/Nicotinic acid)	Black tongue – dogs Pig pellagra	Tryptophan is pro vitamin to niacin
Vitamin B6(pyridoxine)	Goose stepping gait	Eluate factor
Vitamin B12(Cyanocobalamin)	Pernicious anemia	Animal protein factor Microbes of family Actinomycetacea can synthesis it
Pantothenic acid	Scaly dermatitis Dog sitting posture in pigs	Filtrate factor
Folic acid	Macrocytic anemia	
Biotin	Scaly dermatitis Red tongue	Preventive against "Egg white injury"

	Fatty liver kidney syndrome	Avidin- Antri nutritional factor
Choline	Perosis /slipped tendon	

MINERALS

MINERAL	DEFICIENCY	REMARKS
Calcium	Rickets - young Osteomalacia - adults Parturient paresis - cattle Lactation tetany - horse Eclampsia - dog Soft shelled eggs - poultry	Bood level = 9-12 mg/dl
Phosphorus	Pica or Allotriophagy Lamsiekte (lame sickness)	Blood level = 4-12 mg/dl Pica predisposes botulism.
Potassium	Muscle weakness	Intra cellular ion
Sodium	Corneal keratinization Cannibalism &feather pecking - Birds	Extra cellular ion
Sodium chloride (salt)	Heat exhaustion Dehydration	In the absence of aldosterone, Nacl cannot be reabsorbed by kidney – Addison's disease.
Sulphur	For efficient utilization of urea a **nitrogen : sulphur** ratio of **10:1** is suggested.	Sulphur containing **Amino acid**– Cystine, Cysteine,Methionine **Hormone** – Insulin **Vitamin** – Biotin&Thiamine
Magnesium	Hypo magnesemic tetany/grass tetany/grass staggers/lactation tetany Wheat poisoning Stepping syndrome - pigs	Blood level = 1.7-4 mg/dl NH_3 prevents absorption of Mg. K depresses serum Mg.
Iron	Piglet anemia Thumps	Ferritin – storage form Transferrin – circulatory form Absorption form – Fe^{2+} (ferrous) Circulatory form –Fe^{3+}(ferric)
Zinc	Parakeratosis Swallon hock syndrome Crooked leg	Stored in bones
Manganese	Perosis Slipped tendon	Enlargement of Tibiometatarsal joint Slipping of gastrochnemious or Achilles tendon
Copper	Salt sick - cattle Enzootic ataxia - lambs Steely wool - sheep Sway back/swing back/gingin Rickets – lambs&calves Falling disease - cattle Dissecting aneurysm - chicks Scouring/peat scours/teart - cattle	High molybdenum causes conditional Copper deficiency ↑ S ∫ Cu ↑Mo ∫ defieciency
Iodine	Goiter Critinism – young	

	Myxedema - old	
Cobalt	Enzootic marasmus Hill sickness Bush sickness Coast disease Wasting disease Nakuritis Pinning	
Molybdenum		**Toxicity** Teart Peat scours
Fluorine		**Toxicity** Shifting lameness Mottling teeth
Selenium	Muscular dystrophy (white muscle disease) Predisposes retained placenta and abortion in sheep	Influence Vit E absorption Antagonistic to sulphur Improves hatchability of eggs **Toxicity** Blind staggers(Acute) Alkali disease(Chronic)

RARE DISEASES

Corridor disease	Theileria lawrensi
Border disease (sheep)	Togoviridae
Edema disease (pigs)	E.coli
Chewing disease(horse)	Centaurea solstitialis
Derzsy's disease(goose)	Goose parvo virus I
Sleepy foal disease	Actionbacillus equli
Gilchrist disease(man)	Blastomycosis
Graves disease	Exophthalmic goiter
Grouse disease	Trichostrongylus tenuis
Morels disease	Gram positive micrococci
Nairobi sheep disease	Bunyavirus
New forest disease	Infectious bovine keratitis
Pullet disease	Reo virus
Vent disease	Treponema cuniculi
Schmorl's disease(rabbit)	Bacteroides necrophorus
Creutzfeldt –jacob disease(human)	Prions
Tzaneen disease	Theileria mutans
Wesslsborn disease	Flavi virus
Cat scratch disease	Bartonella henselae
Kysanur forest disease	Flavi virus
Jacob disease	Bovine spongiform encephalopathy

PERCRNTAGE OF WATER

Enamel	4%
Cereals & straw	10 – 15%
Hay	15%

Fresh bone	45%
Silage	60 – 65%
RBC	60 – 75%
Animal body	65%
Whole egg	65%
Meat	72%
Animal cell	70-85%
Milk	87%
Embryo	90%
Plasma	91%
Bile	97%
Spinal fluid	99%

TRIVIALS

- Amount of energy lost through methane production – **7%**
- Rate of gas production in rumen – **30 litres/hour**
- Amount VFA in rumen fluid - **60 – 120 meq/lit**
- Life span of RBC in birds – **28-35 days**
- **Feulgen stain** is used for demonstration of nucleus in DNA
- **Degnala disease** is caused by feeding of Mycotoxin contaminated straw
- Larva of Anguina agrostis causes **nematode poisoning**
- Standard unit for measuring radiation - **Becquerel**
- Suppression of immune response (anergy) can be treated with **levamisole**
- Temperature of blood in the body – **38 – 40 ^{0}C**
- Bracken poisoning causes **Bright blindness** in sheep
- Cat has, proportionately to the size of its body, **the largest brain**
- Edema disease in pigs is caused by **E.coli**
- Reagent used in California mastitis test - **Teepol Reagent**
- Earliest recognized carcinogen – **Soot**
- False pregnancy in goat is also termed as – **cloud burst**
- Removal of infected tissue from a wound surface is called **debridement**
- A gap between front & cheek teeth in ruminants is **diastema**
- Drug used in flea collars – **Dichlorvas**
- Dog sitting posture in pigs is seen in **pantothenic acid** deficiency
- ELISA was developed by **Engvall & Perlmann**
- New market cough is a synonym for **Equine influenza**
- Self replicating infectious protein is called as **prions**
- **Ursodeoxycholic** acid is used for dissolving gallstones
- First recombinant viral vaccine developed was **FMD vaccine**
- Inflammation of tongue – **Glossitis**
- Guinea pigs do not synthesize **Vitamin C** hence more liable to scurvy
- Blood in sweat – **Haematidrosis**
- Rat bite fever or haver hill fever is caused by ***Streptobacillus moniliformis***
- **Ivermctin** is toxic to Collie breeds of dog
- **Kitchen death** is caused by carbon monoxide poisoning

- **Thyroid** cartilage of larynx has Adams apple
- Inflammation of vagina – **colpitis/vaginitis**
- Inflammation of nipple – **mamillitis**
- Inflammation nail & claws – **onychia**
- Toxic principle in onion – **n propyl disulphide**
- Removal of diseased ovary – **Ovariotomy**
- Removal of normal ovary – **Oopherectomy**
- Persistent erection of penis is called as **priapism**
- Trochlear nerve is also called as **pathetic nerve**
- **Papain** is used to tenderize meat
- Toxic principle in potato – **solanine**
- Best time for abdominal palpation of pregnancy in dogs **– 24 – 32 days**
- Urine drinking is a symptom seen in **sodium** deficiency
- Adjuvant used in inactivated vaccine – **Aluminium hydroxide**
- **Vero cells** are taken from kidney of African green monkey

I. PHYSIOLOGY

➢ LOCOMOTION

- PM Contraction - Rigor Mortis
- PM Cooling - Algor Mortis
- PM Staining - Livor Mortis
- **Creatine phosphate** in muscle is referred to as ATP sparer or energy buffer
- Each molecule of glucose produce – **38 ATPs**
- About 5-6 hrs after death, all muscles of the body assume a state of contracture – **Rigor Mortis**
- The efficiency of muscle contraction is – **45%**
- Muscle contraction without shortening in length – **Isometric Contraction**
- Whole cardiac muscle obeys all or none law because of **Syncytium**
- **Refractory period** is the brief period during which muscles undergoing contraction for a first stimuli is unable to respond to a second stimuli
- The energy of contraction of muscle is directly proportional to the length of the fibre- **Sterling law**
- **Tetanisation** is the fusion of successive twitches when the frequency of stimuli is given at a rapid rate
- Myasthenia gravis is a neuromuscular disorder in which auto antibodies are produced against **Ach receptors**

➢ BLOOD

- Plasma constitutes about **55-70%** of blood
- Viscosity in blood is provided by **gamma globulins**
- Arterial blood is more **Alkaline** than venous blood
- Yellow colour of the plasma is due to **Bilirubin**
- Serum differs from plasma lacking **fibrinogen, prothrombin** and other coagulation factors
- **RBC of species**

- Biconcave - Dog, Cow, Sheep
- Shallow/flat - Goat
- Shallow concave - Horse, Cat
- Elliptical, sickle shape - Camel , Deer
- Elliptical & nucleated - Birds, Amphibians

- **Poikilocytosis** – variation in cell shape
- **Aniosocytosis** – variation in cell s size
- **Larger size RBC** – in dog (7.3 micron)
- **Smaller size RBC** – in goat (4.1 micron)
- Mature RBC derive energy from **Anaerobic EMP pathway** and **HMP shunt** since they have no mitochondria
- **Aplastic** anemia lacks functional bone marrow
- **True PCV** = venous PCV*0.96(Correction factor for trapped plasma)
- Rouleaux formation is seen in **equines and dogs**
- ESR is negatively influenced by **Reticulocyte and Albumin**
- Site of synthesis of Monocytes - **Lymphoid tissue of bone marrow and spleen**
- In ruminants **Haemal lymph nodes** functions as spleen
- **Vit B_{12} and folic acid** are essential for maturation of RBC
- **Methemoglobin** is formed by oxidation of ferrous iron to ferric iron
- Hb has **200 times** more affinity for CO than O2
- Each gram of Hb binds with a maximum of **1.34 ml** of O_2
- Average life span of RBC is **120 days (20-30 days in poultry)**
- Destruction of RBC in dog is in **bone marrow**

➢ **RETICULO ENDOTHELIAL SYSTEM**

- In liver and spleen –Stellate Or Kupfer Cells
- In tissues - Histiocytes Or Macrophages
- In blood - Monocytes

- The ratio of WBC to RBC is more in **goats(1:1300)** and **less in cattle(1:800)**
- Shift to left is an increase in number of immature neutrophils characteristic of **bacterial infections**
- T-lymphotes provide **cellular** immunity
- B-lymphocytes provide **humoral** immunity
- Suppressor or regulatory T cells regulate the activities of **Cytotoxic T cells and helper T cells**
- **Life span**
  - Granulocyte - 4-8 hrs
  - T lymphocytes - 2-3 yrs
  - B lymphocytes - 3-4 days
  - Monocytes - 24 hrs
  - Platelets - 8-11 days
- Platelets are nucleated in **birds and reptiles**
- **Albumin** acts as a primary carrier to fatty acids
- Plasma proteins acts as **blood buffer** and thus maintains pH(7.4)
- **Prostaglandin**
  - PGG2,PGH2 - Platelet aggregation

- PGI2 - Vasodilator
- PGI2 - Platelet aggregation inhibitor

- **Vitamin K** is necessary for the formation of prothrombin and clotting factors V, VII, IX and X
- **Heller And Paul Mixture** =Ammonium oxalate : potassium oxalate = 3:2
- **Sodium fluoride** is ideal anticoagulant for estimation blood glucose level
- Hemophilia A due to deficiency in **factor VIII**
- Heparin is produced by **mast cells and Basophils**
- **Blood groups**
  - Dogs - 8 groups
  - Horse - 8 groups
  - Cattle - 11 groups
  - Sheep - 7 groups
  - Pigs - 13 groups

➢ HEART AND CIRCULATION

- Systemic Circulation - 84% of Blood
- Pulmonary circulation - 8% of Blood
- Coronary circulation - 7% of Blood
- **SA node** controls the rate of heart
- Excitatory stimuli originate outside SA node - **Ectopic foci**
- Conduction velocity is fastest in **Purkinje** fibres
- Cardiac sounds can be recorded by using an instrument called **phonocardiogram**
- **Lub sound (S1)** – closure of AV valve
- **Dub sound (S2)** – closure of pulmonary valve
- **Electriocardiograph** is an instrument to measure electrical changes of heart
- QRS complex shows spreading of electrical potential through A.V node, bundle of his ,purkinje fibres, ventricular muscles
- Output of each ventricle is referred as **stroke volume**
- **Cardiac output** is the volume of blood ejected by either the left or right ventricle through the aorta or pulmonary artery per minute
- **Starlings law** = Energy liberated by cardiac muscle is directly proportional to fibre length
- Vagus nerve is **negative chronotropic** and **negative inotropic**
- Two **baroceptors** one in carotid sinus (**sinus or buffer nerve**) and one in aortic body (**cardio depressor nerve**)
- **Endothelin** is the most potent of all the mammalian vasoconstrictor substances
- True **capillaries** are the place of nutrient exchange
- **Pulse pressure** is the difference between systolic and diastolic pressure
- Blood pressure using **Sphygmomanometer** is measured using femoral artery in dogs and Coccygeal artery in cattle
- Increased blood flow to tissues in response to increased metabolic rate is called as **Active Hyperemia**
- Cerebrospinal fluid produced from **lateral, third and fourth ventricle of brain**

➢ RESPIRATION

- Exchange between atmospheric air and pulmonary capillary is **External respiration**
- Gas exchange occurs in **Alveoli**
- Dead space is the respiratory passage from the **External nares to alveoli**
- **Hyperventilation** is increased in alveolar ventilation cause **respiratory alkalosis**
- **Hypoventilation** is decreased in alveolar ventilation cause **respiratory acidosis**
- **Inspiration** is an active process, **Expiration** is passive process
- In **horse** even under rest, expiration is active
- **Hypernea** is state of breathing in which rate, depth or both are increased
- **Polypnea** - rapid, shallow panting type of respiration
- **Tidal volume** – air breathed in during a quite normal respiration
- The entry of air in to pleural cavity is called **Pneumothorax**
- **Residual volume** represents the amount of gas remaining in the lung even after forced expiration
- Respiratory quotient(RQ)= Volume Of CO_2/ Volume Of O_2
    - RQ of CHO - 1
    - RQ of Lipids - 0.7
    - RQ of protein - 0.8
- Partial pressure of O_2 in alveoli **pO_2=100 mmHg**
- Partial pressure of CO_2 in alveoli **pCO2=40 mmHg**
- One gram of Hb can transport **1.34 ml of O_2**
Arterial blood	**venous blood**
pO_2= 100 mmHg	pO_2 =40 mmHg
pCO_2=40 mmHg	pCO_2=45 mmHg

- Greater portion of $CO_2$is transported in blood in chemical combination as **HCO3**
- **Chloride shift or hamburger shift** – in venous blood HCO3 ion comes out of RBC and to replace Cl ion goes in to RBC
- Binding of O_2 to Hb displaces CO_2– a phenomenon referred to as "**Haldane effect**"
- **Asphyxia** is hypoxia combined with hypercapnea
- **Hering Breuer reflex** – inhibits inspiration so that prevents further inflation during over stretch
- Central chemoreceptor area is in **medulla**, peripheral chemoreceptor area is in **carotid and aortic bodies**

➢ RESPIRATION IN BIRDS

- Both inspiration and expiration are active
- **Syrinx** - is the vocal organs in birds
- Exchange of gases between lungs and blood occur in **Parabronchi**
- Since Air sacs are Avascular, **no gaseous exchange occurs**
- Diverticula from airsacs are connected to many bones , hence they are **pneumatic**

➢ NERVOUS SYSTEM

- Astrocytes closely attached to blood vessels of **CNS**

- Microglia or microcytes formed from **leucocytes**
- **Schwann's cell (neurilemma)** produce myelin sheath, insulating and coating nerve fibre
- **Nodes of ranvier** aid in flow of ions between ECF and ICF
- Velocity of myelinated nerve fibre ranges from **30 -100m/sec**, whereas in unmyelinated **30 m/sec**
- The duration of activity of neurotransmitter in synaptic cleft last only for **1-2 m sec**
- Specific type of neuron synthesis and release only one type of neurotransmitter substance at nerve terminal – **Dale's principle**
- Neurotransmitters susceptible to **anoxia and anesthetic agents**
- **Excitatory neurotransmitters** : Glutamate,Substance P, L-Aspartate
- **Inhibitory neurotransmitters**: Glycine, GABA, Dopamine, Serotonine, Taurine, Morphine, Endorphine
- **Both excitatory and inhibitory** : Ach, Nor Epinephrine, Epinephrine, Histamine, PG
- **Neurotransmitter** **Aminoacid Precursor**
  - Norepinephrine phenyl alanine
  - Glycine serine
  - GABA L-glutamic acid
- Exteroreceptors and proprioreceptors are collectively called **Somatoreceptors**
- **Proprioreceptors** – for posture and balance
- **Fore brain** – Proscencephalon
- **Mid brain** - Mesencephalon
- **Hind brain** – Rhombencephalon
- Two cerebral cortices are connected by transverse myelinated fibres known as the **corpus collasum**
- The ability of one hemisphere to control movement, reducing that burden for the other half is called **Cerebral Dominance**
- **Thalamus** functions as sensory relay nuclei
- **Limbic cortex** primarily functions as visceral brain
- **Hypothalamus** acts as a principal motor output pathway of the limbic system and controls the vegetative functions of the body
- Formation and recall of memory require the function of **amygdala and hippocampus**
- Melatonin released from **pineal gland** in response to darkness
- Melatonin inhibits **gonadal activity**
- Tri geminal, Abducent, facial, vestibular originates from **pons**
- Cerebellum is important in the planning and execution of **ballistic movements**

REFLEX	CRANIAL NERVE
Pupillary light	Oculomotor
Corneal	
▪ Blink	Ophthalmic division of trigeminal
▪ Lachrmation	-do-
Salivary reflex	Trigeminal, facial, glossopharyngeal
Emetic	glossopharyngeal, vagus,vestibular
Sucking	trigeminal and facial
Swallowing	vagus, hypoglossal, glossopharyngeal
Mastication	trigeminal, facial,GP
Cough reflex	vagus

- Sneeze trigeminal

- **Sleep** is a state of reversible unconsciousness
- Sleep inducing centre is located in **thalamic reticular** area
- **Serotonin** is a sleep inducing substance secreted by raphe nuclei
- The central motor control system include **the motor cortex, basal ganglia and cerebellum**
- Coordination of slow or ramp movements is associated with **basal ganglia**
- **Membranous labyrinth** is the functional part of vestibular apparatus
- The terminal portion of the spinal cord, the meninges and nerves are collectively referred to as **cauda equinae**
- **Brachial plexus** – C6,C7,C8,T1&T2
- **Lumbosacral plexus** – L3,L4,L5,S1&S2
- **Mixed(both motor sensory) cranial nerves**: Trigeminal, Facial, Glossopharyngeal, Vagus
- **Sensory cranial nerves**: Optic, Olfactory/Vestibulotrochlear

➢ DIGESTIVE SYSTEM

- Salivary secretion in cattle – **100 – 200 lit/day**
- Organ of prehension in dog & cat – **fore limb**
- **Fundic glands**
  - Body chief cells/peptic cells – pepsin & rennin
  - Neck chief cells – intrinsic factor & mucin
  - Parietal/oxyntic cells – HCl
- **Acetate : propionate :Butyrate ratio**
  - Forage diet – 70:20:10
  - Grain diet - 60:30:10
- Normal VFA content of rumen – **60 -120 meq/lit**
- Ketone bodies serves as energy source in **CNS & heart**
- **Pancreas**
  - **Secretin** – stimulates secretion of bicarbonates from pancreas
  - **CCK** – stimulates secretion of enzymes from pancreas
- **Sphincter of oddi** gaurds terminal part of common bile duct
- **Jaundice**
  - Obstructive jaundice – conjugated bilirubin
  - Hepatic jaundice – free bilirubin
  - Hemolytic jaundice – both free & conjugated
- **Duodenum** acts as pace maker of intestine
- CHO in the Small Intestine stimuli for GIP secretion
- Fat & protein in the Small Intestine stimuli for CCK secretion
- Acid in the Small Intestine stimuli for secretin secretion
- **Reverse peristalsis** is a normal feature in colon
- **Absorption**
  - Glucose & amino acid – active transport (Na+ Co transport)
  - Short chain fatty acid & glycerol – passive diffusion
  - Intact protein & triglycerides – pinocytosis

➢ EXCRETORY SYSTEM

- **Renal function** is the total cardiac out put that passes through the kidneys (21% in man; 20% in dogs)
- Glomerular filtration rate – **180 lit/day**
- Glomerular membrane is completely impermeable to **plasma proteins**
- **Filtration fraction** – percentage of the renal plasma flow that becomes glomerular filtrate(normal plasma flow – 650 ml/min ; normal GFR – 125 ml/min)
- **Glucose &amino acid** are reabsorbed entirely from glomerular filtrate

Part	Amount Of GFR Reabsorbed	Remarks
Proximal tubule(action of PTH)	65%	Decrease Ca excretion
Descending loop of henle	15%	More permeable to water Less permeable to urea & sodium
Ascending loop of henle		Less permeable to water More permeable to urea
Distal tubule(action of aldosterone)	10%	Active Na+ transport Secretion of K+
Collecting tubule(action of ADH)	9.3%	Permeable to water

- **Plasma load** – total amount of substance in the plasma that passes through the kidneys each minute (plasma load of glucose -600mg/min)
- **Tubular load** – fraction of plasma load that is filtered as glomerular filtrate(tubular load of glucose – 125 mg/min)
- Urine is thick in **horse**
- Tubular fluid contain 2 buffer system namely – **phosphate buffer & Ammonia buffer**
- Presence of fat in urine is **not pathological**
- Glucosuria is a characteristic finding in **enterotoxemia**
- When the pressure in bladder reaches **150 mm H_2O**, contraction of bladder begins
- Avian kidney has 2 types of nephrons – Mammalian type(25% glomerular filtrate) & reptilian type(75% glomerular filtrate)
- Metabolic end product of protein in **mammals – urea** where as in birds & reptiles it is uric acid

GROWTH & BEHAVIOR

- **Only 3%** of the cells with in adult body is capable of dividing
- Shape of Growth curve is **sigmoid or 'S' shape**
- GH does not have effect on growth during the **fetal life**
- **Krypton gas** is used to measure body weight indirectly by dilution method
- Thermo neutral zone for most farm animals **60 -90^{0}F**
- **Torpor** is a stage in which animals or birds make their metabolic activities decline

- **Serum magnesium** level is constantly increased during hibernation
- **Brown fat** present in hibernating animals helps them to awake from hibernation
- **Estivation /summer sleep** is observed in – frog, crocodiles & alligators
- Amount of heat loss by evaporation of 1g of water is **580 calories**
- Sweat glands – **Eccrine in man ; Apocrine in animals**
- Among farm animals **sheep & cattle** have lowest critical temperature
- Raise in 1^0c in body temperature can cause increase of **10 -20% in the basal metabolism**
- Oily secretion of **preen glands** makes the plumage resistant to wetting
- **Ethology** is the study of animal behavior

➢ ENDOCRINOLOGY

- **Carbolic acid** is the first disinfectant identified by joseph lister
- **Idoxuridine** is the first antiviral drug identified by Kaufman
- **Secretin** is the first hormone identified by bayliss & starling
- **Oxytocin & vasopressin** are the peptide hormones
- Precursor of steroid hormones – **cholesterol**
- RECEPTORS
  - Protein ,peptide hormones & catecholamines - cell surface
  - Steroid hormones - cytoplasm
  - Thyroid hormones - nucleus
- **First messenger** – hormone
- **Second messenger** – c AMP, Calmodulin, Cytosolic Calcium, Diacyl Glycerol, Inositol Triphophate
- **Third messenger** – phosphokinase
- Physiologically, the pituitary gland is a **master gland**
- **Arachidonic** acid is a precursor for prostaglandins
- Long day light promote reproduction in **horse – long day breeder**
- Sheep & goat – **short day breeders**
- **α - receptors** control catecholamine release from sympathetic nerve endings

Hormone	No of Amino acid	Type of action	Remarks
Growth hormone	190	Anabolic hormone Protein sparer	**Deficiency**-Dwarfism **Excess** – gigantism (young) Agromegaly (adult)
Prolactin		Lactogenic hormone	Crop milk secretion – pigeons Broodiness – birds Maintenance of CL – sheep &goat Metarnal behavior - animals

Vasopressin	8		**Deficiency** Diabetes insipides
Oxytocin	8		Let down of milk Sperm transport Contraction of uterus
Thyroxine		Potent Galactopoitic hormone Catabolic hormone T4(Thyroxin) – more predominant than T3 T3 is more active than T4	Metamorphosis – amphibians Moulting – birds **Deficiency** Cretinism(young) Myxedema(adult)
Para thyroid hormone (Chief cells of parathyroid gland)	84		Increases Ca absorption Minute to minute regulation of blood calcium
Calcitonin (C cells of thyroid gland – animals Ultimobronchial gland –reptiles, amphibians & birds)	32		Rapid but short time regulation of blood calcium Prevent post prandial hyper calcemia
Insulin (β cells of pancreas)	51	Hypoglycemic factor	Fat sparer **Deficiency** - diabetes mellitus
Glucagon (α cells of pancreas)	29	Hyperglycemic factor Ketogenic hormone	
Mineralocorticoids (zona glomerulosa of adrenal cortex) Eg - aldosterone			Electrolyte balance Blood pressure homeostasis
Glucocarticoids (zona reticularis of adrenal cortex) Eg - Cartisol			Anti inflammatory **Deficiency** –Addisons disease **Excess** – cushing syndrome

Catecholamines (adrenal medulla)			Non shivering thermogenesis

II. VETERINARY ETHICS AND JURISPRUDENCE

ACTS	YEAR
Livestock importation act	1898 modified on 1952
The Glanders &Farcy act	1899
The dourine act	1910 modified on 1957
The poisoning act	1919 modified on 1952
Dangerous drugs act	1930
Drugs and cosmetics act	1940
Drugs and cosmetics rules	1945
Prevention cruelty to animal's act	1960
Prevention cruelty to animals to drought& pack animals rules	1965
Prevention cruelty to animals (licensing of Farriers rule)	1965
Prevention cruelty to captured and wild animals	1972
Wild life (protection) act	1972
Project Tiger	1973
Prevention cruelty to animal's registration of cattle premises	1978
Transportation of animals rules	1978
Experimental animals act	1982
Animal welfare board of India	1982
Project Elephant	1992

Note :-

- Livestock importation act 1898 not permitting transport of following diseased animals -Tickpest,Anthrax,Glanders,Farcy,Scabies
- Applicable in all states of India except in J&Kstate

- **Cloning in sheep - <u>1997, DOLLY.</u>**
- **<u>Phook or doomdev</u>** injection air or any materials in to the female genital organ

THE INDIAN PENAL CODE

THE INDIAN PENAL CODE	DEALS WITH
Section 44	**Illegal harm** to the animals
Section 47	Definition of animals - **any living being other than human beings**
Section 192	**False entry in records**
Section 197	**False certification** of animals
Section 204	**Destruction of any documents**
Section 269	Done by **negligence** to spread infectious disease
Section 270	Done by **intention** to spread infectious disease
Section 271	Not following quarantine rule
Section 272	**Adulteration** of any food or drink
Section 273	**Sale of unfit food or drink**-6 months prison with Rs -1000/ - fine.
Section 274	**Adulterating medicinal** items for sale
Section 275	**Sale of adulterated medicine**
Section 289	Disobey any order, with any animal in his possession
Section 304	Negligently causing death of any person
Section 377	**Voluntary carnal inter course/ Beastiality** with any animals – 10 yr prison with Rs 10000/ fine
Section 420	**Fraudulent cheating** of persons altered animals - prison of 7yr
Section 427 & 428	**Mischief, maiming, killing by poisoning** – prison of 2 yr
Section 430	Causing **decrease of water supply** for animals

III. IMMUNOLOGY

- ***<u>Louis</u>* <u>Pasteur</u>** who was credited with the formulation of **<u>germ theory</u>** did extensive work on **fowl cholera, anthrax** and **rabies** and **developed vaccines.**
- The innate immunity is also called as **<u>natural defense</u>**
- Humoral immunity is mediated by antigen specific blood glycoproteins called **<u>antibodies</u>.**

- There are two populations of T cells – **T helper cells** (T_H cells) and **cytotoxic T cells** (T_C cells).
- **Differences Between Humoral & Cell Mediated Immunity**

	Humoral immunity	**Cell mediated immunity**
Antigen	Extracellular antigens	Intracellular antigens
Responding lymphocytes	B lymphocytes	T lymphocytes
Effector mechanism	Antibody mediated elimination	Lysis of infected cell
Transferred by	Serum	T lymphocytes

- The portions of antigen that are recognized by the immune system (by individual lymphocytes) are called **epitopes** or **antigenic determinants**
- **Apoptosis** is programmed cell death.
- Memory cells escape apoptosis through expression of a specific gene sequence called ***bcl2***
- Immunologic unresponsiveness against individual's own antigen is referred as **tolerance**
- The specific immune response that takes place after an antigen stimulus can be divided into three phases **Recognition Phase, Activation Phase** & **Effector Phase.**
- There are three classes of lymphocytes – **B-lymphocytes, T-lymphocytes and natural killer cells (NK cells)**
- Mature B cells do not produce antibody but it differentiates into two daughter cells upon antigenic stimulation – **plasma cells and memory cells**
- **Plasma cells** are the only cells in the body to produce antibodies
- The two important CD receptors of T cells are **CD4 and CD8**.
- The **helper T cells** have **CD4 receptors** and **Cytotoxic T cells** have **CD8 receptors**
- The **NK cells** mediate a phenomenon called **Antibody Dependant Cell Mediated Cytotoxicity (ADCC)** that removed the antigen coated with immunoglobulins

Sl.No	**Property**	**B cells**	**T cells**
1.	Site of development	Bone marrow, bursa, Peyer's patches	Thymus
2.	Distribution	Lymph node cortex, splenic follicles	Spleen periarticular sheath
3.	Circulate	No	Yes
4.	Antigen receptors	BCR	TCR
5.	Important surface antigens	Immunoglobulins	CD2, CD3, CD4, CD8
6.	Antigens	Free foreign proteins	Processed foreign

	recognised		proteins on MHC
7.	Tolerance induction	Difficult	Easy
8.	Progeny cells	Plasma cells, memory cells	Helper T cells, cytotoxic cells
9.	Secreted protein	Immunoglobulins	Cytokines
10.	Phenotypic markers	Fc receptor, Class II MHC, CD19, CD21	Helper T cell $CD3^+$, $CD4^+$, CD^- Cytotoxic cell $CD3^+$, CD4-, CD^+

- The macrophages are considered as powerful phagocytic cells and are referred as **big eaters** or **garbage collectors**

Different names are given for macrophages found in various organs.

a. Blood stream - **Monocytes**
b. Connective tissue - **histiocytes**
c. Liver - **Kupfer cells**
d. Brain - **Glial cells**
e. Lung alveoli - **Alveolar macrophages**
f. Lung capillaries - **Pulmomary intravascular macrophages**

- The most important CD marker of macrophages is CD68, which is otherwise called as **macrosialin**
- The primary function of macrophage is **phagocytosis**
- The actual mechanism of macrophage-mediated phagocytosis is by **receptor-mediated endocytosis** followed by lysosomal enzyme degradation.
- The percentage of neutrophils in blood circulation among animals varies widely. It is **60-70% in carnivores, 20-30% in ruminants and 50% in horses**
- **Opsonin** make the antigen palatable for phagocytic cells.
- **Ig E** is one of the isotypes of antibodies that is responsible for **allergic reactions**.
- Interdigitating dentritic cells are scattered throughout the skin epidermis and called as **Langerhans cells.**

The important roles of generative and peripheral lymphoid organs

1. **Bone marrow** (mammals) and **Bursa of Fabricius** (birds) – **B cell factories**
2. **Thymus** and **intestinal epithelium** (payer's patches)– **T cell factories**
3. Lymph nodes – Junctional filters in lymphatic system

4. Spleen – Filter in circulatory system
5. MALT – localised antibodies at major sites of pathogen entry

- A microorganism is said to be **pathogenic** when it can cause infection and the ability to cause infection is termed as **virulence**.
- Molecules with a molecular weight of **5000 or greater** are good immunogens
- **Haptens** are small antigens that cannot elicit antibody response individually. But they become immunogenic when coupled with larger molecules.
- Exotoxins are highly immunogenic and stimulate the production of antibodies. The antibodies against exotoxins are called **antitoxins.**
- When these exotoxins are precipitated by mild protein denaturing agents such as formaldehyde, the exotoxin loses its pathogenicity but retains its immunogenicity called **toxoids**
- Some times rarely immune response is elicited against normal body components. Such substances are called as **autoantigens**
- **Heterophile antigens** are immunologically related groups of antigens that occur in the cells of some bacterial species and also in some species of animals.
- Chemically the antibody molecules are **glycoproteins**.

- The flexibility of an antibody molecule is due to a region called **hinge region** that is rich in **proline** and **cysteine** residues.
- The antigen-combining site of an antibody is called as **paratope**.
- **IgM** is the biggest antibody molecule with a molecular weight of 970kD.
- **IgM** is the first antibody to class to appear in primary immune response
- **IgG** is the only antibody class that can pass through placenta
- **IgE** presence in large amount is an indication of allergic condition.

- Macrophages and dendritic cells are called as antigen presenting cells (APCs)

1. **Primary binding tests** – In these tests the binding of antigen to an antibody is measured directly. E.g. RIA, ELISA, IFA etc.
2. **Secondary binding tests** – In these tests, the results of antigen-antibody interaction (agglutination, precipitation, fixation of complement) *in-vitro* are measured. E.g. HI, AGID, CFT etc.
3. **Tertiary binding tests** – These tests are *in-vivo* tests and require a living system. In these tests, the effects of actual protective effects of antibodies are measured in living system. E.g. Neutralisation assay

- The ability of an assay to detect only the target and not any other is referred as **specificity** of the test.
- The **sensitivity** of an assay refers to ability of the test system to detect very minute amount of the target
- **In Fluorsescent immunoassays (IFA)** fluorescent dyes like fluorescent isothiocyanide (FITC) or rhodamine is used
- If the concentration of antibody is in excess it will not produce agglutination. This phenomenon is called as **prozone reaction.**

- **Inactivated vaccines** - Formalin and Beta propiolactone are the common inactivating agents.

IV. GENERAL MICROBIOLOGY

- **Antoni van Leeuwenhoek** is called as **father of bacteriology**.
- **Robert Hooke** - identified cells using his compound microscope
- Louis Pasteur is called **father of Microbiology**.
- **Flagellum** is the organ of locomotion for bacteria.
- **Monotrichous** - Bacteria having single polar flagellum.
- **Lophotrichus** - Having tufts of flagella at one end
- **Amphitrichous** - Having flagella at both ends
- **Peritrichous** - Having flagella all around surface
- The flagellum is composed of three parts **filament, hook and basal body**
- The major component of cell wall of Gram positive bacteria is **Peptidoglycan (80-90%).**
- The LPS is also referred as **Endotoxin**
- **Mycoplasma** do not have cell wall.
- The ribosomes of bacteria are **70S** composed of 30S and 50S ribosomes subunits.
- ✓ Four nucleic acid bases form the deoxyribose-nucleotides. They are **Adenine (A), Guanine (G), Cytosine (C) and Thymine (T)** of DNA.
- ✓ The nucleotides of DNA are linked by **3'-5' phosphodiester** bonds.
- ✓ RNA has got purine bases **adenine (A)** and **guanine (G)** and pyrimidine bases **Cytosine (C)** and **Uracil(U).**
- ✓ DNA is used to code for the synthesis of RNA is called **transcription**.

➢ GROWTH OF BACTERIA

- **Generation** is the interval for the formation of two cells from one cell
- **Lag phase:** The brief period of no activity is called as lag phase.
- **Exponential phase:** During this phase there is rapid increase in the number of bacteria.
- **Stationary phase:** During this phase there is no increase in number of cells.
- **Death phase:** The death phase is also exponential but it is slow. It is due to lack of nutrients.

Bacteria are classified in to five categories.

- ✓ Psychrophile - (13^oc)
- ✓ Mesophile - (39^oc)
- ✓ Thermophile - (60^oc)
- ✓ Hyperthermophile - (88^oc)
- ✓ Hyperthermophile - (105^oC).

- **Halophile** - Salt loving, prefer Nacl concentration between 1-30%),
- **Osmophile** - grow in high sugar concentration
- **Xerophile** - grow in very dry conditions

➢ Yield of ATP molecules in respiration **: *38 ATP***

➢ **Mutation:** inheritable change in base sequence of nucleic acid

➢ **Point mutation:** Mutations involving one or very few base pairs are referred as **point mutation**.

➢ **Transduction**: process in which DNA is transferred from cell to cell through viruses that infect bacteria called as **Bacteriophages.**

➢ **Conjugation:** process of transfer of DNA directly from one bacterial cell to another cell by a mechanism that requires cell-to-cell contact

- **Plasmids:** are also referred as extra chromosomal DNA
- **Transposition:** Certain genes in bacteria are capable of shifting from one location to another location in the chromosome

- **Disinfectants** - chemicals that are used to kill microorganisms on **inanimate objects**.
- **Antiseptics** - chemicals that are relatively in toxic and are used to kill or inhibit microorganisms **in living tissues**.
- Generally the chemicals with antimicrobial actions are referred as **germicides.**
- The substances obtained from microorganisms alone are referred as **antibiotics.**

- ✓ **First report of viruses:** by **Dimitrii Ivanowsky** attributed the causative agent of tobacco mosaic disease.

  FIRSTS
  - **Animal virus –** Foot and mouth disease by **Loeffler and Paul Frosch**
  - **Human virus –** Yellow fever by Reeds Commission
  - **Plant virus –** Tobacco mosaic disease by **Dimitrii Ivanowsky**
- ✓ The DNA found in the chromosome is attached with a protein called **histones** and this protein is also responsible for staining property (basic staining).
- ✓ The two strands of DNA are joined together by **hydrogen Bonds.**
- ✓ The most commonly used stain for fungal identification is **Lactophenol Cotton Blue.**
- ✓ The media that are commonly used for fungal isolation are the **Sabouraud's dextrose agar**

- The substances that pathogens produce that cause damage to phagocytes are referred to as "**Aggressins**".
- **Endotoxins** are part of the outer cell wall of bacteria.
- **Endotoxins** are associated with cell wall of Gram-negative bacteria - **Lipopolysaccharide**

Extra cellular bacterial proteins that function as invasin

	Invasin	Bacteria Involved
✓	**Coagulase**	*Staphylococcus aureus*
✓	**Leucocidin**	*Staphylococcus aureus*
✓	**Lecithinase**	*Clostridium perfringens*
✓	**Anthrax Lf**	*Bacillus anthracis*

V. MEAT SCIENCE

- Lateral retro pharyngeal lymph node is used to rule out TB
- Hemal lymph node absent in **horses and pigs**
- Water : protein ratio of young animal **> 4:1**
- Muscle : Bone ratio for healthy animals - **4:1**
- Rigor mortis time of **cattle = 9 hrs**, **birds = 2 hrs.**
- Chilled meat temperature is **7˚C**
- Chilled offal temperature is **3˚C**
- Frozen temperature of meat is **-18˚C**
- Cooked meat temperature is **72˚C**
- Black cartridge used for slaughtering **medium size of animal**
- In electrical stunning low voltage temperature is **70 volts/250mA, 7-10 sec**
- In stunning if current is not sufficient it lead to **Curarisation/Missed Shock**
- Act of slaughter in jewish method is **shechita**
- First slaughter house → **leonar, Mumbai**
- Phosphorous level of meat and blood **55-60% and 80%**

- Mould formation is common in **chilled meat**
- Process of freeze drying called **lyophilisation**
- Sterilization by radiation called **Radapperization**
- Marbling absent in **horse flesh and venison**
- Musky odour seen in **buffalo meat**
- Glycogen content in horse **0.5-1%**
- Refractive index is high in **horse fat**
- Feed efficiency – **poultry(1:1.8)>rabbit(1:2)>pig(1:3)>cattle(1:5)**
- Dressing percentage of pig →**70-75%**
- Ritual method practiced in india is **halal & jhatka method**
- Gut sweat bread → **Pancreas**
- Reducing agent used in curing is **Sodium Ascorbate(0.2-1%)**
- Ultimate pH level of meat is **5.5-5.7**
- Process of conversion of muscle to meat called **rigor mortis**
- Rigor mortis occurs **8-12 hrs** after slaughtering
- Autolytic lysosomal enzymes in meat is called **cathepsin**
- **PSE** occurs mostly in **pig**, **DFD** is common in **beef**
- In cold storage condition, **Z line is distrupted**
- Thawing temperature of meat is **4-6˚C**
- Freezing point of meat is **(-1.5˚C)**
- Presence of watery or blood stained fluid from frozen meat is called **weep/drip**
- Scalding temperature of pig is **62-64˚C for 6 min**
- **One animal unit** =one bovine=2 pigs=3 calves = 5 sheep
- Overhead rails should be placed at the height of **3.3 m for cattle dressing**
- Meat analogues are **Soyabean protein and gluten of wheat**
- Meat of deer is called **venison**
- Dressing % of veal =**63%**
- Art of removing skin/hide is called **flaying**
- Fresh, emulsion type of pork sausage called '**salami**'
- **Vitamin B1 (thiamine)** is higher in pork
- Water level of meat is **65-80%**
- Milk has an excellent source of Ca & P and low in **Fe, cu, I and vitamin C.**
- Self life of vacuum packaging is **8-10 weeks at 0˚C**
- Musty/earthy odour due to **Achromobacter** and fishy odour due to ***E.coli***
- **Keet** is the name of young guinea fowl
- Cow slaughter is banned in india except in states of **kerala and west Bengal**
- **Maillard reaction** is responsible for development of brown color on the surface of cured meat
- Black rot in eggs is cause by **Proteus and Pseudomonas**
- Red rot caused by **Serratia**
- In sausage making, salts added in the level of **4-4.5%**
- Functional unit of myofibrils called **Sacromere**
- Commonly used humectants are **glycerol/propylene glycol**
- Buffalo meat is white due to absence of **carotene**
- Vitamin A present in beef and mutton **absent in Buffalo, Chevon And Pork**

- Giblet consisting of **heart, liver, gizzard**
- Poultry meat contain high level of **oleic and linoleic acid** and low level of cholesterol
- The onset of rigor mortis is enhanced at ambient temperature **above 20˚C**
- In plate type freezer achieved at the temperature of **-10˚C** & blast type freezer achieved at **-10˚to -30˚C**
- Canned meat products have a self life of **2 yrs at ambient temperature**
- Hippophagia –consumption of horse meat
- Kynophagia – consumption of dog meat
- Weight taken 24hrs prior to slaughter is considered as Live weight of the animal

- PLUCK in cattle – larynx, trachea, lungs, heart and liver
  Sheep – spleen also
  Pigs – esophagus also
- Meat inspector in his one day work(8hrs)can examine – 75 cattle/200 pigs/250 calves/400 sheep
- **Area size**

Small abattoir	Upto 30,000 units/year	1 – 2 acres
Medium abattoir	50,000 + units/year	2 – 4 acres
Large abattoir	1 lakh + units/year	4 – 6 acres

- **light intensity**
  (Taken at the level of 0.9 m from floor)

All inspection points	540 lux units	50 foot candles
Slaughter hall & work room	220 lux units	20 foot candles
Other areas	110 lux units	10 foot candles

- **Room temperature**

Chilling room	-1 to 5^0C
Detention room	20^0C
Edible offal room	3^0C
Meat cutting room	12^0C

- **PPM level**

Chlorine for carcass washing	100 ppm
Chlorine for equipment washing	250 ppm
BOD of domestic sewage	250-300 ppm
BOD of slaughter house	1500-2000 ppm

Sodium nitrite level in cured meat	200ppm
Sodium nitrate level in cured meat	500ppm

- **Dressing percentage**

cattle	50 -54 %
sheep	45 -48 %
Goat	43 -50 %
Pig	70 -75 %
Poultry	65 – 70 %
Rabbit	52 – 58%

- **Bleeding time**

Species	Bleeding time(mts)	Amount of blood (% in body wgt)	Blood yield
Cattle	6	3 - 4%	10 – 12 kg
Calves	6	5 – 6%	1.5 kg
Sheep	5	4 - 4.5%	1 -1.5 kg
Pig	6	3 -4%	2 -3 kg
poultry	1.5 - 2		

Slaughtering of pigs

- Desirable thickness of fat on the back is **1.5 inches** for lean pork production
- Gaseous Stunning – **65-70%CO2**,
- Electrical stunning **- 60-80 volts, 5-10 sec**
- Sticking – **carotid arteries and jugular veins** , 5-6 min
- **Calcium deficient** in meat of pig
- Pig – **highest fat storing ability**
- Pork is **rich in phosphorus, iron,energy**
- **Vitamin A and D not present** in pork
- **Blue pig -** crossing of white and black breed
- **Lard** – pig fat
- **Store pig** – 8 -15 weeks of age for market
- Scalding temperature **– 60-63˚C for 5 min**

VI. GYNAECOLOGY

Oxytocin

- First hormonal peptide to be synthesized found in the animals
- Oxytocin = rapid birth
- Two sites of origin – ovary, hypothalamus
- Contraction of oviduct, milk letdown
- Ovarian oxytocin - Luteal function – acting on endometrium – induce $PGF_2\alpha$ in turn leads to Lysis of CL
- Estrogen enhances responsiveness of smooth muscle to oxytocin

GnRH

- Release of FSH, LH

FSH

- *Growth & maturation of graffian follicle*
- Spermatogenesis – up to secondary spermatocytes
- Acts on receptors of sertoli cells leads to production of ABP
- Spermiation
- Secretion of inhibin from granulose cells of ovary and sertoli cells of testes

LH or ICSH

- Pre ovulatory LH surge
- Maintains activity of CL
- Stimulates leydig cells

Prolactin

- **Luteotropic** properties in dogs, mice, rats
- Maternal behavior
- Functions as metabolic hormone in lower forms of animals

Placental hormones

- PMSG, hCG, PL, PSPB

PMSG

- Can be isolated from blood, not found in urine
- Endometrial cups of pregnant mare – these are formed by **40th** day of gestation and persist till **85th** day of pregnancy
- Important for maintenance of pregnancy in mare
- Clinical use – super ovulation, anestrum
- More of **FSH** like activity

HCG

- Syncytio trophoblastic cells of placenta of primates
- More of **LH** like activity
- Clinical use – induce ovulation, cystic ovaries

Placental lactogen

- GH like activity
- Imp. Regulator of maternal nutrients to the growing foetus

Estrogen

- Sexual receptivity in female
- Secondary sexual characters
- Ductal development of mammary gland

- Attachment of embryo to uterine wall
- Anabolic effect
- Negative feedback mechanism to the GnRH
- Development of female reproductive tract
- Clinical use : Induction of heat, treatment of misalliance, as Ecbolic (Mummification, Pyometra), induces milk production in cow

Progesterone

- Source ; ovary, placenta, adrenal, testes
- Inhibits uterine contractions
- Increases endometrial secretions
- Maternal behavior, nest building
- Induction of lactation

Clinical use

- Treatment of ovarian cysts not responds to GnRH
- Cervico vaginal prolapsed
- Early embryonic mortality
- Habitual abortion
- Cow, Goat, Sow – CL dependant

TESTES

- Mediastinum testes absent in stallion
- Connective tissue capsule – Tunica albuginea
- Medial septum of testes – Dartos
- Blood testes barrier – primary – Peritubular cells -prevent auto immune reactions
  Secondary – junctional complexes between sertoli cells
- Testes – 4-6°c lower than body temperature
- Oxytocin, PGF2α, Ach, tends to alter the Epididymal Transit Time
- Extra gonadal reserve (EGR) – Epididymis, vas deferens, Ampulla
- Time require to complete a cycle of seminiferous epithelium(Spermatogenesis)
  Bull – 14 days
  Boar – 9 days
  Ram – 10 days
  Horse – 12 days
- **RUT** – Certain definite period of sexual excitement in some wild animals (Deer, Camel, Elephant) – spermatogenesis occurs in this period
- **Ampullae & Vesicular gland** absent in dog and cat
- **Yellowish** colour of bull semen is due to riboflavin
- **Bulbouretheral gland** absent in dog
- Sigmoid flexure – **Pre scrotal** – Boar, **Post scrotal** – Bull, Ram
- Retractor penis muscle controls sigmoid flexure

Glans penis

- Bull – pointed
- Ram – urethral process
- Boar – glans penis absent

- Dog – two parts bulbus glandis(proximal 1/3) , pars longa glandis(distal2/3)
- Cat – short, terminal part having several spines
- Stallion – prominent urethral process, Groove - Fossa glandis

Testicular descent

- Bull – 106 days of gestation
- Horse – Near birth
- Ram, Boar – 70 days of gestation
- Dog – 3 – 4 days post natally
- **High flankers** – Testes reaches the inguinal canal but not descent in to the scrotum
- **Impotentia coeundi** – Reduced to complete lack of sexual desire and ability to copulate
- **Impotentia generandi** – Inability to reduced ability to fertilize
- **Balanitis** – Inflammation of glans penis
- **Posthitis** – Inflammation of prepuce
- **Balanoposthitis** - Inflammation of penis and prepuce
- **Phimosis** – Unable to normally protrude the penis
- **Paraphimosis** – Unable to retract the penis in to the prepuce
- **Diphallus** – Double penis
- **Phallocampsis** – deviation of penis either ventral or lateral or spiral
- **Rainbow penis** – ventral deviation
- **Corkscrew penis** – lateral deviation

Inherited sperm defects

Diadem effect	Sign of disturbance in spermiogenesis, Eversion of galea captis &crater shaped depressions in the nucleus, Nuclear pouch formation defect.	Feulgen stain & phase contrast microscopy helpful in revealing this defect.
Knobbed spermatozoa	Acrosomal defect, Eccentrically placed thickening of the Acrosome.	Eosin-B, Fast green stain& phase contrast microscopy helpful in revealing this defect.

- **Testicular hypoplasia** – Giant cells, medusa cells, high incidence of cytoplasmic droplets
- **Testicular degeneration** – Large no. of primary abnormality

Spermatogenesis

- Bull, Ram, Dog – 60-70 days
- Stallion – 40-45 days
- Boar – 50-60 days
- **Azoospermia** – no sperms
- **Oligospermia** – decrease in sperm concentration

Artificial insemination

- 1780 – Lazzaro spallanzani (ITALIAN) - AI in bitch
- 1900 - Ivanoff (Russian) – used AI as a technique for breeding

- 1939 – in India – Kumaran -Palace dairy farm – Mysore

Semen collection

Species	**Artificial vagina Tempeture**
Bull	39-41°c
Stallion	45-50°c
Boar	45-50°c
Ram & bucks	45-50°c
Dog	40-42°c

- **Sperm cell concentration** – Bull - 10% of the semen volume, Boar – 2-5%
- **Species** **pH**

  Bull, Ram 6.8

  Stallion, Boar 7.4

  Dog 6.7
- Fructose – Normal sugar providing energy to spermatozoa in ruminants
- Sorbitol – Sugar alcohol can be oxidized to fructose and provides source of energy
- Inositol – Boar semen
- Ergotheionine – Boar, Stallion
- Glyceryl phosphoryl choline – Epididymal Secretion
- **Age at Puberty**

Species	**Female**	**Male**
Cattle	6-18 months	9-12 months
Horses	10-24 months	18 months
Dog	6-12 months	7-10 months
Swine	5-8 months	5-7 months
Cat	5-18 months	5-18 months

- **Monoestrous** – Wild Animals
- **Polyestrous** – Cow, Sow
- **Regular estrous cycle** – Cow, Sheep, Mare, Bitch, Sow
- **Spontaneous ovulators** – ovulation takes place but CL formed will not be functional until mating
- **Induced ovulators** – ovulation & CL formation depends upon the mating has occurred or not (cat, Rabbit, Mink)
- **Uniparous / Monotocous** – one ovum, one fetus(cow, mare, sow)
- **Multiparous / Polytocous** – 3 -15 ova, 3-15 fetus(dog, cat, sow)
- **Nullipara** – female that have never conceived / carried young one
- **Primipara** – conceived for the first time (1^{st} gestation period)
- **Pluripara** – conceived previously 2 or more times earlier

Species	**Implantation(Days after Conception)**
Cow	22 – 35 days

Mare	36 – 38 days
Ewe	16 -18 days
Sow	13 – 20 days

- FSH & LH required for antrum formation
- Cow – **Metestrual or post Estrual bleeding** – capillary bleeding due to the with drawl of estrogen
- Young animals – slight shorter length of estrous cycle

  Sexual differentiation
  - Feline, porcine embryo – 30 days of gestation
  - Ovine – 35 days
  - Bovine – 45 days
- **Ovum ovulated** - All species Metaphase II – 2^{nd} meiotic division
  Mare, Dog, Fox – 1^{st} meiotic division

Species	**Estrus period**	**Ovulation time**
Cow	14-18 hrs	12-18 hrs after the end of estrus
Mare	4-7 days	Last 2 days of estrus
Sow	2-3 days	Last day of estrus
Ewe	1-2 days	Last day of estrus
Bitch	7-9 days	First 3 days of estrus
Cat	Induced 4 days if copulation occurs or else 9-10 days	One day after mating

- Capacitation initiated in the uterus and completed in isthumus of oviduct
- **Hyaluronidase** – Bull acrosome
- **Arylsulfalase** – Boar acrosome
- **Syngamy** - Fusion of male and female pronuclei
- **Pheromone** – volatile substance secreted or released outside the body and perceived by the olfactory system of other individuals of the same species
- **Boar** – Saliva (sub maxillay gland), Prepucial pouch – 2 Attractants 3α androstenol, 5α androstenone
- **Flehmen response** – Bull, Ram, Stallion
- Delayed ovulation, silent estrus, anovulation may be due to **β-carotene deficiency**
- Early embryonic mortality occurs between **8-19 days** after breeding
- Cow – best time of AI – middle to the end of standing heat (**mid estrus** not metestrus)
- **Card test** – rapid, sensitive accurate test for field screening of **brucellosis**
- Leptospirosis – gargety milk

Disease	organism	Time of abortion
Vibriosis	*Vibrio fetus veneralis*	**Early Embryonic death** – common 4 th month to term – occasional (**II trimester)**
Trichomonosis	*Trichomonas foetus*	**First trimester** (2-4 months)
Fungal abortion	*Aspergillus fumigatus*	5^{th} -7^{th} months
Epizootic bovine Abortion	*Psittacosis,Chlamydia Group of org*	6^{th} -8^{th} month
Listeriosis	*Listeria monocytogenes*	**Last trimester**(7^{th} -9^{th} month)
Brucellosis	*Brucella abortus*	**Last trimester** of pregnancy
Leptospirosis	*L.pomona,L.hardjo, L.grioppotypphosa*	Last half of gestation
IBR –IPV	*Herpes virus*	All 3 trimesters of the pregnancy

Gonadal sex determination

- XX – **Medulla inhibited** and cortex develops - **F**emale
- XY – **cortical development inhibited** –testes develops - male
- Primary sex cords - Ancestors of spermatozoa
- Secondary sex cords – Ancestors of oocytes

Species	Ovary shape	More functional
Bull , Ewe	Almond	Right
Mare	Bean	Left
Sow	Mulberry	Left
Bitch	Oval	

- Ovarian hormones – **Estrogen, Progesterone, Oxytocin ,Relaxin, Inhibin and Activin**
- Oviduct – opening of infundibulum "***ostium tubae abdominal***"
- Opening of utero tubal junction "***ostium tubae uterinum***"

Uterus	species
Bicornuate	Cow, Ewe, Goat , Sow
Simplex	primates, humans
Deciduate	Bitch, Queen
Non-deciduate	Cow, Doe, Ewe, Mare, Sow
Cotyledonary	Ruminants

Diffuse	Mare, Sow
Zonary	Bitch, Queen
Discoidal	Guinea pig

- Cattle –Caruncle - Arranged in 4 rows (70-120 in number)
- True water(2^{nd}) bag - **amnion**
- Mare – cruciform or 'T' shaped
- Bitch and queen entire uterus lies in the abdominal cavity
- Portion of cervix projects in to the vagina – **Portio vaginalis**
- **Fornix** – **absent in sow**, prominent in mare
- Remnants of wolffian duct – **gartners duct**
- Pregnancy diagnosis also known as **cyesiognosis**
- **Positive signs of pregnancy** – Amniotic vesicle, Fetal membrane slip, Fetus, cotyledons

Days	**Palpable part @ pregnancy**
30 days	Amniotic vesicle
35-90 days	Fetal membrane slip
About 90 days	Fetal bump
90-100 days	Placentomes
120 days	Fremitus

- White heifer disease due to **sex linked recessive gene** is commonly seen in white short horn cattle
- Uterine tubal patency test – **phenolsulphonpthalene(PSP) dye test**
- **Follicular cyst** – **nymphoni**a (bullers), multiple in both ovaries,relaxation of sacrosciatic ligament- upward displacement of coccyx – **"sterility hump"**
- **Luteal cyst** – often single, **anestrous**, **adrenal virilism**

Mummification of fetus

- In cattle – **hematic type** – 3-8 months , **papyraceous type** occur in other species
- R/E - firmer,dryer leather like tissue with uterine wall without cotyledon

R_X

- PGF2 α -(Lutalyse,vetmate,iliren,dinofertin)
- Cattle – 25mg (total dose)

Maceration of fetus

will occur at any stage – commonly 3^{rd} month

- **Trichomoniasis** and **vibriosis** organisms invade the uterus cause infection and pus formation
- Dropsy of fetal membranes over all incidence 0.3%
- ***Hydroallontois*** *(88%),* ***most frequently encountered than hydroamnios*** *(5-10%)*

- Hydroallontois - **bloated bull frog like calf**
- Uterine torsion – twisting or revolution of the gravid uterus **on its long axis**
- Signs of approaching parturition in mare – **waxing of teat, patchy sweating**
- ***Fetus decides the day of birth and dam decides the time of birth***
- Normal placental Expulsion time :
    - *cattle - 8 - 12hrs,*
    - *Mare - 0.5 – 3hrs,*
    - *sheep &goat - 3 – 6 hrs*
- Bitch – ***Placentophagy***
- Sow – ***Foetophagy***
- During fetal expulsion – cow, Ewe, Doe – Sternal recumbency, Mare – lateral recumbency
- Post partum period – **puerperium**
- Uterine involution completed by
    - cattle - 26 – 52 days following parturition
    - Mare - 32 days
    - Bitch - 4 – 5 week
- Post partum uterine discharge – **Lochia**
- Onset of estrus after parturition, cattle :- 33 – 90 days, buffaloes :- 4 – 6 months
- ***Foal heat – 5 -12 days post partum***
- Bitch - the post partum **Lochia is green colour** is due to Uteroverdin – break down product of Hemoglobin .
- Uterine incision is closed by – **double row of lembert or cushing sutures**
- Feeding sweet clover to sheep – Hyperestrogenisim can leads to uterine prolapsed.
- Downer cow – clinically parturient paresis but unable to rise **after24 hours and two calcium infusions**
- Creeper cow – cow becomes alert and gains control following calcium injection but **remains recumbent due to inability to use hind quarters**
- Synthetic analogues of **GnRH** – Buserelin(RECEPTAL) , Fertirelin(OVALYSE) , Gonadorelin (FERTAGYL)

Presentation P_1	*Relation of the **spinal axis of the fetus to that of dam***. (eg; longitudinal / transverse and anterioer / posterior)
Position P_2	*Relation of the **dorsum of the fetus** in longitudinal presentation or the head in transverse presentation **to that of quadrants of maternal pelvis.*** (eg; dorso – sacral ,dorso-pubic etc.,)
Posture P_3	***Relation of the extremities** or the head, neck and limbs of* the *fetus to the **body of its own***. (eg; shoulder flexion, hip flexion nape etc.,)

- Post partum heat in pigs- **3 – 5 days**
- At the time of deep freezing – **30 million** sperms /ml
- At the time of AI (post thaw) - minimum **10 million** sperms / ml
- Buck spermatozoa quite susceptible to cold shock
- Buck semen – Presence of egg coagulating enzyme (Phospholipase A) prevents the storage at 5 °c in yolk containing diluents
- Equilibrium of semen @ **5°c for 6 hrs** to enable **glycerol action**
- Sealing powder – **poly vinyl alcohol**
- **Laboratory seal** has to be cut during AI
- Minimum of **10-15 million** of viable sperms present after freezing and thawing in each doses
- The capacity of French mini straw – **0.25 ml**

VII. **LIVESTOCK PRODUCTION AND MANAGEMENT**

Four pillars of livestock management (or) LPM

1) Breeding 2) Weeding 3) Feeding 4) Heeding

- Turkey - *Meleagris gallopavo*

- ❖ J. Quail - *Coturnix coturnix japonica*
- ❖ Guirea foul - *Numida meleagris*
- ❖ Duck - *Anas plathyrhynchos*
- ❖ Goose - *Anser anser*

Common Terms and Definitions

- **Horse**
- Geld (or) gelding - castrated male horse.
- Broken horse - A well trained horse
- Unbroken horse - Untrained horse
- Colt foal - Male young one
- Filly foal - Female young one
- Double rig - Cryptorchid (both testicles retained in the abdomen)
- Foaling - Act of giving birth to young one.

➢ Mule - **Mare** x **jack ass**

➢ Jennet/Jenny/hinny/Genet -**stallion** x **she donkey**

- **Cattle**
- Heifer - *Young female over one year, which has just attained maturity.*
- Slink calf - *An aborted calf*
- Bobby calf - *Male calf about 1 week old.*
- Free martin - *Twin calves of different sexes are born*
  - ➢ The bull calf - *Sexually normal .*
  - ➢ *female calf* - *Sterile (always)*
- **Sheep**
- Wedder (or)wether - *An adult castrated male sheep.*
- Gimmer - Female sheep which is between 1 and 2 shearing.
- Seggy - an adult male castrated after service
- **Frog** – the central elevated portion behind the foot
- **Chestnut** – the horny growth situated below the hock on both the hind limb
- **Hogging** – clipping the mane
- **Pouring** – pouring small quantity of dip into parts of the fleece along the back,sides and belly
- **Crutching** – removing soiled dung-stained wool of Perineal and inguinal regions
- **Scouring** – removal of impurities in raw wool
- **Mulling** - castration by crude method
- **Ringing** – removal of wool from the region around the penis
- **Eyeing** – clipping of wool around the eye to prevent wool blindness

Species	**Number of defined breeds India**
Cattle	28
Buffalo	7
Sheep	44

Goat	23
Equines	6

- **Watering of livestock**

Species	**water intake /day**
Cattle & buffalo	27 – 28 lit
Adult camel	70 – 90 lit
Sheep & goat	18 lit
Pigs	25 – 30 lit
Poultry	250 ml
Dog &cats	14 lit
Horse	36 lit

Species		**Water req.for all purposes / day**
➢ Cow	-	100 – 110 lit
➢ Horse	-	72 lit
➢ Pigs	-	40 -50 lit

Potable water

Standard physical qualities

Organic matter	*3ppm*
PH range	*7-8.5*
Turbidity	*5 turbidity scale*

Chemical qualities

Chloride, Sulphate	250ppm
Fluoride	1ppm
Ammonia	
Lead	0.1ppm
Arsenic	0.05ppm
Iron	0.3ppm

Hardness of water

- temporary hardness – **bicarbonates of calcium and magnesium**
- Permanent hardnes - **Chlorides and sulphates of calcium and magnesium.**
- Chlorine demand for normal water – **0.9-1.8 ppm**
- Brackish taste of water is due to presence of **sodium chloride**
- **Sickle shaped horn – *surti***
- **Tallest Indian sheep breed – *Nellore***
- **Shortest Indian sheep breed – *Mandya***
- Pelt breed – ***karakul***
- Largest goat breed – ***jamnapari***
- Dwarf breed of goat – ***Barbari***
- Milk fat percentage highest in ***Jakffarabadi*** & lowest in ***Nili-ravi***
- ***Chegu*** and ***chanthangi*** are pashmina goat
- Gestation heat is also present in goat
- Safe sanitary distance is **150-200 feet** away from the sources of contaminations
- **Glutaraldehyde (2%)** aqueous solution used for sterilization of instruments
- Trap is a contrivance for preventing **sewar gas** escaping in to house drainage system
- Presence of iron in water encourages the growth of iron bacteria such as **crenothrix** and **gallionella**
- Higher concentration of fluoride causes interference with calcification giving rise to dental dystrophy known as **mottled teeth**
- Cooling power can be measured by **kata thermometer**
- Air velocity **100ft/min** at **70˚C** is found to be comfortable for broilers
- Percentage of CO2 present in the atmosphere can be measured by **Haldane's apparatus**

➢ Short day breeders – sheep and goat

➢ Long day breeders - horse

✓ Housing -East- west orientation – temperate regions

✓ North – south orientation – tropical regions

<u>Identification of horse</u>

- **Grey** – skin is black with admixture of black and white hairs
- **Bay** – varies from dull red to yellowish color, black mane, tail and the limb
- **Piebald** – irregular patches of white and black
- **Star** – a white mark on the forehead either large or small
- **Stripe** – a narrow white marking running down the face,may be thin or broad
- **Conjoined star and stripe** – stripe in continuation of a star
- **Blaze** – a white marking covering almost the whole of the forehead between the eyes and extending down the front of the face beyond the width of nasal bone and usually involving the muzzle
- **White face** – white covers the whole of forehead
- **Snip** – any isolated white mark in between the nostrils
- **White muzzle** – both lips will be white
- **Whorls** – any irregular setting of hairs
- **Freeze branding** - Dry ice **– (- 70˚C) ,** Liquid nitrogen – **(-196˚C**)

<u>Teeth</u>

✓ **Canine teeth** absent in mare,cattle

✓ **Tushes – canine teeth of pig**

- ✓ **Wolf teeth** – 1st pre molar of upper jaw in horse
- ✓ **Dental star** – a mark seen on the table surface of incisors in horse
- ✓ **Infundibulum** – dark depression on the table surface of incisors in horse
- ✓ **Carnassials / sectorial teeth** – in dogs.
  - ➢ 4th cheek tooth of upper jaw (4th pre molar)
  - ➢ 5th cheek tooth of lower jaw (1st molar)

- ✓ **Galvayne's groove** is a depression on the labial surface of the corner incisors
- ✓ **Bishoping** is an attempt to make the old animals to be mistaken for a young one

Dental formula

species	**Temporary (deciduous)**		**permanent**	
	2 (Incisors / canine / premolar)		**2** (Incisors/canine/premolar/molar)	
Cattle/sheep/goat	0/4 , 0/0 , 3/3	20	0/4 , 0/0 , 3/3 , 3/3	32
Horse	3/3 , 0/0 , 3/3	24	3/3 , 1/1 , 3-4/3 , 3/3	40 - 42
Pig	3/3 , 1/1 , 3/3	28	3/3 , 1/1 , 4/4 , 3/3	44
Dog	3/3 , 1/1 , 3/3	28	3/3 , 1/1 , 4/4 , 2/3	42
Cat	3/3 , 1/1 , 3/2	26	3/3 , 1/1 , 3/2 , 1/1	30
Camel	1/3 , 1/1, 3/2	22	1/3 , 1/1, 3/2 , 3/3	34

- Double dished face is characteristic of **jersey** and **Guernsey**
- **Golden yellow** color milk is seen in Guernsey
- Best milk production of world is **Holstein Friesian**
- Key stone of arch in animal breeding – **selection**
- Mass selection can be powerful for **highly heritable traits**

Species	**Sperm count/ml**	**volume**
Bull	600-1200 million	2-10 ml
Buffalo	600-1000 million	2-5 ml
Ram	800-4000 million	0.6-2 ml
Stallion	50-200 million	30-280 ml
Boar	25-1000 million	150-450 ml

- **Calf starter** should be fed at 3 months of age **(TDN -70%, CP -22%)**
- Additional feeding during the pregnancy period – '***Steaming up'***
- Cows should be bred after calving within **60-90 days**
- Ear notching is commonly practiced in **pigs**

- Removal of testicles in fowl – **Caponisation**
- Draught power of bullock – **0.75 HP**
- Gestation period of goat is **145-155** days
- Best known Indian goat milch breed – **jamnapari**
- **Crude Fibre** utilization - **Goat>sheep>buffaloes>cows**
- In sheep **flushing** is practiced **2-3 weeks** before mating
- Age of ram for breeding purpose – **2 yrs**
- Sheep tends to survive best in **drier climates**
- At 20 wks of age, **16 hrs** of lighting is required
- Air movement should not exceed **30 ft (9.2m)/min**
- For production of 1ml of milk **400-500ml** of blood must pass through the udder
- Major elements (Ca, P , K , Cl , and Na) cannot be changed by altering the levels of these elements in the ration of a cow
- **STH,ACTH,TSH and Oxytocin** exert their effect in maintaining the normal lactation curve
- **Galactophore** - a milk duct
- **Galactosidase** - enzyme which catalyses the splitting of lactose into **glucose + Galactose**
- **Galactopoiesis** – maintenance of lactation
- **Lactogenesis** – initiation of milk secretion
- Concentrate feeding – 0.35 kg per lit of milk
- Colostrums also known as **Beesting**
- Best time for castration is **8-10 weeks** for cattle
- Deworming – with **piperazine adipate** with in 3^{rd} to 7^{th} day, repeat it once in a month upto 6^{th} month of age
- Calf mortality - **below 8%**
- Adult mortality – **below 3%**
- Chemical used for shearing in sheep – **Cyclophospamide**
- Limiting amino acid of sheep - **Methionine**
- Dry matter requirement of sheep - **2.5 – 3 kg /head / day**
- The only milk producing sheep breed (goat like sheep) – **Sonadi**
- **Fineness of wool** – expressed in terms of **spinning counts (s)**
- Ratio of secondary to primary follicle in **Fine wool breeds** – **20 : 1**
  Carpet wool breeds– **1:1 to 3:1**

- Diameter of Wool fiber – **15 – 50 µ**
- Diameter of Kemp fiber – **100 – 200 µ**
- Hair - Medulla is present

Type of wool	Diameter	S unit
Fine wool	<25 µ	64s to 80s
Medium wool	25 – 40 µ	50s to 62s
Coarse wool	>40 µ	<50s

- The fiber from the Angora goat is known as **Mohair**
- Fleece contain Suint and Grease
- **Suint** – water soluble salts present in the wool, which is excretory products from skin
- The waviness of wool is known as **crimp,** fine wool will have more crimps
- Mutton – Pale pinkish
- Chevon – dark red with coarse texture

	Floor space per animal (Sq.ft)	
Type of animal	**Covered area**	**Open area**
Cows	20-30(3.5 m^2)	80-100(7 m^2)
Buffaloes	25-35	80-100
Young stock	15-20	50-60
Pregnant cows	100-120	180-200
Bulls	120-140(12 m^2)	200-250(120 m^2)
Ram /Buck	3.4 m^2	
Ewe /Doe	1 m^2	
Boar	9 m^2	9 m^2

VIII POULTRY SCIENCE

- **BREED**: group of individuals with in the species having distinct physical & productive characteristics, which are efficiently transmitted to decendents
- **variety**: subdivision of breed mostly decided by type of comb, colour of plumage
- **Strain**: population of small number of individuals in variety reproducing with well established common characteristics

Breeds

- **Mediterranean class (**Egg type): **M L A** (Minorca ,Leghorn , Ancona)
- **English class**(Meat type): **C O S A**(Cornish, Orphington, Sussex, Australop)
- **American class** (Dual type): **R P N W**(Rhode islandred, Plymouthrock, New Hampshire, Wyandotte) –
- **Asiatic class** – Brhaman, Cochin,Langsharn

Duck

Egg layers: Khaki Campbell, Indian runner

Meat ducks: white pekin, Aylsburry, Muscovy, Rouven

Sex ratio : Male:Female **1:15-16** - Replacement pullets

1:10-12 - broiler breeders

Family selection is useful in low heritability characteristics

- Low heritability characters **egg production , fertility and viability**
- Pedigree selection is used for **sex limited traits**
- Individual selection adopted for traits of **high heritability**,
- **highly heritable characters** – egg weight, shell quality, sexual maturity, growth rate, confirmation

- Selection of birds for **Layer Line** – 10-14 weeks of age
  Meat Type Line – 8 weeks of age
- **NAFED** – National Agricultural Co-Operative Marketing Federation of India
- In marketing of eggs, state level government organizations like MAFCO,TAPCO,POMFCO,NECC and NAFED are making considerable efforts for **marketing and sale promotion of eggs**
- **NECC** – National egg coordination committee – **fixes the prices for the eggs**
- **India – 3rd largest egg producer** next to china & USA
- Fertile egg – nucleus is called as **Germ disc**, infertile egg it is called as **Germ spot**
- **Oviposition** – act of laying, due to the release of **Arginine** and **vasotocin**
- **Brown color of egg** shell is due to the pigment **Porphyrin**
- **Blue shelled eggs** – pigment **Oocyanin**
- The normal depth of air cell is **4 to 8 mm**
- Shell from outside covered by a layer of cuticle which is **Bacteriostatic**
- Shell membranes – **0.001 – 0.02 mm thick**
- Shell – **11 %** of total egg weight
- Albumen – **58 %** of total egg weight
- Yolk – **31 %** of total egg weight
- **Ovomucin** – responsible for firmness of thick albumen

➢ **Oviduct**

- **Infundibulum** - fertilization of ovum, the yolk stays for about **15 min**
- **Magnum** – major qty of thick albumen secreted here , materials stay about **3 hours**
- **Isthmus** – 1.25 hrs, egg white,2 shell membranes, some salt and water is added to egg
- **Uterus** – major role in egg formation, hard calcareous shell, shell pigment, some minerals& water along with cuticle deposited, egg spends max time 21 hrs at this place
- **Vagina** – egg just passes without spending time
- **24 – 26 hrs** required for formation of an egg
- **Haugh unit(HU)** – Evaluating albumen quality, the HU of good quality egg – **70**
- Temperature Egg holding room **18 – 20°c**
- **Physiological Zero** – to arrest the development of embryo before setting at 75-80 % humidity
- Fumigation – 1x – 40ml of formalin with 20g of Kmno4/2.80m3
- Incubator - temp-37.5- 37.8°C ,65-70% humidity
- Hatcher – temp- 36.5 – 36.8°C, 75 – 80% humidity
- Incubation period – 20-21 days
- **Brooding management** – up to 4 weeks – broilers, 6-8 wks – layers
- **Brooding space** – 50-66 cm^2/chick, temperature – 33°C during first week,2.6°C reduced every week till reaches 21°C
- **Debeaking** - generally done twice in egg type chicken – Day old & Around 9^{th} day or at 3-4 weeks of age
- **Toe-clipping** – breeding males – 6-9 days of age
- **Dubbing** – removal of comb , around 7-8 weeks of age
- **Cropping** - removal of wattles
- **The average stocking density of adult birds**
  Free range **- 250birds/ha**
  Semi intensive **– 750 birds/ha**

Intensive system – **10000-25000birds/ha**

- **Foul-patch** – the ground immediately surrounding the houses- more danger of infection
- **Depth of litter** – **5cm** for chicks,**7 -10cm** for growers and layers
- The **relative humidity in the deep litter** system should be **around 40%**
- The **moisture content of litter** should not be less than **18%** and should not exceed **>24%**
- The ammonia level produced by litter should not exceed **25ppm**
- Orientation of poultry houses – **East-West direction**

Floor space requirement

	Layers		**Broilers**	
	Age (weeks)	Space/bird(cm sq)	Age (weeks)	Space/bird(cm sq)
Deep litter	0-7	650-675	0 - 4	450-470
	8-11	900-925	5 - 7	750-850
	12-19	1800-2000		
Cage system	0-8	200-250		
	9-20	275-300		
	20 & above	337-375		

- **Restricted feeding**- increases the size of initial eggs laid and is an important factor **to regulate the size of eggs**
- **Egg-borne transmission** (Trans ovarian diseases) - Salmonellosis , Mycoplasmosis, Avianleucosis complex, Ranikhet disease , Infectious Bronchitis, Avian Encephalomyelitis,avian Adeno virus infection, IBH(inclusion body hepatitis), EDS-76, Fowl typhoid
- **Mottled yolk** – Due to coccidiostat, hot weather, gossypol poisoning
- **Blood spot** – Vitamin A deficiency
- **Brooder pneumonia** – Aspergillus fumigates
- **Gape worm** (Forked worms)– Syngamus trachea
- Vaccine - Drinking water administration – For 10 liters of water **1kg of ice** and **60g of skimmed milk powder** is used
- The RH of poultry house should range from **45-75%**
- Hatch weight of broiler chick - **35 – 40 g**
- Chicks must remain in continuous lighting **up to 8 wks** of age

NUTRITION

- Supplemental **nitrogen: sulphur** necessary in the ratio of **10:1**
- Cereal grains are deficient in **lysine** and **tryptophan**
- Fish meal is rich source of **lysine, tryptophan** and **methionine**
- Piglets highly susceptible to **iron** and **cobalt** deficiency
- **Piglet anaemia**(**thumps**)

- symptoms - Pale in the region of ears and belly, Listlessness, Rapid breathing, often Diarrhoea .
- R_X - 100-150 mg of iron in the form of iron dextron – 3 days after birth if necessary a second inj.-3 weeks later

- Weight at weaning age is proof of **efficient growth** and also an indication of the **milking ability** of the gilt
- Creep feeding given from **3rd week** onwards (25-30% CP)
- Yellow maize is rich in **cryptoxanthine**
- **Restricted feeding** produces better quality meat
- Cotton seed meal is known for its efficiency to produce **hard and firm meat**
- Feeds like **ground nut, maize, rice bran, vegetable oils**, etc when fed in liberal will result in **soft pork**
- Maize as a cereal deficient in **calcium**
- **Choline** and **methionine** are needed to supplement to counteract the toxicity resulting from tannin
- Rice polish – rich in **thiamine** and higher in **niacin** and **riboflavin**
- Wheat bran – 12% fibrer rich in **phosphorus** and **poor in calcium**
- ***Blood meal - >80% protein***
- ***Meat meal – 50-55 CP***
- Blood meal is deficient **isoleucine**
- Ground nut cake **40-50% protein**
- Feather meal **5%** inclusion level

MICROBIOLOGY

1. Koch's postulates was derived by using which bacterium ?***Bacillus anthracis***
2. Kanagawa reaction is exhibited by...***Vibrio parahaemolyticum***
3. Father of Microbiology ***Louis Pasteur***
4. In presence of specific antibody, *Streptococcus pneumoniae* shows --- ***Quellungreaction*** reaction
5. Father of Bacteriology ***Robert Koch***
6. Small pox vaccine was developed by --- ***Edward Jenner*** -----in the year1796.
7. A polymer of glycerol phosphate that is present only in G+ bacteria cell wall ***Teichoic acid***
8. Rabies vaccine was first done on ***Joseph Meister***
9. Loeffler and Frosch shares the credit of discovery of---- ***FMD Virus*** --
10. The only anti TB drug that has the ability to destroy the acid fastness of Mycobacterium. ***Izoniazid***

11. The bacteria that is used to evaluate the phenol coefficient using Rideal Walker method ***Salmonella typhi***

12. Mastitis causing Str.agalactiae and Str. dysgalactiae are classified as group - ***B and C*** --- and group--***A*** is S. pyogenes respectively as per Lancefield classification.

13. The substance present normally in spores at high levels,but decreases during the favourable condition. ***Calcium Dipicolinate***

14. Greyish-white medusa head type of colony is shown by *Bacillus anthracis* in which medium ? . ***Nutrient Agar***

15. Chinese letter arrangement and metachromatin granules are features of ***Corynebacteria***

16. Agent that causes Summer Mastitis ***Corynebacteriapyogenes***

17. Growth of *E.rhusiopathiae* is favoured by which aminoacid ? ***Tryptophan***

18. Tuberculous lesions are prominent in digestive tract rather than in respiratory tract in ***Poultry***

19. Etiological agent of Calf Diphtheria ***Fusobacterium necrophorus***

20. Characteristic features of abortion in cattle caused by B.abortus ***Necrotic placentitis and Leatheryplacenta***

21. Type of vaccines used against brucellosis in calves & cows. ***Strain 19 (living) and Strain 45/20(killed) respectively***

22. Kennel Cough in dogs caused by **.. *Bordetella bronchiseptica***

23. Pasteurella, Yersinia and Listeria have one thing in common as part of their staining character. ***Bipolar staining***

24. Etiological agent of fowl coryza ***Haemophilus gallinarum***

25. Classification of Pasteurella species ***Robert's and Carter's serotyping***

26. The best medium for an enhanced growth of Campylobacter ***Thiol medium***

27. In Mc Konkeys agar, E.coli produces - ***Pink*** colonies whereas Salmonella produces -***Colourless***

28. Ringer and Gillespie medium is used for the growth of .. ***Leptospira***

29. 'Symptomatic anthrax is the synonym for.... ***Black Quarter***

30. Para anthrax in pigs is caused by .***Clostridium septicum***

31. Gaint cells of Langhans are absent in T.B affecting which species ***Canines and Felines***

32. In H&E staining T.B calcification appear as... ***Blue color.***

33. Epitheloid cells fuse to form syncytia and it enters ..***Symplasma....***stage in Johne's diseases.

34. Among domestic species ***... Sheep.*** is most susceptible to anthrax.

35. Condition in sheeps under 1year of age, affected by Cl.septicum due to toxaemia ***Braxy or Bradsot***

36. Pulmonary Adenomatosis in sheeps by retrovirus is ..... whereas Cl.botulinum type D infection in cattle is ..... ***Jaagsiekte ; Lamsiekte***

37. Dunkop and Dikkop are forms of ..... ***African Horse Sickness.***

38. Diagnostic test for E.I.A ***Coggin's Test***

39. Inclusion bodies in Fowl pox is ..... and in cow pox is.... ***Bollinger bodies ; Guarnieri bodies***

40. Instrument used to perform the Polymerase Chain Reaction ***Thermocycler***

41. Ulcerative enteritis in poultry caused by .....***Clostridium colinum***

42. Infectious encephalomyelitis caused by Flavi virus transmitted by ixodes ricinus***. Louping ill***

43. Granules present within the Guarnieri body***. Paschen's granules***

44. Synonym for Infectious bulbar paralysis caused by Herpes***. Psuedorabies/Mad Itch/Aujezky's disease***

45. Two medium used for the growth of mycoplasma. ***PPLO Agar and Frey's medium***

46. In McFaydean reaction ,color of organism and capsule ***Blue ; Pink***

47. Bursitis in horse caused by Brucella abortus ***Poll Evil and Fistulous Withers***

48. The etiological agent of 'Struck' in sheep **Clostridium perferinges Type C**

49. Bottle brush appearance in Gelatin stab is growth feature of .. . ***Erysipelothrix rhusiopathiae*** **and** ***Clostridium perferinges***

50. Visna/Maedi in sheep is caused by..... ***Retro virus***

PARASITOLOGY

1. Enzymes involved in hatching of Ascarid egg***: Chitinase and esterases***
2. McLean counting system is devised for : ***Ascaris suum***
3. An ascarid without somatic migration: ***Toxascaris leonina (A. galli belongs to Family heterakidae)***
4. Herring worm: ***Anisakis***
5. Cod fish worm: ***Phoconema***
6. Hourglass shaped esophagus in : ***Oxyuris equi***
7. Hourglass shaped buccal capsule found in : ***Oxyspirura mansoni***
8. Funnel shaped pharynx: ***Haebronema megastoma***
9. Cup shaped buccal capsule with cusp shaped teeth: ***Stephanurus dentatus***
10. Parasite responsible for "ungroomed rat tail appearance" in horse: ***Oxyuris equi***
11. Caecal worm of poultry: ***Heterakis gallinae***
12. Nematodes with "H" shaped excretory system: ***Rhabditidae***
13. Characteristic "ear" shaped (dorsal) tooth in : ***Strongylus vulgaris***
14. "Morocco leather" appearance associated with: ***Ostertagia ostertagi***
15. "Ring worm like lesions" associated with: ***Trichostrongylus spp***
16. "Horse shoe" shaped ovary: ***Echinococcus granulosus***
17. "Boot" shaped spicule: ***Dictyocaulus filariae***
18. "Heart" shaped spicule: ***Nematodirus baltus***
19. "Lancet" shaped spicule: ***Nematodirus fillicolis***
20. "Spoon" shaped spicule: ***Nematodirus spathiger***
21. "Y" shaped dorsal ray: ***Haemonchus contortus***
22. Recurved spicules: ***Gaigeria pachyscelis***
23. No spicule: ***Trichinella spiralis***
24. Black scours worm:***Trichostrongylus colubriformis***
25. Barber's pole worm/ wire worm/ large stomach worm/ twisted stomach worm: ***Haemonchus contortus***
26. Eyeworm of poultry: ***Oxyspirura mansoni***

27. Brown stomach worm: ***Ostertagia ostertagi***

28. Red stomach worm of pig: ***Hyostrongylus rubidus***

29. Fox hook worm: ***Uncinaria stenocephala***

30. Pig hook worm: ***Globocephalus (G. urosubulatus, G. longimucornatus)***

31. Elephant hook worm: ***Barthomostomus (B. sangeri), Grammocephalus clatheratus***

32. Lungworm of dog: ***Filaroides osleri***

33. Lungworm of cat: **Aleurostrongylus spp**

34. Lungworm of rat: ***Angiostrongylus cantonensis*-** causes "**eosinophilic meningio encephalitis**" in man

35. Eddy worm: Class **Turbellaria**

36. Larva with "S" shaped tail: ***Filaroides osleri***

37. Nurse cells characteristic of ***Trichinella spiralis***

38. "Stichosomes" are characteristic of: ***Trichurid esophagus***

39. "Cordons" in: ***Ascaridae***

40. "Bosses" in: ***Gongylonema***

41. Cuticle extended posteriorly beyond the tail of worm: ***Physaloptera spp***

42. Bursa strengthened with chitinous plate: **Protostrongylus spp**

43. L1 with characteristic cuticular knob: ***Dictyocaulus filariae***

44. L1 with button hook tail: ***Dipetelonema dracunculoides***

45. Anterior helmet seen in: ***Dracunculus medenensis***

46. Definitive host of *Dioctophyma renale*: ***mink***

47. The dish "Fessikhs" is associated with: ***Heterophyses heterophyses***

48. The dish "Marrara" is associated with: ***Sparganosis***

49. Phenomenon of "progenesis" is associated with: ***Family Plagyorchidae***

50. "Furcocercus cercaria": ***Schistosomes***

51. "Microcercus cercaria": ***Paragonimidae***

52. "cercaria vitrina": ***Dicrocelium dendriticum***

53. Radia with "procruscula": ***Fasciola spp***

54. Nematodes with flame cells: Class ***Acanthocephala (Macracanthorrhyncus hirudinaceus*)**

55. Halzoun syndrome associated with: ***Fasciolosis and spirometrosis***

56. Cestode with "sickle" shaped hooks: ***Taenia spp***

57. Cestode with "rosethorn" shaped hooks: ***Dipylidium caninum***

58. Cestode with "Hammer" shaped hooks**:** ***Davinia spp***

59. Cestode with "bunch of grape" ovary: ***Dipylidium caninum***

60. Metacestode tetrathyridium is seen in: Family ***Mesocestoides***

61. Metacestode strobilocercus seen in: ***Taenia taeniformis*** (as Cysticercus fasciolaris)

62. "Lapets" present in: ***Anoplocephala perfoliata***

63. "Dumbbell" shaped uterus: ***Stilasia hepatica***

64. Fringed tape worm: ***Thysanosoma actinoides***

65. Gravid uterus is replaced by egg capsule in: Family ***Linstowiidae***

66. Cooked rice grain appearance: ***monezia gravid segments***

67. Cucumber shaped segments: gravid segments of ***Dipylidium caninum***

Following diseases/conditions are associated with parasites

1. Milk spots: ***Ascaris suum***

2. Balling up in horse:***Parascaris equorum***

3. Mud colour faeces: ***Toxocara vitulorum***

4. Rat tail appearance: ***Oxyuris equi***

5. Black head: ***Heterakis gallinae*** **(Egg carrier of *Histomonas meleagridis*)**

6. Parasitic otitis: ***Rabditis bovis***

7. Black scours: ***Trichostrongylus worms***

8. Villous atrophy: ***Trochostrongylus and Nematodirus***

9. Ringworm lesions: ***Trichostrogylus***

10. Morocco leather: ***Ostertagia ostertagi***

11. Pulpy kidney disease (with***Cl. welchi): nematodirus***

12. Swimmer's itch***: Schistosoma spp (non human)***

13. Foot rot in sheep: ***Strongyloides papillosus***

14. Pimply gut: ***Oesophagostomum spp***

15. Colic in horse: ***Cythiostomum tetracanthum***

16. Haemorrhagic warts (in tracheal bifurcation): ***Filaroides osleri***

17. Fistulous whither: ***Onchocerca cervicalis***

18. Eosinophilic meningeo encephalitis in man: ***Angiostrongylus cantonensis***

19. Wahi /kaseri/ summer mange: ***Onchocerca spp***

20. Bursati / granular dermatitis/ summer sore: ***Habronema (cutaneous habronemiasis)***

21. Arteritis in horse: ***strongylidae family***

22. Oesophageal tumour: ***Spirocerca lupi***

23. Gastric tumour: ***Gnathostoma spinigerum***and ***Habronema megastoma* (*Draschia megastoma*)**

24. Cholangiocarcinoma: ***Clonorchis sinensis***(oriental liver fluke/Chinese liver fluke)

25. Urinary bladder carcinoma: ***Schistosoma haematobium***

26. "Swine fever" and epizootic pneumonia: ***Metastongylus spp***

27. Husk or hoose: ***Dictyocaulus viviparous***

28. Enzootic cerebrospinal nematodiasis: ***Setaria digitata***

29. Hump sore: ***Stephanofilaria assamensis***

30. Ear sore: ***Stephanofilaria zaheeri***

31. Fatal hemorrhagic enteritis in mink: ***Euryhelmis squamula***

32. Rot dropsy***: Fasciola spp***

33. Snoring in cattle: ***Schostosoma nasalis***

34. Nodular taeniasis in poultry: ***Reilettina echinobothrida***

35. Hepatitis cysticercosa: ***Cysticercus tenuicollis***

36. Gid/Staggers: **Coenurus cerebralis (of *Taenia multiceps*)**

37. False gid: ***Oestrus ovis* (larva)**

38. Macrocytic / pernicious anemia**:** ***Diphyllobothrium latum***

39. LD bodies: ***Leishmaniosis***

40. KB bodies: ***Theileriosis***

41. Visceral Leishmaniosis: ***Leishmania donovani, L. chagasi, L. infantum***

42. PKDL: ***L. donovani***

43. Kala azar: ***L. donovani***

44. American kala azar: ***L. chagasi***

45. Rural zoonotic leishmaniasis**:** ***L. major***

46. Chiclero ulcer/ bay sore**:** ***L. mexicana mexicana***

47. Classical espundya: ***L. braziliensis braziliensis***

48. Uta: ***L. peruviana***

49. Nagana: ***Trypanosoma brucei, T. congolensi, T. vivax***

50. Souma*:* ***T. vivax in cattle***

51. African sleeping sickness: ***T. brucei gambiensi, T. brucei rhodasiensi***

52. Surra: ***T. evansi***

53. Tibarsa /Gufar: ***T. evansi*** **in camel**

54. Mal de Cadares: ***T. equinum***

55. Dourine / equine syphilis: ***T. equiperdum***

56. Dollar spots: ***T. equiperdum***

57. Yellow buttons: ***Trichomonas gallinae*** **(Avian trichomonosis)**

58. Saucer shaped ulcer in tissue: ***Histomonas meleagridis***

59. Suphur yellow faeces: ***Histomonas meleagridis***

60. Travellers diarrhea: ***Giardia lamblia***

61. Flask shaped ulcer: ***Entamoeba histolytica*** **(in intestine)**

62. Red dysentery: ***Eimeria zuernii*** **in cattle**

63. Rectal coccidiosis: ***Eimeria burnetti***

64. Ladder lesions in duodenum: ***Eimeria acervulina***

65. Signet ring: ***Plasmodium spp***

66. Texas fever/Red water fever/Bovine pyroplasmosis: ***Babesia spp in cattle***

67. Equine biliary fever: ***Babesia equi (now as Theilaria equi)***

68. Tropical bovine theileriosis: ***Theileria annulata***

69. Benign tropical thieileriosis: ***T. mutans***

70. East coast fever/ January disease: ***T. parva***

71. Buffalo disease/Corridor disease: ***T. lawrensi***

72. Malignant theileriosis: ***T. hirci***

73. Gall sickness: ***Anaplasma marginale***

ICAR VET REFRSHER

1. Bacterial disease in which Pasteur's vaccine used- ***Anthrax***

2. 'Para anthrax' in pigs caused by- ***Cl. septicum***

3. Foot rot in sheep is caused by - ***Bacterioides nodosus***

4. Duck Plague is the synonym for –***Duck Viral Enteritis***

5. The indistinct margins of a radiograph due to a large focal spot of X-ray beam ***-penumbra.***

6. The optimum temperature of developing and fixing solutions in radiography is ***-68F***

7. Avian influenza virus has ***8 gene segments***

8. M. leprae can be cultivated in vivo only in- ***Armadillo***

9. State of unresponsiveness towards an antigen is - ***Anergy***

10. The cholinergic drug that cannot be hydrolyzed by AchE is ***-carbachol***

11. The penetrating power of X-ray beam depends on - ***kvp***

12. Anaesthesia produced by combination of drugs is termed as-***Balanced anaesthesia***

13. Antigen-Antibody complexes present in dentrites of Dentritic cells- ***Iccosomes***

14. BCG is an attenuated form of - ***Mycobacterium bovis***

15. Vitamin C is used as an antidote to ---***Nitrate-----poisoning***

16. Oseltamivir is the drug of choice against- ***Bird flu in humans***

17. The species of animal in which Ivermectin crosses the BBB- ***Equines***

18. The only anaesthetic agent known to be carcinogenic- ***fluoroxene***

19. The drugs contraindicated in parakeets & cats respectively are- **procaine & morphine**

20. The species most sensitive to the ill-effects of xylazine - ***cattle***

21. A pantropic virus that commonly affects Canines- ***Canine distemper virus***

22. Symplasma stage in submucosa is seen in- ***Johne's Disease***

23. Oestrogenic mycotoxin causing reproductive disorders in swine is- ***Zearalenone***

24. 'Blue eye' or Rubarth's Disease is the synonym for- ***Infectious Canine Hepatitis***

25. Which is the most potent opiate analgesic? ***carfentanil***

26. Name a benzodiazepine antagonist- ***flumazenil***

27. Ketamine is contraindicated in head injuries as it reduces -***Intra cranial pressure***

28. The subtype of Avian flu virus causing human casualties around the world- ***H5N1***

29. Mad cow disease is caused by- ***Prions***

30. Cold enrichment procedure is done for the isolation of **- *Listeria***

31. 'J' chain is present in immunoglobulins- ***IgA and IgM***

32. In the body, Chloral hydrate is converted to - ***tricholoroethanol***

33. Name one anaesthetic agent which is steroid in nature- ***Althesin***

34. Dose of Anthrax vaccine- ***1ml s/c***

35. Anaphylatoxins are- ***C3a and C5a***

36. The specific antidote of Morphine is- ***Nalorphine***

37. Dunkop (pulmonary) and Dikkop (cardiac) are two forms of - ***African Horse Sickness***

38. 'Wire loop' lesions in the glomerular basement membrane seen in- ***SLE***

39. The drug used to stabilize mast cells- ***Cromolyn sodium***

40. ***Hyaluronidase--*** enzyme used with local anaesthetics to promote its diffusion and absorption

41. Milbemycin oxime is obtained from-***Streptomyces hygroscopicus***

42. Name a suture material that glows in darkness easy to handle in poor light- ***Flurofil***

43. Cardinal Signs of Inflammation was propounded by- ***Cornelius Celsus***

44. FMD virus multiplies in the ------***Str.spinosum***--------- layer of epidermis

45. Father of Immunology is- ***Edward Jenner***

46. Lamsiekte in cattle and sheep is caused by - ***Cl.botulinum type D.***

47. Vaccine strain of B.anthracis is - ***Aviurlent and Non capsulated***

48. Monsell's suture technique is used in - ***Enteroanastomosis***

49. Ethylene oxide is a gaseous agent used for sterilization kills microorganisms by-***alkylation..***

50. VitC is necessary for hydroxylation of proline & lysine in synthesis of -***collagen***

51. 'Bomb burst' or 'Umbrella like' colonies are characteristic of - ***Listeria***

52. Influenza virus is typed based on ***Matrix and Nucleocapsid antigen***

53. The conversion of DHFA to THFA is blocked by- ***Trimethoprim***

54. Examples of pencillinase resistant pencillins- ***Methicillin and Cloxacillin***

55. First immunoglobulin to be synthesized in Neonates- ***IgM.***

56. 'Abortion storms' ***in sheep*** is caused by- ***Campylobacter foetus***

57. Vaccine strain used for prophylaxis of IBD infection-***Georgia***

58. Which is the only benzimidazole drug that wont inhibit Fumarate reductase- ***mebendazole***

59. Name an anthelminthic which was previously used to treat human gout- ***piperazine***

60. The experimental animal used for FMD research is - ***Guinea pig***

61. The no: of Capsomers in Adenoviruses is- ***252***

62. The source of Vero cell line is - ***African Green Monkey (Kidney)***

63. Heat resistant ability of sporulated bacterium is due to the compound-***Ca dipicholinate***

64. The generation of monoclonal antibodies involves-***Salvage pathway***

65. Antibiotic which can also function as an anthelminthic agent is- ***Hygromycin B***

66. Ivermectin toxicity can be reversed by using - ***Picrotoxin***

67. Cucurbitin, an active principle in Pumpkin seed is used for the treatment for-***Cestodiasis***

68. Name a live vaccine previously used against rabies- ***Flury's LEP & HEP***

69. Periarticular lymphoid sheath (PALS) is populated by ***T lymphocytes*** are seen in-***Spleen***

70. Habel's testing (mouse test) is done for the diagnostic assessment of- ***Rabies***

71. Most immunogenic viral polypeptide of FMD virus is - ***VP1***

72. Rabbits show genetic tolerance towards- ***Atropine***

73. The diuretic that cannot be given along with aminoglycoside antibiotics- ***Furosemide***

74. The antibiotic Gentamicin is obtained from- ***Micromonosporum purpureum***

75. Ochratoxin primarily causing renal impairment is produced by- ***Aspergillus ochraceus***

76. Name the smallest animal virus- ***Porcine circovirus (17-20nm)., FMDV is of 28-30nm size.***

77. Pyometra in bitches is caused by –***E.coli***

78. Strawberry foot rot is caused by-***Dermatophilus congolensis***

79. Drug of choice for mycoplasmosis- ***Tylosin***

80. 'Tennis racket' shaped spores are present in- ***Cl. chauvoei***

81. Psittacosis or Ornithosis in birds is caused by- ***Chlamydophila psittaci***

82. The proton pump inhibitor used to treat Zollinger-Ellison syndrome-***Omeprazole***

83. Rabies virus (bullet shaped) belongs to the genus- ***Lyssa virus***

84. 'Bull Nose' in pigs is caused by- ***Fusobacterium necrophorus***

85. DNA virus that codes for reverse transcriptase enzyme- ***Hepadna virus***

86. Chronic Respiratory Disease in birds is caused by - ***Mycoplasma gallisepticum***

87. Immediate precursor of all sex steroids- ***Pregnenalone***

88. In avian tuberculosis the lesion are confined to - ***GI tract***

89. Name a commonly used AchE reactivator- ***Pralidoxime.***

90. Piperonyl butoxide is used as a synergist along with -***Pyrethroids***

91. HVT is the vaccine strain used against- ***Marek's Disease***

92. In B.abortus, the ratio between LPS antigens A and M is - ***20:1***

93. Kume and Page Scheme is used for the classification of- ***Haemophilus***

94. 'Reverse Genetics' is nowadays used for the production of vaccine strains of - ***Avian flu virus***

95. Drug of choice against Theileriosis is -***Buparvaquone***

96. With H&E staining the calcified tissue appears -***Blue***

97. The toxic level of Aflatoxin in ducklings is- ***0.03ppm***

98. Summer Mastitis in cattle is caused by -***C. pyogenes***

99. Heart Water disease is caused by- ***Cowdria ruminantium***

100. EMJH medium is commonly used for the cultivation of -***Leptospira***

101. Hoti's test is used for detecting -***Str. agalactiae*** mastitis

102. Infectious Bulbar Paralysis is the synonym for- ***Psuedorabies***

103. Sulphonamides are metabolized by ***acetylation* in** ruminants***and glucuronidation in*** canines.

104. Scythe shaped spleen is seen in -***Horses***

105. The most important symptom of anthrax in dogs is -***Gastroenteritis.***

106. Braxy in sheep is caused by -***Cl. septicum***.

107. The microbes that have the ability to survive pasteurization temp is -***Listeria and Coxiella***

108. Techoic acid is present in the cell wall of - ***Gram + bacteria***

109. Route of inoculation in chicken embryos is ***intravenous for Blue tongue virus***

110. 'Darling disease' is caused by - ***Histoplasma***

111. New Jersey, Indiana and Trinidad are strains of - ***Vesicular stomatitis virus***

112. Diene staining is used for - ***Mycoplasma***

113. Aspergillus flavus in SDA produces-***Yellowish green colonies***

114. Cork screw motility is shown by -***Campylobacter***

115. Turkey coryza which is highly contagious is caused by - ***Bordetella avium***

116. Castanida and Machiavello staining are employed for detecting- ***Chlamydia***

117. The antibodies used against the Rh antigen to prevent Erythroblastosis foetalis- ***Rhogam***

118. The immunoglobulin known as 'Reagin'- ***IgE***

119. Macrophages present in Kidney are known as- ***Mesangial cells***

120. Interleukin that suppresses the immune response is - ***IL-10***

121. Etiological agent of silage disease is – ***Listeria.***

122. Smallest living organism of individual existence- ***Mycoplasma***

123. Bacillus anthracis have medusa head like colonies in -***Nutrient agar***

124. Clostridium perfringens type A in animals causes- ***Gas gangrene***

125. The class of immunoglobulin that first appears in primary immune response- ***IgM***

126. Polypeptide chain called secretory component is present in- ***IgA***

127. Docking in dogs can predispose to a conditon called- ***Perineal Hernia***

128. Hoflund's syndrome is the synonym for- ***Vagal indigestion***

129. Vitamin K dependent clotting factors are- ***2, 7, 9 and 10.***

130. Limber neck in poultry is caused by- ***Clostridium botulinum type C***

131. The amino acid tryptophan act as growth promoter for the microbe- ***Erysepelothrix***

132. The most potent Aflatoxin is- ***B1***

133. The cytolytic product of CTL cells that forms transmembrane pores in target cells- ***Perforins***

134. Autoimmune disease in which Ig's are formed against Ach receptors- ***Myasthenia gravis***

135. World's first veterinary school in - ***1762, Lyons, Paris***

136. The dog breed that has genetic predisposition for skin tumor- ***Boxer***

137. Gavard's muscle is the synonym of -***Int.obl. muscle layer of stomach***.

138. Ventral bending (concave) of the spinal column is called- ***Lordosis***

139. A and M antigens are absent in- ***B.canis & B.ovis***

140. Foothill abortion / BEA in cattle is caused by- ***Chlamydophila psittaci***

141. The antibacterial system naturally present in milk is- ***Lactoperoxidase system***

142. Marsupialization in bitches is done usually to treat- ***Pyometra***

143. Dose of Ivermectin is – ***200 micrograms/Kg body weight***

144. The breed of cattle which has strong predisposition for Eye Cancer- ***Hereford***

145. Male dog urinates like bitch in - ***Cystitis***

146. Knott test is done to detect ***Dirofilariosis in dogs***

147. Half life of IgG is - ***20-21 days***

148. Benign tumor of gingiva is called - ***Epulis***

149. The drug used to contract gall bladder (cholecystokinetic)- ***Ceruletide***

150. The type of paralysis produced by the drug piperazine on worms is – ***flaccid***

151. Cart wheel shape chromatin is seen – ***Plasma cells***

152. The most abundant buffer system in plasma- ***bicarbonate buffer***

153. The smallest animal cell has a diameter of – ***2 microns***

154. The Fc fragment of Ig's can be recovered by digestion with the enzyme- ***Papain***

155. Most common respiratory pathogen in canines - ***Bordetella bronchiseptica (kennel cough)***

156. Rabbit ileal loop assay is commonly done for the detection of - ***ET E.coli***

157. Haemo-lymphnodes are commonly seen in - ***Ruminants***

158. Clonal selection theory of antibody production was proposed by- ***Burnet***

159. Biphasic fever in dogs is indicative of - ***Canine distemper***

160. Ramstedt's surgical procedure is performed to correct- ***Pyloric stenosis***

161. The immediate precursor of thrombocytes are- ***Megakaryocytes***

162. Rouleaux formation in blood smear is a common finding in – ***Felines***

163. Substance required for platelet aggregation is – ***Thromboxane***

164. The interleukin commonly referred as chemokine is - ***IL-8***

165. Rectal pinch test is done for the diagnosis of - ***Johne's disease***

166. Surgical cat gut is often sterilized by- ***Isopropyl alcohol or ethylene oxide***

167. Giant kidney worm of Dogs is - ***Dioctophyme renale***

168. The sedimentation coefficient of IgG ***is 7S*** and IgM ***is 19S***

169. Principal metabolic pathway in RBC is- ***Glycolysis***

170. Tyzzer's disease in foals and lab animals is caused by – ***Bacillus piliformis***

171. Avian spirochetosis is caused by – ***Borrelia anserina***

172. Colopexy is used to treat- ***Recurrent rectal prolapse***

173. Mouse ascites method is used to production of - ***Monoclonal antibodies***

174. The dog breed having genetic predisposition to cardiac hypertropy- **Grey hound**

175. Suture technique used for uterine stump closure- ***Parker kerr method***

176. In humans ***MHC is referred to as HLA complex*** whereas in mice it is ***H-2 complex***

177. "Paple" shaped abdomen is diagnositic of – ***Vagus Indigestion***

178. Tenesmus followed by bloody dysentery in calves is characteristic of – ***Eimeria zuernii***

179. The coccidial organism commonly found in felines and canines **– *Isospora (Eimeria absent)***

180. "Slime balls" ie., cercarial aggregation seen in- ***Dicrocoelium infection.***

181. "Grunt" on applying pressure on xiphoid region in cattle is indicative of- ***TRP***

182. Salmon poisoning in dogs caused by -***Neorickettsia helmintheca***

183. Antibody having least half life is - ***IgE***

184. Genetically mutant mice lacking NK cells is called**- *Biege (Athymic mice- 'Nude')***

185. Salivary cyst found in sublingual duct is- ***Ranula***

186. Membrane bound IgM is a - ***Monomer***

187. Class II MHC restricted cells are- ***T helper cells***

188. Lyme disease is caused by – Spirochete***, Borrelia burgdoeferi, (IH- Ixodes)***

189. Antidote for warfarin toxicity is – ***Vitamin K***

190. The drug that intensifies the toxic effects of Warfarin is – ***Phenyl Butazone***

191. The amino acid which is deficient in cats is - ***Taurine***

192. Complement activation is predominantly mediated by **- *IgM***

193. The compound used as gastric sedative in dogs is - ***Chloretone***

194. The receptor for co-stimulating B7 molecules on APC is- ***CD28***

195. Enteroplication is the surgical technique to correct- ***Intussusception***

196. The antibody that can exist as monomer, dimer, trimer and tetramer- ***IgA.***

197. Insulin like growth factor –I is also called as – ***Somatomedins***

198. The diuretic with Aldosterone antagonistic action is – ***Spironolactone***

199. The drug used to experimentally induce diabetes in dogs- ***Alloxan***

200. Allopurinol is the drug of choice for the treatment of – ***Gout***

201. In passive HA, chemical used to coat antigens in RBC- ***Tannic acid or chromium chloride.***

202. Infectious RNA molecule of low molecular weight comes under the category- ***Viroids***

203. Pink eye is caused by ***Moraxella bovis*** and Summer pink eye is caused ***by IBR virus***

204. 'Dew drop' colonies and satellite phenomenon is exhibited by- ***Haemophilus***

205. ***9R is*** the vaccine strain of - ***Salmonella Gallinarum***

206. Glaucoma, a condition of increased intra ocular pressure is treated using- ***Acetazolamide***

207. Canrenone is the metabolite of – ***Spironolactone***

208. Kanagawa reaction is shown by – ***Vibrio parahaemolyticum***

209. SMEDI in pigs is caused by – ***Parvo Virus***

210. "White Spotted" kidney is a sequelae to – ***Leptospirosis and E.coli infections***

211. Infarcts in kidney of Swine is characteristic of – ***Erysipelas***

212. In GI tract, the antigen transport is carried out by specialized cells called- ***'M' cells***

213. Infectious protein particles causing 'Scrapie' in sheep are called- ***Prions***

214. The penicillin which is effective against pseudomonas infection- ***Carbenicillin***

215. Burton's line in gums is indicative of - ***Lead poisoning***

216. The drug that can replace Ivermectin in sensitive dogs- ***Milbemycin oxime***

217. Jaagsiekte " Driving Sickness" in sheeps is caused by ***Retro virus***

218. Jaagsiekte is ***Pulmonary adenomatosis*** and Visna-Maedi (Retro) is ***Progressive pneumonia***

219. Farmer's Lung in cattle is caused by - ***Micropolyspora faeni***

220. The virus having a unique 'double capsid'- ***Reovirus***

221. Viral etiology of neoplasms were first reported by- ***Ellerman and Bang***

222. The group specific antigen of ALV which is commonly used for ***COFAL test is -p27***

223. Recombinant DNA technology was first developed by- ***Cohen and Boyer***

224. Ephemeral fever (3 day sickness) is caused by - ***Rhabdovirus***

225. "Facial Eczema" in cattle is caused by ***Pithomyces chartarum (fungus with toxin sporidesmin)***

226. "Gall Sickness" is the synonym for- ***Anaplasmosis***

227. Antigenic variation in avian influenza virus is largely due to- ***Genetic Shift***

228. MAB technique for producing monoclonal Ig's was devised by- ***Kohler and Milstein***

229. Bence Jones proteins (light chains of Ig) are present in urine in -***Multiple myeloma***

230. ***Rose-Waaler test*** is used for the detection of -***Rheumatoid factor (IgM)***

231. The dose of Heparin used as an anticoagulant is- ***10-20 IU/ml***

232. The media used to select the myeloma cells in MAB technique is- ***HAT medium***

233. The site present in an antibody to which an antigen binds is called- ***Paratope***

234. The vector for Reoviral Blue tongue in sheeps is- ***Culicoides spp***

235. "Pizzle rot" (Ovine Posthitis) in sheeps is caused by- ***Corynebacterium renale***

236. Gid, Sturdy, or Staggers is caused by-***Coenurus cerebralis (T. multiceps)***

237. The most commonly used serological test ELISA was developed by- ***Engvall and Perlman***

238. The gene for virulence in ND virus and AI virus are-***Fusion gene and HA gene (respectively)***

239. 'Tigroid heart' in calves is characteristic of- ***FMD***

240. Vascularization of Cornea is known as - ***Pannus***

241. The lesion in eyes of horses due to leptospiral infection - ***Periodic Ophthalmia***

242. "Blue eye" is the synonym for- ***Infectious Canine Hepatitis (adenovirus)***

243. "Hot Spot" (pyotraumatic dermatitis) is caused by- ***Staphylococcus aureus & S. intermedius.***

244. The interleukin often referred to as B cell growth factor is- ***IL-6***

245. FMD virus belongs to the genus- ***Aphthovirus***

246. 'Dropped Sole' in horses is a condition due to- ***Chronic Laminitis***

247. Feline pan leucopenia is caused by- ***Parvo virus***

248. Avian Influenza is caused by Influenza A virus of the family- ***Orthomyxoviridae***

249. The principal source of Interferon β is - ***Fibroblasts***

250. SAT-1,2 and 3 are types of FMDV originated from- ***Africa***

251. The interleukin responsible for class switching of IgM to IgG is - ***IL-4***

252. The animal species that serves as " ***mixing vessel***" for Avian and Mammalian flu is – ***Pig***

253. Disinfectant of choice against Anthrax bacilli- ***Gluteraldehyde (2%)***

254. HVT, the vaccine strain used against MDV (serotype I) belongs to- ***serotype III***

255. In birds, Avulavirus is the causative agent of - ***Newcastle disease***

256. The cell surface marker of memory T cells is- ***CD45RO***

257. In ALV infection, the tumor development is due to activation of oncogene called- ***c-myc***

258. Disinfectant of choice against FMD virus- ***Sodium Carbonate (4%)***

259. Staphylorraphy and Uranoplasty are techniques used to correct- ***Cleft palate***

260. Negri bodies for diagnosis of rabies can be detected using- ***Seller's stain***

261. Malignant tumor of mesenchymal cells is referred as –***Sarcoma***

ICAR -SET

1. Pseudo glanders is caused by----------***Histoplasma farciminosum***

2. Gestation period of lion/tiger is ----------. ***100-105 days***

3. Eye worm of poultry is ----------***Oxyspirura mansoni***

4. Bubo is the abscess of ----------***lymph node***

5. The etiology of Crazy chick disease is ---------- ***hypovitaminosis-E***

6. A pet animal which is an induced ovulator is ----------***Cat***

7. The amino acid that is essential for the synthesis of haemoglobin. ***glycine***

8. One gram of haemoglobin carry ---------- ml of Oxygen. ***1.34ml***

9. One gram of haemoglobin on degradation will produce---------mg of bilirubin***. 35mg***

10. .Micro organisms that survive pasteurisation temperature are---------- ***listeria and coxiella***

11. Summer mastitis is caused by ----------***Corynebacterium pyogens***

12. Both intranuclear and intracytoplasmic inclusion bodies are present in the infections caused by ----------- ***morbilli virus (paramyxo viridae)***

13. Normal intraocular pressure is ----------***20mm of Hg***

14. Enzyme responsible for the production of Ketone bodies is ---------- ***HMGCOA lyase***

15. Plasma protein precipitated last in salting out is ---------- ***Albumin***

16. The ratio of Calcium and Magnesium in blood is ----------***6:1***

17. Quellung reaction is shown by ---------- ***Streptococcus pneumoniae***

18. Drug of choice for Theileriosis is ----------***buparvaquone(BUTALEX)***

19. Kanagawa reaction is shown by ---------- ***Vibrio parahaemolyticum***

20. The cerebrospinal fluid pressure is ---------- ***8-12 mm of Hg***

21. Antidote of choice in copper poisoning is ---------- ***d-penicillamine***

22. Adrenaline at the rate of 1:1000 is used for the treatment of ---------- ***Shock***

23. Drug of choice in heart block is ---------- ***Isoproterenol***

24. Total no: of carbon atom in hemoglobin molecule is ----------***64***

25. Neostygmine is the drug of choice in ---------- ***Myasthenia gravis***

26. Homatropine is a synthetic derivative containing tropine and ---------- ***Mandelic acid***

27. Etiological agent of "Strawberry Footrot" is ---------- ***Dermatophilus congolensis***

28. The dose of Yohimbine and 4-AP in Xylazine reversal is ----------***0.05-.25mg/Kg***

29. Antibiotic that has the ability to bind with calcium is ---------- ***Gentamicin (all aminoglycosides)***

30. Xanthine Oxidase inhibitor that is used to treat Gout is ---------- ***Allopurinol***

31. Neuromuscular blocker which is kept on ice to prevent hydrolysis is ----------***succinyl choline***

32. Refractive power of eye lens is ----------***59D***

33. ----------connects the lateral and third ventricles in brain ***foramen of monroe***

34. The breed of dog sensitive to thiopentone is ----------***grey hound***

35. Local anesthetic with antifungal and antibiotic action is ----------***dorsacaine***

36. Drug of choice for tape worms in poultry is ----------***di butyl tin di laurrate***

37. Commonly used anesthetic that by-passes stage II of anesthesia. ***Barbiturates***

38. Antibody with shortest half life is ----------***IgE***

39. The cells lining the ventricles of brain ----------***ependymal cells***

40. Bierbeck granules are present in ----------***dendritic cells***

41. ----------% of oxygen consumed is used by brain ***Eight***

42. Most potent local anesthetic is ---------- ***Bupivacaine***

43. Fibrosis of yoke gall in cattle is also known as ---------- ***Tumor neck***

44. ----------is the condition seen in horses due to pressure of collar on neck ***Sit fast***

45. Malignant hyperthermia in swine is caused by----------anesthesia ***Halothane***

46. Cart wheel chromatin and Russel bodies are seen in ---------- ***Plasma cells***

47. The ratio of systolic, diastolic and pulse pressure is ----------***3:2:1***

48. Mineral toxicity that leads to fracture of pes is ---------- ***Fluorosis***

49. The immunoglobulin with longest hinge region is ---------- ***IgD***

50. The antagonist for Etorphine. ***Naltrexone***

51. Remnant of yolk sac in birds is called ---------- ***Meckel's diverticulum***

52. ---------- litre of gas is produced per minute in ruminants ***0.5 - 1.0***

53. Central lacteal is absent in the villi of ---------- ***Birds***

54. Nostrils are most dilatable in ---------- and rigid in ---------- ***Horses, Pigs***

55. When cattle lie down the rate of respiration ---------- ***Increased***

56. Inner surface area of lungs is ---------- times the surface area of body ***125***

57. During panting, the tidal volume is ---------- ***Constant***

58. Gas exchange in birds takes place in ---------- ***Lungs***

59. Diving ducks have respiratory centre sensitive to ---------- ***Posture***

60. Di palmityl lecithin is a ---------- ***Respiratory Surfactant***

61. Homogenizer valve is made up of ----------***Stellite***

62. At vacuum, milk boils at a temperature of ----------***50-55^{0}C***

63. Normal acidity of milk is ----------***0.14 %***

64. Predominant bacteria of milk is ----------***Micrococci***

65. Lactic acid bacteria are ---------- in nature - ***Aerotolerent anaerobes***

66. Flavour producing compounds found in curd are ----------,----------and ----------
Diacetyl, Acetyl methyl carbinol, Acetalimide

67. Sweet curdling is due to ----------like enzymes-***Renine***

68. Bitty cream is produced by the enzyme ----------***Lecithinase***

69. Milk fat contains generally ---------- type of fatty acids-- ***Saturated ,Shortchain***

70. Fe content of Khoa is ----------***100ppm***

71. Balance wheel of dairy industry is ----------***Butter***

72. Butter contains --------**80**----------% of fat

73. Bacteria used for ripening of cream…***Streptococcus lactis* and *S. diacetylactis***

74. Clarified butter fat is the synonym for --------***Ghee***----------

75. Cheese made from whey---***Ricotta cheese***

76. ---------- is a low fat cheese--***Sapsago***

77. Sodium alginate is obtained from ----------***Macrocystis pyrifera***------

78. Commonly used packaging material for milk is -------***LDPE food grade***----------

79. ----------***30***---------% of milk produced in the world is used for cheese making

80. Cheese made from buffalo milk - ***Mozarella***

81. Comb, wattle and earlobes of poultry are developed from .....***Dermis***.....

82. The sternum of poultry is ..... shaped-- ***Boat***

83. Chicken kidney has ..... lobes -- ***Three***

84. Brooding instinct is governed by ....***Prolactin***.....

85. *Gallus varius* is also called ....***Green jungle plexus***.....

86. The network of nerves in submucosa of intestine…..***Meissner's plexus***

87. Brush border of intestinal mucosa is constituted by .....***Microvilli***.....

88. Capacity of rumen in cattle- ***250 litres***

89. Ileo-caecal, Ileo-colic and Ileo-caeco-colic junction are seen in ...***Horse***..., ...***Dog***... and .....***Cattle***..... respectively

90. Ascending colon is replaced by large colon in ....***Horse***.....

91. Among birds, ...***Pigeon***..... drinks by suction

92. Starch on hydrolysis yield .....***Maltose***.....

93. Cholecystokinin .....***Delays***..... gastric emptying

94. Increased functional activity of colon leads to ....***Constipation***.....

95. Cattle secrete .....***100-200***.....litre of saliva per day

96. Among domestic animals, amylase is highest in the saliva of . ***Swine***.....

97. Saliva constitute .....***80***.....% of water entering rumen

98. Rennin converts casein to ..***Para casein***.....

99. Opening of bile duct to duodenum is guarded by ...***Sphincter of Oddi***.....

100. In horse ....**75....%** of energy comes from VFA.

PHARMACOLOGY

1. Plasma protein to which majority of drugs bind is ---------***Albumin***

2. ---------- is the principal metabolic pathway for sulfonamide compounds ***Acetylation***

3. Precursor of endogenous catecholamines in the body is--------***phenylalanine***

4. Drug of choice in acute anaphylactic shock is ------***epinephrine***

5. OP compound that interact with both esteratic and anionic site of acetylcholine esterase is -----.

Echothiophate

6. A racemic mixture of d-hyoscyamine and l-hyoscyamine is --------***Atropine***

7. What are soporifics? ***sleep inducers***

8. The term "Anaesthesia" was coined by ------***Oliver Wendell Holmes***

9. Precursor of serotonin is ------***Tryptophan***

10. What are endorphins?**Endogenous analgesics**

11. Species that require more amount of anaesthetics is-------***Horse***

12. The avian species in which procaine is contraindicated is -----***Parakeet***

13. In which breed of dogs thiobarbiturates are contraindicated? ***Grey Hounds***

14. Paralysis of ------ is a complication encountered in anaesthesia of Horse ***facial nerve***

15. Which stage of anaesthesia is bypassed by barbiturates?***Stage 2***

16. Laryngyospasm during induction of anaesthesia is more common in -------***cats***

17. Specific treatment for malignant hyperthermia in Pigs caused by halothane is-----***Dantrolene***

18. Oxidation of chloroform to phosgene can be prevented by adding -----***1% ethanol***

19. Barbiturates are derivatives of ----------***Malonyl Urea***

20. Oxytetracycline is obtained from ----------***Streptomyces rimosus***

21. ---------- is a benzimidazole with antifungal property ***Thiabendazole***

22. Primary mechanism of action of Mebendazole is inhibition of --------- by worms***Glucose uptake***

23. Wormicidal drug that can be given as immunomodulator at lower doses is ------- ***Levamisole***

24. Two chemical components seen in Ivermectin are ----- and --------B_{1a} ***and*** B_{1b}

25. Drug active against immature stages of *Fascioa hepatica* is ----------***Diamfenetide***

26. Antidote for Cyanide poisoning was discovered by ---------***K K Chen***

27. Organochlorine compound which does not accumulates in the body is ----------***Endosulfan***

28. The enzyme in haeme synthesis which is inhibited by lead poisoning is ---------***Aminolevulinic acid dehydratase***

29. *Conium maculatum* is better known as ---------***Hemlock***

30. Dose of BAL in Arsenic poisoning in Large animals is -----***3mg/kg @ 4hr interval deep i/m***

31. --------- is the metabolic product of Procaine ***PABA***

32. Give an example of a specific COX-2 inhibitor ***Cefocoxib***

33. Old Hen Test is used to detect ---------- potential of Organophoshate compounds ***Organo Phosphorous Induced Delayed Neurotoxicity***

34. ***Bright blindness*** **-----** is a type of retinal degeneration caused by Bracken Fern Poisoning

35. The specific antidote for Copper poisoning is ----------***D-penicillamine***

36. Violent Dyspnoea "Thumping" is seen in pigs as a result of ----------***Gossypol poisoning***

37. Animal species to which Benzene Hexa Chloride is highly toxic is -------***cat***

38. Highly potent Organophosporous compound is ---------. ***Parathion***

39. The synergists that is added to pyrethroid compounds in order to enhance its effect is ------***Piperonyl Butoxide***

40. What are Burton's Lines? ***Blue line in gums in lead poisoning***

41. Specific antidote for Nitrate poisoning is ----------***Methylene Blue***

42. Gentamicin, the aminoglycoside drug is obtained from **---------** ***Micromonosporum purpureum***

43. The Fungal toxin that causes reproductive problems in sows is --------**Zearalenone**

44. The anti BP drug Atenolol belongs to which group of Antiarrythmic Agents ?***Class 2***

45. Most potent H_2 Blocker is ----------***Famotidine***

46. Most potent Local anaesthetic is---------***Bupivacaine***

47. What does " Utectic Mixture " contain? ***Prilocaine and Lidocaine***

48. The most potent of all the Aflatoxins is------B_1

49. Father of Pharmacology is ------***Rudolf Bucheim***

50. Izoniazid and Ethambutol are the drugs used in the treatment of --------***Tuberculosis***

PATHOLOGY

1. 'Punched out ulcers' in abomasum- pathognomonic lesion of ?***Theileriosis***

2. Negri bodies in cattle with rabies seen in ....***Cerebellum***

3. Father of pathological anatomy ***Antonio Benevieni***

4. Father of cellular pathology ***Rudolph Virchow***

5. Lysosome first demonstrated by.....***Novikoff***

6. Most reactive free radical in inducing cell damage***Hydroxyl radical***

7. Removal of damaged organelle during cell injury is called as .....***Autophagy***

8. Component of cytoskeleton useful in tumor diagnosis ***Intermediate filaments***

9. Eosinophilic, intracytoplasmic inclusion in liver in alcoholic liver disease***Mallory body***

10. Condition in which impairment of phagocytic property of WBC occurs. ***Chediak Higashi syndrome***

11. Best fixative for glycogen ***Non-aqueous fixatives(methyl alcohol)***

12. Stains for glycogen (any two) ***Best carmine & PAS***

13. Macrophage laden with lipids in atherosclerosis called as....***Foam cell***

14. Russel bodies seen in ....?***Plasma cells***

15. Partial or complete loss of melanocytes in the epidermis...***Vitiligo***

16. Pigments causing 'Brown Atrophy' ***Lipofuscin***

17. Aggregates of ferritin micelles called... ***Hemosiderin***

18. Heart failure cells are .....***Alveolar macrophage laden with Hemosiderin***

19. Unconjugated hyperbilirubinemia is indicative of .....jaundice. ***Prehepatic jaundice***

20. Direct Van den berg reaction is indicative of .....jaundice ***Obstructive jaundice***

21. Color of faeces in obstructive jaundice ***Grey / Clay color***

22. Hyperkeratosis in cattle common in which poisoning ?***Chlorinated naphthalene poisoning***

23. Type of necrosis involved in hypoxic cell death in the CNS ***Liquefactive necrosis***

24. Necrosis in which architectural details persist but cellular details are lost. ***Coagulative necrosis.***

25. Enzymes important in apoptosis ***Caspases***

26. Conditions in which PM clotting of blood doesn't occur. ***Anthrax & Sweet clover poisoning***

27. Pathological calcification without derangement in blood calcium levels. ***Dystrophic calcification***

28. Special stain for demonstrating Calcium in tissues. ***Van Kossa's Silver nitrate***

29. 'Tophi' is related to which disease ? ***Articular gout***

30. Condition characterized by green refrigence of Congo red stained sections under polarizing microscope. ***Amyloidosis***

31. Name the anaphylatoxins C_{3a} ***and*** C_{5a}

32. Chemical mediators from arachidonic acid metabolism via cyclooxygenase pathway.***Thromboxane A2 and Prostaglandins***

33. 'Triple response' in tissue inflammation was formulated by .....***Sir Thomas Lewis***

34. Colloidal carbon technique is used in identifying .....***Leaking vessels in inflammation***

35. Name some SRS-A(slow reacting substances of anaphylaxis)***Leukotrienes like*** LTC_4, LTD_4, LTE_4

36. Cationic proteins produced by eosinophils toxic to parasites.***Major Basic Proteins***

37. Suppurative inflammation of hair follicles caused by Staph. Aureus***Boils***

38. Diffuse spreading suppurative inflammation of connective tissues***Cellulitis***

39. Modified macrophages in case of granuloma are called ...***Epitheloid cells***

40. Granulation tissue is a hallmark of .....***Healing***

41. Adhesive glycoproteins of Extra-cellular matrix.***Fibronectin & Laminins***

42. Condition in which cardiac sclerosis/ cardiac cirrhosis occurs.***Chronic general passive hyperemia***

43. Alteration from a less specialized cell type to more specialized ones.***Metaplasia***

44. A malignant tumor which doesn't metastasize***Basal Cell Carcinoma***

45. Oncogenes discovered by.....***Michael Bishop& Harold Varmus***

46. 'Sticker tumor' discovered by Novinsky is better known as ....***Canine Transmissible Venereal Tumor***

47. Reed Sternberg Cells are typical of ...***Hodgkin's disease***

48. Horn cancer is most commonly seen in Bull or Bullocks ?***Bullock***

49. Black tongue/ canine pellagra is caused by.....***Niacin deficiency***

50. Rodent ulcer is better known as ***..... Basal cell carcinoma***

BACTERIOLOGY & MYCOLOGY

1. The most commonly used endospore stain- ***Schaeffer-Fulton stain***

2. Capsule of B. anthracis is made of – ***D-glutamic acid***

3. Teichoic acid in Gram-positive bacterial cell wall has- ***Glycerol/ribitol***

4. Archaebacterial cell walls usually consists of – ***Proteins and polysaccharides***

5. Metachromatin granules serves as a reserve of – ***Inorganic phosphate***

6. The chemi-osmotic mechanism of ATP synthesis proposed by- ***Peter Mitchell***

7. Reducing media for anaerobic bacteria contains- ***Na-Thioglycolate***

8. *Mycobacterium leprae* is usually isolated in- ***Armadillos***

9. Selective media for S.typhi is – ***Bismuth sulphite agar***

10. Selective media for Staphylococcus aureus is- ***Mannitol Salt Agar***

11. Paraffin and mineral oils are often sterilized by- ***Hot air oven***

12. □ Sterilizing agent used in space crafts is- ***Ethylene oxide***

13. Test used to find the carcinogenicity of mutagens is- ***Ames test***

14. Three kingdom classification of bacteria proposed by- ***Carl Woere***

15. Pyrogen induced by endotoxins is – ***IL-1***

16. Lab test to detect the presence of endotoxins in preparations- ***Limulus assay***

17. Resoloving power of a compound microscope is – ***0.2ì m***

18. Heat resistance of spores is due to presence of – ***Dipicolinic acid***

19. Target site of polymyxin is- ***Bacterial cell membrane***

20. Thickness of Gram+ve and Gram-ve cell walls are- ***20-80nm and 2-7nm respectively***

21. Most abundant membrane protein of Gram-ve bacterial outer membrane- ***Braun's lipoprotein***

22. Non-motile asexual sporangiospores of phycomycetes is – ***Aplanospores***

23. Exogenously borne sexual spores are known as – ***Basidiospores***

24. Psuedohyphae is characteristic of – ***Candida albicans***

25. North American blastomycosis' is caused by- ***Blastomyces dermatitidis***

26. 'European blastomycosis' is caused by- ***Cryptococcus neoformans***

27. Asexual spores produced by fragmentation of hyphae is – ***Arthrospore***

28. Staining used for detection of fungi in pathological specimens- ***Periodic acid Schiff stain***

29. Media used for stimulating production of chlamydospores of C. albicans- ***Corn meal agar.***

30. Method used for observing the development of spores and hyphae of fungus is called- ***Block-slide culture technique***.

31. Mucor is distinguished from other members of Phycomycetes by- ***Absence of rhizoids***

32. Asexual spores of Ascomycetes are known as- ***Conidiospores***

33. 'Bottle bacillus' is the synonym for- ***Pityrosporum ovale***

34. 'Pseudoglanders' or 'Japanese Farcy' caused by ***Histoplasma capsulatum***

35. 'Fluffy colonies' , 'Powdery colonies' and 'Lemon yellow colonies' are produced by- ***Microsporum distortum , M. gypseum*** **and** ***M. canis*** **respectively.**

36. Most potent toxin producing aflatoxicosis is **– *B1***

37. 'Facial eczema' in cattle is caused by - ***Pithomyces chartarum***

38. "Farmer's Lung" is caused by ***Micropolyspora faeni***

39. □ % of Agar used for the preparation of solid media is- ***1.5%***

40. Microbial population can be maintained in the exponential growth and at constant biomass for extended periods by using- ***Chemostat/Turbidostat***

41. The phenomenon by which bacteria monitor their own population density through sensing the level of signal molecules- ***Quorum assay***

42. Indicator bacterium used in autoclaving is- ***Bacillus stearothermophilus*** **(spores)**

43. The commonly used agent for 'cold sterilization is - ***Gamma radiation***

44. The disinfectant action of chlorine is due to the formation of- ***Hypochlorous acid***

45. Linear chromosomal DNA is found in- ***Borrelia burgdoferi***

46. The topoisomerase that removes the supercoiling during replication- ***DNA gyrase.***

47. The negative stain used in electron microscopy is – ***Phosphotungstic acid***

48. Bacterium that exhibits directed swimming in response to Earth's magnetic field or to local magnetic fields- ***Aquaspirillum***

49. The structure that remain after the treatment of a gram –ve bacteria with lysozyme/penicillin is – ***Spheroplast***

50. An inorganic solidifying agent used for autotrophic bacteria- ***Silica gel***

51. The procedure for staining the capsular material of *B. anthracis* is- ***MacFadyean reaction.***

52. Botulism due to which type of toxin occurs in relation with ***phosphorous deficiency- Type D***

53. Vole's Bacillus is the synonym for - ***Mycobacterium murinum***

54. Specific media used for isolation of M. bovis is Stonebrink's medium containing ***Sodium pyruvate***

55. 'Stormy clot' reaction is characteristic of - ***Clostridium welchi***

56. The characteristic 'earthy odour' of the cultures is a feature of- ***Psuedomonas psuedomallei***

57. 'Flying sea gull' appearance is characteristic of- ***Campylobacter***

58. Vaginal mucus agglutination test in cattle is employed for the diagnosis of- ***Campylobacter*** **infection.**

59. Rolling disease in mice is caused by- ***Mycoplasma neurolyticum.***

60. Eaton's agent is the synonym of - ***Mycoplasma pneumoniae***

61. Dick's test is used for the id entification of- ***Streptococcus pyogens***

62. Chinese letter arrangement is seen for- ***Corynebacterium***

63. Fried lander's bacillus is the synonym for ***Klebsiella pneumoniae***

64. Weil-Felix reaction is used for diagnosis of Rickettsial infections using ***Proteus***

***vulgaris* X strain**

65. Swarming growth and fishy odour of colonies is characteristic of- ***Proteus vulgaris***

66. Kauffman-White scheme is used for serotypic differentiation of ***Salmonella***

67. VR (Venkatraman-Ramakrishnan) medium is used as a transport media for- ***Vibrio cholerae***

68. Epidemic typhus' (Brill-Zinsser disease) is caused by ***Rickettsia prowazaki***

69. 'Scrub typhus' is caused by ***Rickettsia tsutsugamushi***

70. Rickettsial disease that are not arthropod borne are ***Q-fever and Trench fever***

EPIDEMIOLOGY

1. Which is the first veterinary school? ***Lyon, France 1762***

2. Quarantine was first introduced by------ ***Lancisi, physician to Pope Clement XI from Rinderpest***

3. First animal virus ------- and was identified by ------- & ------- ***FMD, Loeffler and Frosch***

4. Disease which do not produce any overt clinical sign. ***Subclinical infection***

5. Study of outbreaks in avian population is known as------- ***Epornitics***

6. ------- Epidemiology involves observing and recording disease and possible causal factors. ***Descriptive***

7. ------- is the study of cause, distribution and control of disease in related individual and of inherited defects. ***Genetic epidemiology***

8. ------- is an examination of aggregation of units. ***Survey***

9. Survey records events occurring at a particular point of time. ***Cross sectional survey***

10. Unit of an epidemiologist ***Population***

11. ------- is the identification of undiagnosed cases of disease using rapid tests. ***Screening***

12. -------is the making of routine observation on health, production and environmental factors and recording and dissemination of these observations. ***Monitoring***

13. ------- investigate relationship between disease and hypothetic causal factors in specified population.***Cross sectional study***

14. ------- is comparison of exposed group with non exposed group to the factors with respect to development of disease. ***Cohort study***

15. -------is any observable event that can vary. ***Variable***

16. Survey records events occurring for a long period of time. ***Longitudinal study***

17. ------- Factors are associated with the definite onset of disease. ***Precipitating factors***

18. Constant occurrence of disease in a population or usual frequency of occurrence of disease is known as------- ***Endemic***

19. Sudden unpredictable number of cases in a population***. Epidemic***

20. Widespread epidemic ***Pandemic***

21. Irregularly and haphazardly occurring diseases are known as -------***Sporadic***

22. Amount of disease in a population is given by------- ***Morbidity***

23. Amount of death in a population is given by------- ***Mortality***

24. Time of occurrence of a disease constitute-------distribution ***Temporal***

25. Place of occurrence of disease constitute -------distribution ***Spatial***

26. -------is the number of instance of disease or related attribute in a known population at designated time, without distinction of new and old cases. ***Prevalence***

27. -------is the number of new cases occur in a known population over a specified period of time. ***Incidence***

28. 28. -------is the proportion of cases of a contagious disease that develop as a result of contact with primary cases. ***Secondary attack rate***

29. P α I X------- ***D(duration)***

30. ------- is more intensive form of data recording. ***Surveillance***

31. Total mortality rate of all disease is known as------- ***Death rate***

32. Map where line joining equal morbidity rate is ------- and mortality rate is------- ***Isomorbs, isomorts***

33. ------- is any characteristic that affects the health of a population. ***Determinant***

34. Epidemiological triad's are-------, ------- &------- ***Host, gent and environment***

35. Ability of organism to cause disease in a particular host, in terms of severity is known as------- ***Virulence***

36. ------- is quality of disease induction. ***Pathogenicity***

37. Sites within genome that frequently mutate. ***Hot spot***

38. Infection of susceptible host without overt clinical sign. ***Inapparent infection***

39. ------- is any animal sheds an agent without clinical sign. ***Carrier***

40. Animal which excrete agents during incubation period is known as------- ***Incubatory carrier***

41. . ------- Climate comprises of normal component weather to which animal are exposed. ***Macro***

42. Infection transmitted from one segment of population to the another segment of the population is known as-------- ***Horizontal transmission***

43. Infection transmitted from one generation to next generation is known as------- ***Vertical transmission***

44. Host in which agents are transmitted mechanically. ***Paratenic host***

45. Host in which multiplication of agents takes place. ***Amplifier host***

46. Inanimate vectors are called as------- ***Fomits***

47. Cyclopropagative transmission is a combination of-------&------- ***Developmental and propagative***

48. Example for stercorarian transmission***. T.cruzi***

49. ------- is the period between infection and maximum infectiousness. ***Generation time***

50. Time between infection and availability of agent in an arthropod vector is known as-------***Extrinsic incubation period***

51. ------ relates the amount of organism required to initiate an infection. ***Infectivity***

52. The length of time for which an organism can remain infective outside its host is known as the ------- ***Stability***

53. Switch from virulence to non-virulence ***Phase variation***

54. Transmission of disease from one generation to another via egg is known as. ***Trans-ovarian***

55. Transmission from one developmental stage to another is known as------- ***Transtadial***

56. Rain forest are described as------- where as deciduous forest is ------- ***Megatherms and mesotherms***

57. ------- is the natural restriction where animal can roam. ***Home range***

58. Part of the animals home range that it defend aggressively from invaders is known as------- ***Territory***

59. According to Wynne Edward hypothesis population control was the main purpose of -------***Group behaviour***

60. Which is the functional position of an animal in an ecosystem? ***Niche***

61. Avoidance of competition is usually in -------animals. ***Sympatric animals***

62. Which is the smallest spatial unit providing uniform condition for life? ***Biotope***

63. Collection of all living organism in a biotope is known as------- ***Biocenosis***

64. Man made ecosystem ***Anthropurgic***

65. Junction of two ecosystem is known as------- ***Ecological interface***

66. ------- is the modified patch of vegetation, created by man, with in a biome that has reached in a climax. ***Ecological mosaic***

67. Study of disease in relation to ecosystem in which they are found is known as------- ***Landscape epidemiology***

68. Foci of infection. ***Nidi***

69. An area that has ecological, social, and environmental condition that can support a disease is known as------- ***Nosogenic area***

70. ------- is a nosogenic territory in which a particular disease is present. ***Nosoarea***

71. If all animal in a population are surveyed then it is known as------- ***Census***

72. If relative risk is more than one it denotes-------***Positive statistical association between factor and disease***

73. ------- is the decrease in mortality and morbidity**.** ***Control***

74. Examples for primary prevention ***Vaccination and quarantine***

75. Animal which excrete agents during recovery period is known as------- ***Convalescent carriers***

76. Extinction of an agent ***Eradication***

77. Culling of infected animals during epidemic is often accompanies by the slaughter of animals that may have been exposed to infection and therefore be at risk of developing disease is known as -------

Pre emptive slaughtering

78. Proportion of animals that are resistant to infection or disease in population. ***Herd immunity***

PHYSIOLOGY

1. Rumen gas largely consists of Carbon dioxide and methane in the proportion of ….**65:35**.....

2. Urea is recycled in the rumen through ....**Saliva**.....and .**diffusion across rumen wall**.....

3. If acetic : propionic ratio in the rumen goes down below**.. 3 : 1.....** the fat content decreases in the cow milk

4. The pH of ileal fluid ranges from .....**7**....to ....**8**..

5. The rumen protozoa store carbohydrate in the form of ... **amylopectin**

6. The testosterone released from tunica interna is converted to estradiol, a female sex hormone under the influence of **... FSH.....**

7. The estrogen produced by mammalian ovary or placenta normally are ....., ...and **.....(Estrone, estradiol and estriol)**

8. In ruminants, the placenta is of ..... type**(Epitheliochorial**)

9. Grayish coloured corpus luteum present in**. Ewe** (species)

10. PRL (prolactin) promote the secretion of progesterone by the corpora lutea in .....and .....(species)→**Rat and mice**

11. Bruce effect in mice involve blockage of **Prolactin**secretion which is necessary for maintenance of CL

12. the blood supply to udder is maintained by .....**Pudental.....**artery

13. **..fructose.....**is the main source of energy in bull semen

14. Collapse of alveoli is known as .....**Atelectasis**.....

15. one gram of hemoglobin can bind with maximum of .....**1.34.....**ml oxygen

16. Expiration if regulated by ...**pneumotaxic.....**centre of the brain

17. Rate of diffusion of carbon dioxide through respiratory membrane is about .....**20.**.....times rapid than oxygen diffusion

18. The volume of air which remains in the lungs after forceful expiration is called **Residual volume**...

19. Threshold level for low oxygen in air for sheep, goat and cattle is about **.....250**….meters above sea level

20.The critical environmental temperature at which the increase in respiration rate become marked is 60^{o}F for HF,70^{o} F for Jersey and .....**80^{0}F**.....for Brahman cattle

21.The most potent compound which can stimulate the closure of esophageal/reticular groove in cattle even up to two years of age is**.....NaCl.....**

22**..... Acetic (C2) > Propionic (C3) > Iso & N-butyric (C4) > Iso & N-valeric (C5) > Methyl butyric acid (C5)**.....is the usual order of concentration of individual acids present in the rumen

23.Enzymes responsible for metabolism are located in the **..Mid piece**.....(part) of spermatozoa

24.The estrous cycle of ewe is of **.....17**.....days duration

25.The bull spermatozoa can travel **.....60.....**cms per 30 minutes in the female genital tract

26.Sexual receptivity in case of ewe in heat requires the presence of**.....small amount of progesetrone**.....(hormone)

27**.....80.....%** of carbon dioxide transport occur in the form of Bicarbonate ion

28.Utiliozation coefficient for oxygen consumption is**...50**.....% for birds and **...25.....%**for mammals

29.The nerve network Meissners plexus controls secretions of epithelial cell where as Auerbachs plexus control **.....GI movements**.....

30.Coiled colon (Ansa Spiralis) present in ...**pig.**....and.....**ruminants.....(**species)

31.In GI system, contractile waves that travel short distance is termed as**....Segmentation**..and that travel longer distance is**.....Peristalsis.....**

32.Daily production of saliva in cows comes around .....**100-200**.....litres

33.The first hormone ever discovered was **.....Secretin.....**

34.Horse obtains around .....**75.....%** of its energy requirements from large intestinal absorption of volatile fatty acids

35.Protozoan count of rumen is about .....**10^{6}**..ml of rumen content and it account for ...**20.**.....%of rumen metabolism

36. .....**Prolactin**.....hormone induces gene expression in mammary tissue for casein synthesis

37. Herbivores donot have .....**Cephalic**..... phase of gastric stimulation

38. ...**Cervix**.....part of female reproductive tract is known as "neck of the womb"

39. Central frozen semen production and training institute is located at ..**Hessarghata**.....

40. Credit of first birth of a buffalo calf through AI in India goes to...Allahabad Agriculture **Institute**

41. Electro ejaculation was first adopted by **Batteli**.....

42. .....**Estrogen**.....hormone is very important for the duct growth of mammary gland

43. The lactose content in milk is .....**4.6.....%** and is the most consistent component of milk

44. It is estimated that about .**400-500**....ml of blood must pass through udder for the production of one ml of milk

45. As per work physiology, contraction of .....**Spleen**.....(visceral organ) increase no of erythrocyte in the body.

46. Exercise result in increased cardiac output to meet the increased demand of working muscles for oxygen. The cardiac output =stroke volume X ...**Heartrate**.....

47. During strenuous exercise, cardiac output increases upto .....**8**.....fold in horse

48. Race horses are most susceptible to deficiency of .....**Thiamine**....(B vitamin)

49. Proteolytic bacteria represent about .....**12-38**.....% (range) of the total ruminal bacteria

50. ..**Pulmonarycompliance**...is a measurement of the distensibility of the lungs and thorax and is determined by measurement of the lung volume change for each unit of pressure change.

ENDOCRINOLOGY

1) A meal rich in proteins but low in carbohydrates does not cause hypoglycaemia because

a. glucagon secretion is stimulated by meals b. the meal causes compensatory increase in T4 secretion
c. cortisol in circulation prevents glucose from entering the muscles d. the amino acids in the meal are converted to glucose

Ans. a

2) Which of the following is incorrectly paired

a. beta cells-insulin b. F cells- gastrin
c. delta cells- somatostatin d. alpha cells-glucagon

Ans. b

3) After intravenous administration of a large dose of insulin, the return of a low blood sugar level to normal is delayed by

a. thyrotoxicosis b. glucagon deficiency
c. diabetes d. parathormone deficiency

Ans. b

4) Insulin increases entry of glucose into

a. renal tubule b. the mucosa of the small intestine

c. neurons of motor cortex d. skeletal muscle cells

Ans. d

5) Glucagon is not normally found in the

a. brain b. pancreas
c. git d. adrenal glands

Ans. d

6) Which of the following is NOT produced by physiological amounts of glucocorticoids

a. maintenance of normal vascular reactivity b. inhibition of inflammatory response
c. increased excretion of a water load d. inhibition of ACTH secretion

Ans. b

7) Cortisol increases blood glucose level by

a. increasing lipolysis b. increasing protein synthesis in muscles
c. increasing gluconeogenesis d.increasing growth hormone secretion

Ans. c

8) Epinephrine and norepinephrine

a. are amino acids b. are both secreted by neurons in the autonomic nervous system
c. are polypeptides d. both activate alpha and beta adrenergic receptors

Ans. d

9) A decrease in extracellular volume is expected to cause increased secretion of all except

a. vasopressin b. renin
c. thyroxin d. ACTH

Ans. c

10) A patient with parathyroid deficiency 10 days after thyroidectomy will show

a. a low plasma phosphate and Ca++ levels and tetanus b. a low plasma Ca++ levels, increased muscular excitability and Trousseaus sign
c. high plasma phosphate and Ca++ and bone demineralization d. increased muscular excitability, high plasma Ca++ and bone demineralization

Ans. b

11) Which of the following is not involved in regulation of plasma Ca++ levels

a. kidneys b. skin
c. lungs d. intestine

Ans. c

12) Ca++ plays an important role in following biological processes except

a. oxygen utilization b. contraction of cardiac muscle
c. contraction of skeletal muscle d. blood coagulation

Ans. a

13) Epiphyseal closure is regulated by

a. calcitonin b. somatomedins
c. 1,25 dihydroxy cholecalciferol d. thyroxine

Ans. b

14) Which of the following pituitary hormones is a polypeptide

a. MSH b. ACTh
c. beta - endorphin d. growth hormone

Ans. c

15) Growth hormone acts directly on

a. stimulation of protein synthesis b. stimulation of cartilage formation
c. elevation of BSL d. stimulation of bone formation

Ans. c

16) Hypopituitarism is characterized by

a. infertility b. intolerance to heat
c. weight gain d. excessive growth of the soft tissue

Ans. a

17) Excessive growth hormone secretion in adults causes

a. acromegaly b. gigantism
c. increased entry of glucose in muscles d. hypothyroidism

Ans. a

18) Angiotensin increases blood pressure by acting on the following EXCEPT

a. aldosteron secretion b. vascular smooth muscle
c. parasympathetic nervous system d. sympathetic nervous system

Ans. c

19) Erythropoietin

a. contains iron b. has no effect on WBC count
c. stimulates renin secretion d. increases half life of RBC

Ans. b

20) Somatostatin

a. inhibits insulin and glucagoon release b. stimulates insulin and glucagon release
c. stimulator of glucagon release d. acts as obesity hormone

Ans. a

21) Thyroid hormone stored in the lumen of follicles is in the form of

a. free T3 b. free T4
c. attached to thyroglobulin in the gland d. attached to thyroid binding globulin

Ans. c

22) Secretion of growth hormone

a. increases during REM sleep b. increases during exercise
c. increases during starvation d. increases during NREM sleep

Ans. d

23) Atrial natriuretic peptide brings

a. afferent arteriolar constriction in kidney b. efferent arteriolar consrtiction in kidney
c. increases renin secretion d. constriction of mesangial cells

Ans. b

24) Thyroid binding globulins are normal in

a. hyperthyroidism b. pregnancy
c. parents treated with glucocorticoids d. parents treated with estrogens

Ans. a

25) In starvation which of the following is reduced

a. plasma T4 b. plasma T3
c. reverse tri-iodothyroxine d. D thyroxine

Ans. b

26) Hypothyroidism is associated with increased levels of

a. cholesterol b. albumin
c. TBG d. iodine

Ans. a

27) The metabolic rate is least affected by an increase in the plasma levels of

a. TSH b. TRH
c. TBG d. none of the above

Ans. c

28) The coupling of mono iodotyrosine and di-iodotyrosine and the iodination of thyroglobin is blocked by

a. TSH b. TRH
c. iodine d. thiocarbamides such as propylthiouracil

Ans. d

29) Parathyroid hormone

a. decreases Ca++ mobilization of bone b. increases Ca++ mobilization from bone
c. decreases circulating levels of free Ca++ d. increases urinary excretion of Ca++

Ans. b

30) Thyrocalcitonin

a. is secreted by thyroid b. is secreted by hypothalamus
c. is secreted by parathyroid d. increases Ca++ absorption by stomach

Ans. a

31) Growth hormone causes hyperglycemia. It is a result of

(A) Decreased peripheral utilization of glucose
(B) Decreased hepatic production via gluconeogenesis
(C) Increased glycolysis in muscle
(D) Decrersed lipolysis

32) Hormone that bind to cell surface receptor and require the second messenger camp is

(A) **Antidiuretic hormone**
(B) Cholecystokinin
(C) Calcitriol
(D) Gastrin

33) Hormones

(A) Act as coenzyme
(B) Act as enzyme
(C**) Influence synthesis of enzymes**
(D) Belong to B-complex group

PHYSIOLOGY

Cell, Cardio-Vascular System, Nervous System and Muscles

_____ 1. The Pumping chambers of the heart are called the:
A) Atria C) ventricles
C) pacemaker D) cardiac muscle

_____ 2. Why is there no passive tension developed when the muscle is shortened to less than its resting length?
A) passive tension is developed, but it is obscured by the greater active tension
B) muscle contraction cannot occur when the muscle is shorter than its resting length
C) tension cannot develop at wall if muscle is at less than resting length
D) there is no stretch of connective tissue and elastic fiber

_____.3. When a muscle contract, tension develops because of:
A) interaction between the actin and myosin filament
B) the overlapping arrangement of the actin and myosin filament
C) a slackening within the connective tissue element
D) the length-tension relationship

_____4 The initiation of the heart beat normally originate from the
A) AV node C) CNS
B) SA Node D) thyroid gland

_____5 In an Adult mammalian heart, the pulmonary artery is carrying
A) oxygen rich blood to the lungs
B) oxygen rich blood from the lungs
C) oxygen poor blood from the lungs
D) oxygen poor blood to the lungs

_____6 the pulmonary circuit of a mammalian circulatory system connects which chamber of the heart?
A) RV to LA C) LA to LV
B) LV to RA D) RA to RV

_____7 Which of the following tissue or organs is best adapted fro anaerobic respiration
A) skeletal muscle C) cardiac muscle
B) brain D) smooth muscle

_____8. Which of the following statement correctly describe a fully contracted sarcomere to one that is relaxed?
A) the A band remain the same length
B) The H zone remains the same length
C) The I band remains the same length
D) The Z line remains equidistant from each other

_____9. Which of the following sensory or motor tissue would most likely have electrical synapse?
A) cardiac muscle C) retina
B) skeletal muscle D) pressure receptor

_____10. when an action potential moves along skeletal muscle fiber, calcium ions are released from SR. The
calcium ion binds with what molecule component of the thin filament?
A) actin C) myosin
B) troponin complex D) tropomyosin

_____11. the openings through which Na and K ion move to creates an AP are known _____ channels.
A) potential C) ion
B) electrochemical D) voltage-gated

_____12 As the Na-K pump function in a neuron membrane, _____ Na ions is/are pumped for every ____ K ions
pumped in:
A) 1 . . . . .2 C) 3 2
B) 2 . . . . 3 D) 2 1

_____13. The inner ear of mammals also contains the apparatus for balance and equilibrium. Changes of the
position of the head with respect to gravity, as in bending forward, are detected by hair cells i9n the chamber known as the:
A) semicircular canals C) statocyst
B) vestibular canal D) saccules

_____14. the cilia of sensory hair on the basilar membrane are embedded in the:
A) round window C) oval window
B) tectorial membrane D) vestibular canal

_____15 Which of the following sequence describe the blood clotting process correctly
A) damaged platelets + Ca - enzyme - prothrombin – enzyme - fibrinogen – fibrin
B) damaged platelets + Ca – prothrombin – fibrinogen – fibrin
C) damaged platelets + Ca – enzyme – prothrombin – enzyme – fibrin – fibrinogen
D) damaged platelet + Na – thromboplastin – thrombin – fibrinogen

_____16. One of the simplest kinds of behavior is the knee jerk, in which a tap below the knee causes the legs to
jerk up. This behavior require as a minimum which of the following combination of structure?
A) a motor neuron and a muscle
B) a receptor and at least two segment of the spinal cord
C) a receptor neuron, a motor neuron, and a muscle
D) an intact spinal cord and brain

_____17. The vertebrate immune system response involves the following different types of cells which respond
in a highly specific manner
A) erythrocyte and phagocyte C) reticulocyte ands phagocyte
B) T cell and B cells D) Both A and B

_____18. The Y-shaped antibody molecule is produced by
A) infected cells C) B cells
B) T cells D) phagocyte

_____19 cell mediated immunity is the function of
A) T cells C) phagocyte
B) B cell D) reticulocyte

_____20. The eukaryotic plasma membrane is a basically bilayer of:
A) protein C) phospholipids
D) glycopeptide D) phosphopeptides

_____21 The function of the nucleolus is to
A) produce ribosomal subunits
B) orient the cellular poles during cytokines
C) store MRNA before transport to the ER
D) process, packages, and stores lipid and portion from the nuclear membrane.

_____22. The following structures are all part of a continuous network of membranous tubules, flattened sacs and
channels found in eukaryote cells
A) Golgi apparatus, vesicle, Rough ER, peroxisome
B) RER, SER, Golgi apparatus
C) ER, lysosomes, mitochondria, Golgi complex
D) nuclear membrane pore, vesicle, mitochondria

_____23. Which of the following molecules is thought to block myosin cross bridge) binding site on actin when
a muscle is not contracting
A) calcium C) tropomyosin
B) troponin D) ATP

_____ 24. Regeneration of axons:
A) occurs in the segmental distal to the damage
B) is independent of the survival of the perikaryon
C) includes a decrease in volume of the perikaryon
D) is dependent on proliferating of Schwann cells.

_____25. The amount of tension that whole muscle can produce is greatest in which of the following situations?
A) in the single twitch response
B) when ext5racellular Ca is decreased
C) when extracellular Mg increased
D) during maximal complete tetanus

_____ 26.During the relative refractory period
A) the rate of depolarization is decreased
B) the rate or repolarization is increased
C) the threshold for eliciting an action potential is decreased
D) the conductance of potassium is decreased

_____27. The sodium gradient across the nerve cell membrane is
A) a result of donnan equilibrium
B) significantly changed during an AP
C) used as source of energy for the transport pf other ions
D) maintained by an Na-Ca exchanger

_____ 28. The highest blood flow per gram of the left ventricular myocardium would occur
A) when aortic pressure is highest

B) when left ventricular pressure is highest
C) at the beginning of isovolumic contraction
D) at the beginning of diastole

_____29. During ventricular ejection, the pressure difference smallest in magnitude is between the
A) pulmonary artery and left atrium C) left ventricle and aorta
B) right ventricle and right atrium D) left ventricle and left atrium

_____30 . Closure of the aortic valve occurs at the onset of which of the cardiac cycle?
A) isovolumic contraction C) protodiastole
B) rapid ejection D) isovolumetric relaxation

_____31 Which of the following will be greater during the plateau phase of the ventricular AP than at
rest
A) sodium conductance C) potassium conductance
B) total membrane conductance D) calcium conductance

_____32. Stroke volume can be decreased by
A) increasing ventricular contractility C) increasing central venous pressure
B) increasing heart rate D) decreasing total peripheral resistance

_____33 The electrocardiogram (ECG) is least effective in detecting abnormalities in
A) the position of the heart in the chest C) cardiac rhythm
B) atrioventricular conduction D) cardiac contractility

_____34. Which one of the following would cause a reduction in arterial pressure?
A) a decrease in arterial compliance C) a decrease in venous compliance
B) a decrease in blood volume D) an increase in central venous pressure

_____35. The increase in skeletal muscle blood flow that occurs during vigorous exercise
A) causes an increase in total peripheral resistance
B) causes an increase in blood pressure
C) is primarily due to parasympathetic and sympathetic activity
D) is primarily the result of the accumulation of vasoactive metabolites

_____36. A reduction in carotid sinus pressure would cause a decrease in
A) heart rate C) venous capacitance
B) myocardial contractility D) cardiac output

_____37. Blood flow through an organ would be increased by decreasing
A) the diameter of the arterial vessels
B) the number of open arterial vessels
C) arterial pressure
D) hematocrit

_____38. Cerebral blood flow may be increased by increasing
A) ventilation C) pH
B) arterial blood pressure D) carbon dioxide tension

_____39. The greatest percentage of blood volume is found in the
A) heart C) distributing arteries and arterioles
B) capillaries D) venules and veins

_____40. Turbulence is more likely to occur in a blood vessel if
A) the velocity of blood within the vessel increases
B) the viscosity of blood within the vessel increases
C) the diameter of the vessels decreases
D) the length of the vessel increases

_____41. Which one of the following would NOT contribute to local hemostasis?
A) exposure of platelets to collagen
B) the conversion of prothrombin to thrombin
C) the conversion of plasminogen to plasmin
D) the release of thromboxane A2

_____42. Following the loss of blood, the LEAST likely event is an increase in
A) heart rate C) stroke volume
B) sympathetic activity D) total peripheral resistance

_____43. As a result of reduced stretch of the carotid baroreceptors, all the following would increase
EXCEPT
A) cardiac output C) total peripheral resistance
B) heart rate D) parasympathetic nerve activity

_____44. which of the following changes in perfusion of an organ system is an example of autoregulation?
A) The decrease in renal blood floe during hemorrhage
B) The decrease in Blood flow to the skin during exposure to cold environment
C) The increase in cerebral blood flow during hypercapnia
D) None of the Above

_____45. In which of the following organs will the rate of blood flow change the LEAST during exercise
A) skin C) intestine
D) brain D) kidney

_____ 46. The olfactory receptors are located in the:
A) olfactory bulb C) olfactory tract

B) olfactory cortex D) nasal mucosa
_____ 47. Which of the following statements may accurately characterize the properties cardiac muscle?
A) The T – tubule system is located at the Z-lines
B) a transient influx of extracellular calcium ions contribute to contraction
C) individual cells are electrically coupled
D) all of them are correct
_____ 48. Which of the following statements may correctly describe the coupling of excitation and contraction in the heart?
A) increase in extracellular k ions may cause cardiac arrest in diastole
B) absence of Na ions prevent the heart from beating
C) free intercellular ca ions is primarily responsible for the state of myocardial contractility
D) All of them are correct
_____ 49. All of the following are true for the smooth muscle, cardiac muscle, skeletal muscle and
macrophage EXCEPT that they:
A) contain actin and myosin C) have cytoskeleton
B) respond to nervous stimuli D) use ATP for contraction
_____ 50. The ATPase activity require for muscle contraction is located in:
A) myosin C) sarcoplasmic reticulum
B) troponin D) actin
_____ 51. All of the following are important compensatory mechanism on hemorrhagic shock **except:**
A) tachycardia and vasoconstriction C) decreased peripheral vascular resistance
B) absorption of fluid from interstitial space D) formation of angiotensin II
_____ 52. Long term regulation of arterial blood pressure is primarily a function of:
A) the CNS C) peripheral receptor
B) the sympathetic NS D) urine output and fluid intake
_____ 53. Which of the following is present only in the intrinsic pathway of clotting?
A) fibrinogen 9factor I) C) prothrombin (Factor II)
C) accelerin (Factor V) D) anti-hemophilic factor (Factor VIII)
_____ 54. In animal suffering from severe anaphylactic shock, the drug of choice for restoring circulation
and relaxing bronchial smooth muscle is:
A) epinephrine C) dopamine
D) Norepinephrine D) Isoproterenol
_____ 55.All of the following statements regarding systemic homodynamic are true EXCEP that the:
A) greatest cross-sectional area is within the capillaries rather than small veins.
B) greatest percentage of blood volume is in the small veins and the least is in the
arterioles
C) velocity of blood flow is lowest in the capillaries
D) compliance of the venous circulation is less than the arterial circulation
_____ 56. The most important component in the formation of hemostatic plug is
A)RBC C) lymphocyte
B) fibrin D) platelets
_____ 57. The portion of the electrocardiogram with which it most closely associated with ventricular
repolarization.
A) P wave C) ST segment
B) QRS complex D) T wave
_____58. Which of the following encapsulated receptors is the largest and most widely distributed?
A) tactile corpuscle of meissner C) pacinian corpuscle
B) end bulbs D) neuromuscular spindle
_____ 59. Under normal conditions, the major mechanism of body heat loss is:
A) radiation C) perspiration
B) evaporation D) insensible perspiration
_____ 60. A neuronal soma has a resting membrane potential of -65 mV. Opening potassium channels in
the neuronal membrane will most likely causes:
A) depolarization to about -30 mV C) initiation of an action potential
B) hyperpolarization to about -85mV D) no change in membrane potential
_____ 61. Numerous ion channels are involved in the generation of the cardiac action potential. The ion
channel ,most closely associated with the plateau phase of the cardiac action potential is:
A) voltage-gated sodium channels C) calcium-gated potassium channels
B) voltage-gated potassium channels D) voltage-gated calcium channels
_____ 62. The relationship between sodium excretion and blood pressure is an example of a:
A) hormonally mediated events C) counter-current system

B) negative feedback system D) positive feedback mechanism

_____ 63. The hypothalamus is LEAST involve in the regulation of:
A) intake of water C) temperature and osmolarity of urine
B) emotional behavior D) respiration

_____ 64. All the following neurotransmitters are inactivated when diffused out of the cleft or pumped
into the presynaptic nerve ending EXCEPT:
A) serotonin C) norepinephrine
B) dopamine D) acetylcholine

_____ 65. Norepinephrine will cause contraction of the smooth muscle in the
A) bronchioles C) intestine
B) pupils and ciliary body D) arterioles

_____ 66. Which of the following statements about the cerebrospinal fluid (CSF) is true?
A) it is absorbed by the choroids plexus
B) it circulates in the epidural space
C) it has a higher protein concentration than plasma
D) it has a lower glucose concentration than plasma

_____ 67. Which of the following statements about the hair cells of the cochlea is true?
A) they protect the lower airways from large particulate matter
B) they support the basilar membrane
C) they are vestigial organs without function
D) they are contained in the macula

_____ 68. During a voluntary movement, the Golgi tendon organ provides the CNS with information
about
A) the length of the muscle being moved
B) the change in joint able produces by the movement
C) the velocity of the movement
D) the tension developed by the muscle being moved

_____ 69. Thrombocytopenia is a reduction in the number of circulating blood platelets. Which of the
following would most likely occur in thrombocytopenia?
A) decreased vascular permeability
B) failure of initiation of blood clotting cascade
C) failure of conversion of fibrinogen to fibrin
D) absence of plasmin

_____ 70. Erythrocytes may have abnormal shapes and sizes in certain diseases. In iron deficiency you
would expect to see
A) microcytic, hypochromatic anemia with smaller mature erythrocyte
B) macrocytic, hyperchromatic anemia woith fewer, larger mature erythrocytes
C) poikilocytosis (shape change) and more fragile erythrocytes
D) spherical rather than biconcave erythrocytes.

Answers and Explanations: Cell, CV, NS, Muscle

1. The Answer is B

The ventricles are the two lower chambers of the heart and are responsible for the pumping of the blood: The right ventricle pumps blood through the pulmonary artery into the lungs, and the
left ventricle pumps blood to the aorta into the systemic circulation. The atria are the two upper chambers of the heart responsible for the receiving of blood from the body. Pacemaker initiates the beating of the heart. Cardiac muscles make up the wall of all four chambers of the heart.

2. The Answer is D

Passive tension develops when connective tissue and elastic element with in the muscle are stretched, as opposed to active tension which is produced by the actual muscle contraction. Thus, there is no passive tension when muscle shortened to less than its resting length because the muscle is not being stretched. Answer A is wrong because passive tension does not develop. Answer B and C are incorrect because muscle contracts and thus, tension development can occur at shorter muscle length.

3. The Answer is A

Tension development in a muscle is a function of the intersection which occurs between actin and myosin filaments. Answer (B) is incorrect because a physical interaction must occur not merely in overlapping of the filament in order for contraction to occur. Answer C is wrong because a slackening would not contribute to tension development at all. Answer D explains the differences in tension development at different muscle length, but, not only tension develops

4. The Answer is B

The SA node is a small strip of specialized muscle in the wall of the heart RA. This node has the contractile properties of muscle and can transmit impulses like a nerve. The SA nodegenerated the rhythmic self-exciting impulse which causes a wave of contraction across the wall of the atria.

This wave reaches a second mass of nodal tissue, AV node, which is then stimulated to contract. This contraction is transmitted to all part of the ventricle causing them to contact as a unit.

5. The Answer is D

Since arteries always carry blood away from the heart and the blood going to the lungs from the heart is oxygen – poor. Blood returning to the heart from the lungs will be carried in veins (pulmonary veins) and will be oxygen-rich.

6. The Answer is A

The RV pumps oxygen-poor blood to the lungs via the pulmonary artery and the left atrium receives oxygen-rich blood from the lungs via the pulmonary veins. The LV to RA connection is made via the systemic component of mammalian circulation. The other two choices describe two correct sequences of heart chamber in normal circulation, but neither sequences includes pulmonary circulation

7. The Answer is A

Skeletal muscle is the best adapted fro this process and can function some time under very low oxygen tension. Brain cells are among the most sensitive to lack of oxygen while cardiac and smooth muscle are less so, but will not as well adapted as skeletal muscle.

8. The Answer is A

the sarcomere contracts as the thick myosin slide by the thin actin filament. This is accomplished as cross bridges from the myosin "pull" the actin filament. During the contraction of a sarcomere, the Z lines move closer to each other, the I-band of each sarcomere shorten and the H zone gradually disappear., The A band remain virtually the same length since it corresponds to
the length of the myosin filament.

9. The Answer is A

Synapses are two types: electrical and chemical. Electrical synapse occurs between cells that are joined by gap junction, which are found in both cardiac and smooth muscle

10. The Answer B

As an AP moves along a muscle cell, calcium ions released from the SR bind with one of two regulatory proteins found as part of the thin filament. The protein which calcium bind is known as the troponin complex. This binding cause a slight conformational change in the other
regulatory protein known as tropomyosin because of this change the myosin cross bridges can then attach to specific sites on the actin and the contraction can proceed.

11. The Answer is D

An AP is generated by rapid, differential diffusion of ions across the membrane, thereby temporarily reversing polarity across the membrane. The channel through which first sodium and then K moves during this process are regulated by changes in membrane voltage, hence the name "voltage-gated". The term found in other choices have no reference to membrane channel.

12. The Answer is C

The Na-K pump moves Na from the inside of a cell to the outside and K ion from the outside to the inside. The "pump" is actually a protein embedded in the cell membrane. Conformational changes requires energy in the form of ATP and result in Na ion being pumped out and K ion pumped into the cell in a ration of approximate 3 to 2 during each cycle.

13. The Answer is D

Of the 3 areas of the inner ear or labyrinth – vestibule, semicircular canals and cochlea – the vestibule has two interconnected sacs called the utricle and saccules. These sacs have receptors that are sensitive to straight line movement of the head and gravity. The 3 semicircular canals are also located in the labyrinth, but they respond to rotational movement of the head; the vestibular canal or scala vestibule, is the fluid filled upper chamber in the cochlea, separated from the lower chamber (scala tympani) except fro a narrow connection at the apex called helicotrema. Statocyst is mechanoreceptor of invertebrates that functions as organ of equilibrium.

14. The Answer is B

The cilia of sensory hair cells located on the basilar membrane of the cochlea are embedded in the tectorial membrane. Distortion of these sensory hairs causes nerve impulses to be sent to specific region of the cerebral cortex where they are interpreted as sound of a particular frequency. The structure indicated by the other choices for this question are involved in hearing but are not in direct contact with the sensory hair cilia.

15. The Answer is A

Blood clotting is initiated by damaged platelets + calcium to liberate thromboplastin which acts on prothrombin and converts it to thrombin., thrombin initiate the conversion of fibrinogen to fibrin to produce fibrin clot, an insoluble fibrin

16. The Answer is C

Three kinds of responses do not involve the brain, for conscious input is unnecessary and would slow the response. Instead, the Impulse is carried from the receptor neuron directly to the spinal cord and then back pout through a motor neuron to the

appropriate muscle. Thus, the receptor neuron, the motor neuron, and the muscles are the only structure necessary for thereflex action to occur.

17. The Answer is B

T and B lymphocytes response to specific invading organism. Erythrocytes are red blood cells which contain oxygen-transporting hemoglobin. Phagocytes are scavenge cells and are not responsible for the immune process. Reticulocytes are young RBC just after loss of their nuclei and mature into erythrocyte.

18. The Answer is C

B cells or b lymphocytes produce antibodies after stimulated by a specific antigen. T cells or T lymphocytes directly attack foreign cells or substances in the cell mediated immune response. Phagocytes are scavenger cells.

19. The Answer is A

T cells or T lymphocytes participate in cell mediated immunity – attacking foreign cells or substances. B cells produce specific antibody

20. The Answer is C

The plasma or cell membrane in eukaryotes consists of a phospholipids bilayer, a double layer of phospholipids with their relatively hydrophilic (polar) head on the outside and their hydrophobic (non-0polar) fatty acid tail pointed inward. Different protein and carbohydrates may or may not be present, depending on the cell type.

21. The Answer is C

The nucleolus is the region of the mRNA synthesis and the assembly of ribosomal unit. It is formed around the nucleolus organizing region on a particular chromosome, the region of DNA
which is codon to mRNA.

22. The Answer is B

The rough and smooth ER is continuum with the Golgi complex. A vesicle is a membrane bound sac. The peroxisome is a type of vesicle which contains peroxide forming and destroying enzymes. Lysosomes are vesicle which contain hydrolytic enzyme,, microtubules are part of the cytoskeleton. Mitochondria are double membrane organelle.

23. The Answer is C

tropomyosin, a linear protein attaches to the actin, and covers the myosin binding site when the muscle is not contracting.

24. The Answer is D

Axonal regeneration occurs in neurons if the perikarya survive following damage. The segmental distal to the wound, including the myelin, is phagocytosed and removed by macrophages. The proximal segment is capable of regeneration since it remains in continuity with perikaryon. Chromatolysis is the first step in the regeneration process in which there is breakdown of the Nissl substance, swelling of the perikaryon, and lateral migration of the nucleus of the neuron. Regeneration is dependent on the proliferation of Schwann cells, which serve to guide sprouting axons from the proximal segment toward the target organ that is being reinnervated. This process is referred to Wallerian regeneration. Degeneration of perikarya and neuron processes occurs when there is extensive neuronal damage. Transnueronal degeneration only occurs when there is a single input (synapse) with another neuron, In the presence of multiple inputs, Transnueronal degeneration does not occur.

25. The Answer is D

The single muscle twitch generates only a single, sudden contraction. During summation, individual muscle twitches are added together to make strong muscle movements. Indeed, the tension developed during summation is much greater than during the single muscle twitch. When a muscle is stimulated at progressively greater frequencies, activation of the contractile mechanism occurs repeatedly before any relaxation has occurred and the successive contraction fuses into one continuous contraction. Such response is called tetanus. During complete tetanus, there is no relaxation between stimuli; during incomplete tetanus there are period of incomplete relaxation between the summated stimuli. The tension developed during complete tetanus is about four times he developed by the individual twitch contractions.

26. The Answer is A

During the relative refractory period, an action potential can still be elicited, but the stimulus must be stronger than normal. The larger the stimulus is required because the threshold is increased owing to the increase in potassium conductance and sodium inactivation that occur during the AP. These changes in membrane permeability are also responsible for causing the decreases in the refractory period. The decrease in the overshoot potential causes a decrease in the
number of K channels that open during AP. Thus the repolarization phase of the AP is slower than normal.

27. The Answer is C

The Na-K pump uses the energy contained in ATP to maintain the sodium gradients across the membrane. The sodium gradient, I n turn, is used to transport pother substances across the membrane. For example, the Na-Ca exchanger

uses the energy in the sodium gradient to help maintain the low intracellular calcium required fro normal cell function. Although sodium enters the cell during AP, the quantity of Na is so small that no significant change in the intracellular sodium concentration occurs. Because the Na transferences are so low, the Na equilibrium potential is not important determinant of the resting membrane potential.

28. The Answer is D

Blood flow through the coronary vessels of the left ventricle is determined by the ratio ofperfusion pressure to vascular resistance. The perfusion pressure is directly treated to the aorticpressure at the opening of the coronaries. Myocardial vascular resistance is significantly influenced by the contractile activity of the ventricle. During systole, when the ventricle is contracting, vascular resistance increases substantially. Flow is highest just at the beginning of diastole because during this phase of the cardiac cycle, aortic pressure is still relatively high and vascular resistance is low due to the fact that the coronary vessels are no longer being squeezed by the contracting myocardium

29. The Answer is C

The pressure gradient between regions of the CV system is directly proportional to the resistance of the intervening structures. During ventricular ejection the aortic valves are open and do not offer any significant resistance to blood floe. Therefore there is very little, if any, pressure difference between the LV and the aorta. Since tricuspid valve is closed during ventricular ejection, there is an appreciable pressure difference between the RV and the AA. Although pulmonary vascular resistance is relatively small compared with systemic vascular resistance, it nonetheless produces a pressure drop between the RV and the LA. Since most of the resistance in the systemic vasculature occurs at the level of the arteriole, there is a large pressure gradient between the aorta and the capillaries

30. The Answer is D

Closure of the Semilunar valves (aortic and pulmonic vales) marks the beginning of the isovolumetric relaxation phase of the cardiac cycle. During this brief period (approximately 0.06sec.), the ventricles are closed and myocardial relaxation, which began during protodiastole, continues. Intraventricular pressure falls rapidly, although ventricular volume changes little. When intraventricular pressure falls below atrial pressure, the mitral and tricuspid valves and rapid filling of the ventricles begins.

30. The Answer is D

During the plateau phase of the cardiac AP, k conductance decreases below its resting value while calcium conductance is greater than it is at rest. However, the decrease in K conductance is greater than the increase in Ca conductance, so total membrane conductance decreases. The N channels inactivate during the plateau phase, returning Na conductance to its resting value.

32. The Answer is B

Stroke volume is determined by preload, afterload, and contractility. Increasing preload by increasing central venous pressure will increase stroke volume. Similarly, decreasing afterload by decreasing total peripheral resistance or systemic blood pressure will cause an increase in stroke volume. Increasing contractility will also increase stroke volume. Cardiac output equals stroke volume times heart rate. If the heart rate increases and CO does not change, stroke volume will decrease.

33. The Answer is D

The ECG records the conduction of the AP through the heart. Changes in the rate, rhythm or conduction pathway are recorded. Changes in the position of the heart in the chest will change the size and shape of the ECG recorded by various leads. Local; areas of ischemia caused by changes in coronary blood flow will, cause changes in the AP that will be reflected in the shape of the ECG recording. The ECG is unable to detect any changes in the ability of the heart to develop force.

34. The Answer is B

The two major factors that influence pulse pressure are stroke volume and arterial compliance. Decreasing stroke volume reduces pulse pressure, whereas decreasing arterial compliance increases pulse pressure. A decrease in venous compliance would cause an increase in central venous pressure, which would tend to increase stroke volume. An increase in myocardial contractility would also tend to increase stroke volume and, therefore, a decrease in pulse pressure.

35. The Answer is D

During vigorous aerobic exercise there is a pronounced decrease in vascular resistance in skeletal muscle, which lowers total peripheral resistance. It it were not for the increase in CO that occurs with this kind of exercise, blood pressure would decrease. The primary factor that

contributes to the increase in blood flow to exercising skseletal muscle is the local accumulation of vasoactive metabolites. Stimulation of sympathetic nerve fibers that innervates blood vessels within exercising skeletal muscle would tend to increase vascular resistance and decrease flow. Local metabolites overpower the effects of sympathetic stimulation so that flow can increase despite high levels f sympathetic activity.

36. The Answer is C

A reduction in carotid sinus pressure due to a decrease in mean blood pressure due to a decrease in mean blood pressure would elicit a Baroreceptor reflex tending to restore blood pressure to normal. The reflex response include an increase in sympathetic nervous system activity, which would cause an increase in heart rate and myocardial contractility, both of which would tend to increase CO. sympathetic stimulation would also cause constriction of both arterioles and venous vessels. Arteriolar constriction would cause an increase in total peripheral resistance. Sympathetic stimulation of the venous vessels would cause a decrease in venous
capacitance.

37. The Answer is D

Blood flow through an organ is increased by either increasing the perfusion pressure across the organ or by decreasing the vascular resistance. A decrease in the arterial [pressure would decrease the perfusion pressure. Decreasing the diameter of the arterial or venous vessels or decreasing the number of open arterial vessels would contribute to increasing vascular resistance. If the hematocrit is decreased, the viscosity of the blood is decreased resulting in a decrease in resistance and, therefore, an increase in blood flow through an organ,

38. The Answer is D

Cerebral blood flow is under local metabolic control. The increase in H, carbon dioxide, and K that accompanies activity causes increases in cerebral blood flow. Hyperventilation causes a respiratory alkalosis, which, by decreasing brain H ions concentration (increasing pH), decreases cerebral blood flow. Increasing central venous pressure decreases the perfusion pressure across the brain vasculature and thus impedes cerebral blood flow. The brain is protected from an increase in blood flow during hypertension by autroregulatory mechanism.

39. The Answer is D

The total circulating blood volume is approximately 70 ml/kg; about 2/3 is found in the systemic veins and venules. A significant volume of blood (15%) is found in the pulmonary circulation. Smaller quantities are found in the heart (5%), the arterial system (11%), and the capillaries (5%). The large volume of nboo0d found on the venous side of the circulation is used to adjust circulating blood volume. For example, during hemorrhage, contraction of the veins and venules of the skin increases the amount of blood available for perfusion of the heart and brain.

40. The Answer is A

The critical factors affecting the flow of blood of incompressible fluid pipes were described by the English physicist Osborne Reynolds. He discovered that the point at which flow changes from laminar smooth) to turbulent is a function of fluid density, viscosity, and velocity and of the diameter of the vessels. Increasing the length of the vessel may indirectly decrease the likelihood of turbulence by increasing vascular resistance and thus decreasing blood velocity.

41. The Answer is C

The activation of platelets and formation of fibrin strands contribute to blood clotting sand hemostasis. Exposure to platelets collagen, thrombin, and thromboxane A2 causes activation of the
platelets. The conversion of fibrinogen to fibrin is essential for the production of fibrin strands to trap blood component in the forming clot. Plasmin is an enzyme that contributes to the lysis of blood clots. The injection of lytic drugs has become an important clinical tool in the prevention of myocardial infarction.

42. The Answer is C

Following the loss of blood there is a reduction in preload, which results in a decrease in stroke volume. The direct consequence of the decrease in stroke volume is a reduction in CO and secondarily a decrease in blood pressure. This reduction in blood pressure would be detected bythe baroreceptors, leading to an increased activity of the sympathetic nervous system.Sympathetic stimulation would cause an increase in heart rate and total peripheral resistance. Sympathetic stimulation would also lead to an increase in myocardial contractility. An increase in ejection fraction could result from the increase in contractility and reduced afterload. All the reflex compensations described above help to return blood pressure to normal when stroke volume is reduced. Even if compensation were to

correct the problem completely, stroke volume would at best be returned to control value.

43. The Answer is D

The Baroreceptor reflex decreases blood pressure when the mean arterial pressure suddenly rises and increases blood pressure when the mean arterial blood pressure suddenly falls. Stretch pouf the carotid sinus baroreceptors is reduced when there is a decrease in blood pressure, and therefore, the reflex responses to a reduced stretch of the carotid sinus baroreceptors all tend to increase blood pressure. These reflex responses include an increase in sympathetic nervous system activity and decrees in activity of the vagal fibers that innervate the heart. Increasing sympathetic nervous activity increases heart rate and contractility, which; leads to increase in CO. Increased sympathetic activity also increases arteriolar tone, which increases total peripheral resistance and blood pressure. The reduced vagal nerve activity allows the heart rate to increase and thus contributes to the increase cardiac output and blood pressure following a decreased stretch of the carotid sinus baroreceptors.

44. The Answer is D

Autoregulation is the maintenance of a constant blood flow in the presence of a change in arterial pressure. Two mechanisms have been used to explain autoregulation, the myogenic and metabolic theories. The myogenic theory proposes that an increase 0or decrease) min perfusion pressure causes a contraction (or relaxation) of the arteriolar muscle, thus reducing 9or increasing) blood flow toward normal. The metabolic theory proposes that blood flow is adjusted to keep the concentration of metabolic by products at a constant level. The changes in blood flow in response to overall homeostasis (e.g. regulation of temperature or blood pressure during hemorrhage_ 09r specific tissue needs (e.g., the dilation of coronary arteries when energy requirements of the heart increase during exercise) are not classified as autroregulatory processes.

45. The Answer is B

During exercise, metabolism and cardiac output increase, Blood flow to the skin increases to aid in the dissipation of heat while blood flow to the heart increases to provide adequate oxygen and nutrients and to remove wastes. During exercise, systemic resistance falls because of the extensive vasodilation in the exercising muscles. Blood flow to the intestine and kidney decreases in order to maintain adequate blood pressure. Autroregulatory mechanisms within the cerebral circulation keep blood flow in the brain from changing.

46. The Answer is D

The olfactory receptor cells and peripheral [processes are located in and developed from the epithelium of the nasal mucosa. The central processes of receptor cell pass through the cribriform plate of the ethmoid bone to terminate in the olfactory bulb. Fibers from the bulb run through the olfactory tract to the olfactory cortex.

47. The Answer is D

In cardiac muscle, T system is located at the Z lines. This is in contrast to skeletal muscle, in which the T system is found at the junction of the A Band and I band. The long duration of cardiac AP is largely due to slow, inward calcium current that is expressed during the plateaus phase of the AP. The calcium that enters during this phase contributes to the contractile response.

48. The Answer is D

The concentration of cation affects cardiac function. Ultimately, the ionic basis of coupling of excitation and contraction resides in free intercellular calcium. However, superphysiologic levels of k ions may arrest the heart diastole, and lack of Na ions will prevent an isolated perused heart from beating. Contraction occurs as a result of entry of calcium ions from the interstitial fluid (especially T-tubules) and relaxation occurs by the removal of calcium ions from them myoplasm by the SR.

49. The Answer is B

All contractile cells contain actin and myosin. In non-muscle cells, such as macrophages,the contractile elements are important for mobility and shape changes. The mechanics ofcontraction seem to be similar, using ATP hydrolysis as a driving force. In all cell types, thecytoskeletons are composed of contractile filament. Unlike muscle cells, the contraction of nonmusclecells does not seem to be governed by nervous stimulation.

50. The Answer is A

Myosin contains the ATPase activity that hydrolyzes ATP and allows contraction to proceed. The binding of actin to myosin enhances the ATPase activity of myosin. In fact, actin alternatively binds to myosin and is released from myosin as ATP is hydrolyzed. Although troponin is not directly involved in the ATPase reaction, it binds calcium released from the SR and in doing so allows conformational changes in tropomyosin and action to occur, permitting contraction.

Myokinase catalyzes the formation of ATP and AMP from two molecules of ADP.

51. The Answer is C

Although metabolic acidosis may occur and H+ increases, the initial compensatory response to hemorrhage results in large increase in total peripheral vascular resistance. The loss of blood initially decrease cardiac output, but baroreceptor-mediated sympathetic drive causes vasoconstriction. Thus, vascular resistance increases, heart rate increases, and blood pressure return toward normal. Slightly later, the kidney may secrete renin and the product of angiotensin II via converting enzyme activity ultimately ensues. Fluid also will shift from the interstitial compartment to the vascular space, helping to restore cardiac output. Other humoral agent, including epinephrine, vasopressin, and Glucocorticoids may also be released to further compensate for the cardiovascular effects of hemorrhage.

52. The Answer is D

Although short-term regulation of arterial blood pressure is primarily affected by in the integrated response of peripheral baroreceptors and the CNS and sympathetic NS, the primary determinant of regulation of blood pressure is the long run in the relationship of urine output to fluid intake. This system is normally capable of returning blood pressure to normal level, which is different from the short-term nervous regulation. By adjusting ECF and blood volume, renal-body fluid mechanisms alter venous return. The total peripheral vascular resistance is thus altered by these mechanisms rather being the variable that directly determine AP.

53. The Answer is D

The activation of factor X is the final reaction of both the extrinsic and intrinsic pathways of clotting. Activated factor X proteolitycally cleaves prothrombin to thrombin, which in turn cleaves fibrinogen to fibrin. Accelerin stimulates the activities of factor X and fibrin stabilizing factor (Factor XII) stabilizes the clot by cross-linking fibrin. All of these factors are parts of the common pathway. The defect in hemophilia is deficiency in Factor VIII or anti-hemophilic factor. This factor acts at the last step of the extrinsic pathway. Factor VIII acts in concert with Factor IX, a proteolytic enzyme to activate Factor X

54. The Answer is A

Epinephrine is the drug of choice for treating severe anaphylactic shock, since it has both alpha and beta effects. The alpha and beta effects constrict the smaller arterioles and precapillary sphincter, thereby markedly reducing cutaneous blood flow. Veins and large arteries also respond to epinephrine. The Beta effects of epinephrine cause relaxation of the bronchial smooth muscle and induce a powerful bronchodilatation which is most evident when the bronchial muscle is contracted, as in anaphylactic shock. Neither Norepinephrine nor dopamine would be the drug of choice, since neither has action on the beta2 receptor, and therefore, would not cause the bronchodilatation needed for treating anaphylactic shock. Isoproterenol has a powerful action on all beta receptor but almost no action on alpha receptor, so vasodilation instead of vasoconstriction would produce.

55. The Answer is D

Although the capillaries are the smallest vessels, by virtue of the large number and parallelexistence, their effective cross-sectional area is very large. Since velocity is inversely related tocross-sectional are, the velocity in the capillaries is very low. The large surface area and lowvelocity promote exchange of substance between blood and tissue. Resistance to blood flowprimarily occurs in arterioles with smooth muscle, and thus, this is the site of the larges pressure edrop. Blood volume is greatest in small vein by nature of their high compliance.

56. The Answer is D

The simplest form of blood clot at a site of injury is a hemostatic plug. It is composed of an aggregate of platelets with a web of fibrin, which prevents leakage of blood into the intravascular spaces. Platelets are the most component in the formation of this plug. When the blood vessel is injures, cells and plasma start to leak out, but platelets are immediately attracted to the site of injury. They accumulate, pile up, and stop the leakage. They also release tissue thromboplastin, which activates the intrinsic blood coagulation pathways, causing the fibrin mesh to form. The fibrin tightens the plug and traps other cells, strengthening the platelets plug and forming a more permanent plug. RBC and lymphocytes are seen in hemostatic plug as they are trapped from the circulating blood by the aggregation of platelets and fibrin. They act as filler materials in the plug and have no other defined role in the formation of hemostatic plug. Collagen is important In the initiation of hemostasis, as when blood vessels are damaged. The collagen fibrils in the endothelial wall of the vessels are exposed to

the circulation and as one substance that platelets initially stick to when they from a hemostatic plug.

57. The Answer is D

The depolarization observed in the p wave signals the onset of atrial contraction, whereas the QRS complex is associated with the initiation of ventricular contraction. .the sustained depolarization of the plateau is represented by the ST interval (which is not normally associated with any voltage deflection). Finally, the T wave is associated with the onset of ventricular repolarization.

58. The Answer is C

The tactile corpuscles are found in the dermal papillae. The end bulbs vary greatly in dimension and have a wide distribution. The neuromuscular spindles are widely scattered in the fleshy bellies of skeletal muscle. The pacinian corpuscles are the largest and most widely distributed.

59. The Answer is A

A wide variety of environmental conditions provoked several mechanisms to come into play to maintain body temperature by balancing heat production and heat loss. The loss of heat via radiation accounts for more than 60% of the normal heat loss. Conduction of heat to objects or to air (i.e., convection) accounts for 15%, and evaporation accounts for about 25%. Sweating is an important form of heat loss and is regulated by various mechanisms. Insensible perspiration through the skin and lungs although important, remain relatively constant despite environmental changes and thus does not provide major mechanisms to regulate body temperature.

60. The Answer is B

Increasing the membrane's conductance to K will result in the membrane potential approaching the value dictated by the K Nernst Potential, which is about -85mV.

61. The Answer is D

The prolonged depolarization of the plateau phase of the cardiac AP is attributed to slowly inactivating voltage-gated calcium channels.

62. The Answer is B

To answer this question, the concept of a feedback system must be understood. Negative feedback occurs when a change in a variable sets in motion a series of events which are designed to restore the variable to its original condition. In this case, when blood pressure increases, sodium excretion will increase until blood pressure decreases back to its original level. Answer A is incorrect because hormones are not directly involved in the relationship between sodium excretion and blood pressure. Answer C is incorrect because counter-current system generally refer to fluid exchange systems, in which fluid and solutes exchange rapidly between parallel streams flow.

Answer D is the opposite of negative feedback, and in effect it promotes disequilibrium.

63. The Answer is D

The hypothalamus contains osmoreceptors responsible for detecting increases in extracellular osmolarity. These osmoreceptors produce the sensation of thirst, increase drinking, and cause the release of ADH. Thermoreceptors in the anterioe hypothalamus measure core temperature. Other hypothalamic neurons are involved in the initiation and coordination of heatconserving and heat-losing mechanisms. The hypothalamus also serves as a component of the limbic system, which is responsible, in part, for mediating emotional behavior. Respiration is controlled by respiratory centers of the brain stem.

64. The Answer is D

the action of acetylcholine is terminated by acetylcholinesterase, which hydrolyzes Ach to acetate and choline. The choline is pumped into the nerve terminal and used in the re-synthesis of new Ach. All other transmitters are inactivated by re-uptake into the nerve terminal.

65. The Answer is D

The catecholamine Norepinephrine and epinephrine will activate both alpha- and betaadrenergic receptors. . When alpha1 adrenergic receptors are stimulated it increases muscle contraction. Alpha1 adrenergic receptors predominate on arteriolar muscle, sp these muscles contract when stimulated with norepinephrine. The bronchiolar, papillary and ciliary smooth muscle all contains beta receptor, which cause smooth muscle relaxation. The intestinal muscle relaxation is initiated by an alpha2 adrenergic receptor.

66. The Answer is D

CSF, which is in osmotic equilibrium with the ECF of the brain and spinal cord, is formed primarily in the choriod plexus by an active secretory process. It circulates through the subarachnoid space between the dura mater and pia mater and is absorbed into the circulation by the arachnoid villi. The epidural space, which lies outside the dura mater, may be used clinically for instillation of anesthetic. CSF protein and glucose concentration are much lower than those plasma. Changes in those concentration in the CSF are helpful in detecting pathologic processes, e.g.

tumor or infection, in which the blood-brain barrier is disrupted.

67. The Answer is D

The cochlear hair cells are the functioning auditory receptor. Neural pathways from the hair cells synapse with the auditory cortex. The hair cells are contained in the macula 9otolith organ and overlaid by the otolithic membrane.

68. The Answer is D

The Golgi tendon organ is located in the tendon of skeletal muscles and therefore is in series with the muscle. Each time the muscle contracts, the tension developer by the muscle causes the GTO to be stretched... the afferent fibers, which innervate the GTO, fire in proportion to the amount of GTO stretch, and therefore their firing rate provides the CNS with information about the amount of tension developed by the muscle. The muscle length and speed of
shortening is sent to the CNS by afferents that innervate the intrafusal fibers within muscle spindles.

69. The Answer is C

Platelets (thromboytes0 are cell fragments obtained by the break up of megakaryocytes. These cell fragments contain a number of important substances as well as cytoskeletal elements involved in biologic processes such as a clot retraction. Platelets function in aggregation, coagulation, clot re traction, and removal. They are involved in the conversion of fibrinogen to fibrin through the actin of platelet phospholipids. Thrombin is also involved in this conversion, but it is a plasma protein, not a platelet secretory factor. Platelets are not required for the initiation of the blood clotting cascade, but they are required for the adherence and normal formation of a clot. Plasmin is not secreted by platelets but is formed by the conversion of plasma-derived plasminogen under the influence of plasminogen activator secreted by endothelial cells..Plasmin is involved in dissolution, not formation, of blood clots. Thrombocytopenia is a reduction in thenumber of platelets. Under this condition, fibrinogen will not be converted to fibrin in sufficient quantity to allow normal clotting. The absence of platelets aggregation interferes with the normal maintenance and repair of endothelial injury. The endothelium becomes increasingly leaky and eventually may permit thrombocytopenia purpura with seepage of blood from the vessel.

70. The answer is A

In iron deficiency, anemia results with the presence of smaller, pale-staining erythrocyte (microcytic, hypochromatic).In hemolytic anemia there is excessive destruction of RBC in the spleen. Hypochromic, macrocytic anemia results from vitamin B12 deficiency. The presence of spherical rather than biconcave erythrocytes is associated with spherocytes, which often results in hemolysis.

Animal Reproduction

1. Desirable concentration of actively motile spermatozoa per dose of frozen bull semen. -**10-15 million**
2. Commonly used model of AV for bulls.- **Danish**
3. Temperature time protocol needed for destroying spermicidal factor in milk.-**92-95°C for 10-12 minutes**
4. Spermicidal factor present in fresh milk.-**Lactanin**
5. Volume of semen dependent upon the secretions from seminal vesicles.-**Seminalvesicles**
6. -------present in goat seminal plasma causes coagulation when sodium citrate is added.- **Lysolecithin**
7. Freezing point depression of bull semen- (– **0.55°C)**
8. Dose of penicillin G sodium per ml of extended semen.-**500-1000 IU**
9. Distance between grill and straw rack during semen freezing- **4 cm**
10. Which is better ? **rapid** / slow freezing.
11. Dose of dihydrostreptomycin sulphate per ml in extended semen.-**500-1000µg**
12. ----------ovary is physiologically more active. -**Right**
13. Shape of non-pregnant uterus in mare- **Cruciform**

14. Urethral glands are found in ? - **Man**
15. Fructose and citric acid are secreted from which accessory gland – **Seminalvesicles**.
16. High content of ergothionine and inositol in vesicular glands is characteristics of which species .**Boar**
17. Nerve supplying sensory fibres to vagina , vulva and clitoris.- **Pudic**
18. Sex cords of female are called...**Medullarycords**
19. In females --**Mullerian**--- ducts develop into gonadal system while in male-**Wolffian**-ducts develop.
20. Vestibule arises from----------**Urogenitalsinus**
21. The endocrine cells of ovary originate from—**Ovarianmedulla**---------
22. Oocytes surrounded by one layer of flattened cells –**PrimordialCells**-------
23. Ovulation generally occurs in response to –**LHsurge**
24. Follicular development is **enhanced** / suppressed in ovary containing corpus luteum ?
25. Second polar body is formed at the time of ---**Fertilization**-------
26. At ovulation ova of cattle, sheep and swine contain ---**one**-------- polar body.
27. At ovulation ova of horse, dog and fox are in --**Firstmaturation**---division.
28. At ovulation the oocyte liberated in cattle is --**Seconary**----------
29. At ovulation the oocyte liberated in equines is -------**Primary**---
30. Primary spermatocyte gives rise to -----**Four**-------- spermatozoa.
31. Primary oocyte fives rise to --**one**---------- egg.
32. The regression of corpus lutea begins by day --------**15-16**------ in cattle.
33. Mature corpus luteum is smaller than mature graffian follicle in the-.---**Mare**----------
34. Corpus luteum lysis is ---**Estrogen**-------- induced in cattle and sheep.
35. Intrauterine injection of -------**Indomethacin**---------- blocks estrogen induced corpus luteum lysis in cattl
36. The functional segments of oviduct→**fimbriae, Infundibulum ,Ampulla, Isthmus**
37. PGE_3 has a -**Relaxing**---------- effect on oviduct .
38. Uterus of cow, ewe and mare is --**Bipartite**---
39. Uterus of sow is---**Bicornuate**-------
40. Oviduct is supplied blood by ---**Utero - ovarian**-------
41. Blastokinin, a protein which influences blastocyst formation is secreted by uterus of---**Rabbits**-------
42. Fern pattern of cervical mucus is associated with high ----**Chloride**---------- content.
43. pH of vaginal secretion is favourable / **unfavourable** to spermatozoa ?
44. Gartner's ducts are remnants of ---**Wolffianduct**…
45. Depleted secretory cells of oviductal musculature…**Pegcells**
46. Cervix possesses / **doesnotpossess** glands ?
47. FSH and LH are chemically ----**Glycoproteins**…
48 ---------- causes crop milk production in pigeons. – **Prolactin**
49. The long half life of PMSG is due to -------**Sialicacid**----
50. PMSG is formed by endometrial cups which are of ----**Foetal**--------- origin.

A. OBJECTIVE QUESTIONS

1. Animal showing external evidence of pro-oestrus with vulval oedema, hyperemia & sanguinous vulval discharge is

a) Cattle b) **Bitch** c) Doe d) Ewe and Mare

2. Mammary gland duct system growth is under the influence of

a) **Estrogen** b) Progesterone c) Prolactin d) Prostaglandins

3. Mammary gland alveolar growth is under the influence of

a) Estrogen b) **Progesterone** c) Prolactin d) Prostaglandins

4. Exogenous oxytocin has luteolytic action in ----------

a) Bitch b) Cow & Ewe c) Cattle & Sow d) **cow & Doe**

5. Upto secondary spermatocyte stage---------- hormone acts, after which testosterone regulates spermatogenesis

a) Growth hormone b**) F.S.H** c) I.C.S.H d) Insulin e) Androgens

6. In birds & reptiles, ---------- is important in contraction of shell glands & vagina to induce oviposition

a) Oxytocin only b) F.S.H & L.H c) Prolactin & vasopressin d) **vasotocin**

7. Predominate Ig in follicular fluid is ---------

a) Ig A b) Ig M c) **Ig G** d) Ig E

8. One primary spermatocyte produces ----------

a) 4 **Spermatids** b) 64 Spermatids c) 1 Spermatid d) 16 Spermatids

9. One spermatogonia produces----------spermatids

a) 4 b) 1 c) **64** d) 16

10. B-Spermatogonia is formed after ----------stage

a) A 4 b) **Intermediatespermatogonia** c) Primary spermatocyte d) Secondary Spermatocyte

11. 4 - Cell stage embryo is transported from site of fertilization to uterus in

a) **Sow** b) Mare c) Ewe d) Cattle

12. Transuterine migration of embryo is absent in -------

a) Bitch b) **Cattle** c) Sow d) Both a and c

13. Maternal Recognition of Pregnancy (M.R.P) is responsible for

a) Fetal growth b) **Implantation** c) Maternal circulation d) Fertilization e) Parturition

14. First maturation division / meiotic division is not completed at the time of ovulation in

a) Sow b) Cattle & Buffalo c) Ewe & Doe d) **Mare**&**Bitch**

15. Hippomanes are usually found in ---------

a) Yolk sac b) Amniotic fluid c) **Allantoicfluid** d) All of these

16. Steroid hormones have receptors in ---------

a) **Cytoplasm** b) Nucleus c) Cell membrane d) Both a & c

17. An anabolic hormone --------

a) Insulin b) Estrogen c) Testosterone d) **Allofthese**

18. An animal in which pheromones are secreted in saliva foam
a) **Boar** b) Bull c) Stallion d) Ram

19. In the testes , testosterone secreting cells are ----------
a) Germinal epithelium b) **Leydigcells** c) Sertoli cells d) Blood testes barrier

20. First scientific research in A.I in domestic animals was conducted by Italian physiologist ---------- in 1780.
a) Leeuwenhoek b) G. Amantea c) **L.Spallanzani** d) Rapiquet

21. ---------- (1963) developed special cotton plug consisted of polyvinyl alcohol powder for sealing straws.
a) Sorenson b) Nishikawa c) Van Demark d) **Cassou**

B. FILL IN THE BLANKS

1) Acrosome reaction is an indicator of completed----------

2) Polyspermy is common in---------and----------

3) The C.L persists through out pregnancy in all farm animals except----------

4) Endometrial cups are a unique feature of ---------- placenta which secrete---------- hormone.

5) --------- is the major metabolic fuel for foetus

6) Although --------- comprise 70-80% of sugar in fetal ungulates (sheep, goat, cattle) and does not cross placental barrier.

7) Fetal cortisol act on placenta to induce ---------- enzyme which convert progesterone to estrogen to have role in parturition.

8) Lochia , the post partum uterine discharge is also known as -------- or ----------

9) Rate of ovulation is more in ---------- ovary of cattle but ---------- in mare

10) Glans penis is absent in ----------(species)

11) --------- twins are much more common than --------- twins

12) Doddlers are due to a pair of autosomal recessive genes causing ---------- or other----------

13) Congenital valvular defects are common in ----------(species)

14) Super fecundation is more common in ----------

15) Scrotum of domestic animals is located between a thigh except ---------- and------- in which scrotum is located caudal to thighs.

16) Boars masturbate by inserting their penis inside the preputial diverticulum & ejaculate , the condition is termed as ----------

17) Masturbation in animals is also termed as----------

18) Young boars in artificial insemination studs are separated to prevent ----------

19) Paralysis and paraphimosis of penis is seen bulls diseased with--------- & in horses in late stage of ----- ---- (Disease)

20) Inguinal hernia is considered a common breeding defect in ------ & ----- (Species)

21) The hormone produced by Sertoli cells in male & granulosa cells in female is----

22) The enzyme involved in melatonin synthesis & found only in Pineal gland is ----------

23) ---------- (1951) reported the birth of first calf from insemination with frozen semen in cooperation with Polge & Smith.

24) ---------- (1955), first time used pellets as packaging material.

25) Macpherson , Van Demark & Kinnoy (1954) developed freezing of semen in --------(Packaging material)

26) Egg yolk coagulating enzyme (EYCE) / Coagulase / phospholipase /Tricyl glycerol lipase is found in bulbourethral secretion of ---------- semen, which interacts with milk constituents in milk diluents & inhibit motility of spermatozoa.

27) ---------- is the most commonly used cryoprotectant for freezing of semen.

28) ---------- (1948) in Denmark for the first time used large sized straws made of polyvinyl chloride.

Answer of B –fill in the blanks

1) Capacitation
2) Birds & Reptiles
3) Mare
4) Equine , PMSG / eCG
5) Glucose
6) Fructose
7) 17-α- hydroxylase
8) Secundus , Second cleansing
9) Right , opposite
10) Tom (Male Cat)
11) Dizygotic , monozygotic
12) Cerebellar , brain stem lesions
13) Horses
14) Multipara (Dog & Cat)
15) Boar , Tom (Male Cat)
16) "Balling Up"
17) Onanism
18) Pedarasty (Rectal Copulation)
19) Rabies, Dourine
20) Horse , Pig
21) Inhibin
22) HIOMT(Hydroxy Indole –O-Methyl Transferase)
23) Stewart
24) Perks
25) Glass Ampule
26) Buck
27) Glycerol
28) Sorenson

C. MATCH THE FOLLOWING

1)

A. Homosexual behaviour ------ 1. Cat
B. Frequent urination in heat ------- 2. Buffalo
C. I.V.R.I Crystoscope ------- 3. Early Embryonic Mortality
D. Irregular long estrous cycle ----- 4. White Side Test
E. Endometritis ----- 5. Cattle
F. Rage Reaction -- ---- 6. Fern Pattern

a) 2, 5, 6, 1, 3, 4
b) 5, 2, 4, 3, 6, 1
c) 5, 1, 4, 2, 6, 3
d) 5, 2, 6, 3, 4, 1

2) A. Pseudo pregnancy ----- 1.Dog & Cat
B. Prostaglandin antagonist ----- 2. Ruminants
C. Endotheliochorial placenta ---- 3.Carazolol
D. Epitheliochorial placenta ----- 4. Bromocriptine
E. Accelerating parturition ----- 5 .Horse & Pig
F. Synepitheliochorial placenta ---- 6. Indomethacin

a) 4, 3, 6, 1, 5, 2
b) 6, 3, 5, 2, 4, 1
c) 4, 6, 1, 5, 3, 2
d) 6, 1, 5, 2, 4, 3

3) A. Post partum vaginal discharge ---- 1. Glycoprotein
B. Pseudo pregnancy ----- 2. Secundus
C. Cervical mucus ---- 3. Embryo Transfer,1890
D. Embryonic estrogen ----- 4. Clenbuterol
E. Heape ----- 5. M.R.P. in Pig
F. Delaying Parturition ----- 6. Cabergoline

a) 2, 6, 1, 5, 3, 4
b) 2, 4, 5, 1, 3, 6
c) 6, 5, 1, 2, 4, 3
d) 5, 3, 2, 1, 4, 6

4) A. Zero semen volume ------ 1. Azoospermia
B. Zero sperm concentration ----- 2. Teratozoospermia
C. Reduced sperm motility ----- 3. Asthenozoospermia
D. Reduced sperm concentration ----- 4.Hypospermia
E. Abnormal sperm ----- 5. Aspermia
F. Reduced semen volume ------ 6. Oligozoospermia

a) 1, 5, 4, 3, 6, 2
b) 5, 1, 3, 6, 2, 4
c) 1, 4, 2, 5, 3, 6
d) 5, 1, 6, 3, 2, 4

5) A. Mature C.L. ----- 1. Mesonephric duct
B. Female genitalia ------ 2. 40 - 90 days of gestation
C. Slipping of fetal membranes ----- 3. 80 - 120 days of gestation
D. Male genitalia ----- 4. Liver fluke like consistancy
E. Fremitus ----- 5. Paramesonephric duct
F. Cuboni Test ----- 6. 150-290 days of gestation

a) 4, 1, 3, 5, 2, 6
b) 4, 1, 6, 5, 3, 2
c) 4, 5, 2, 1, 3, 6
d) 4, 5, 3, 1, 6, 2

6) A. Chediak Higashi syndrome ---- 1. Swine
B. Polycystic Kidneys ---- 2. Hopping gait
C. Anury ---- 3. Ghost Pattern
D. Twinning ---- 4. Boars
E. "Balling Up" ---- 5. Iodine deficiency
F. Prolonged gestation ---- 6.Equine abortion

a) 3, 1, 2, 6, 4, 5
b) 2, 5, 3, 1, 6, 4
c) 6, 3, 1, 5, 2, 4
d) 5, 3, 6, 2, 1, 4

7) A. Refrigeration of semen ---- 1. Glycerol
B. Cryopreservation of semen ---- 2. 20 times more Zn than blood
C. Buffalo semen ---- 3. Egg yolk
D. Sperm membrane integrity --- 4. I.V.T dilutor
E. Preservation of semen at room temp. ----5. D2 Extender
F. Dog semen --- 6. H.O.S.T

a) 1, 3, 2, 5, 4, 6
b) 1, 5, 6, 3, 4, 2
c) 3, 1, 2, 6, 4, 5
d) 3, 1, 5, 6, 4, 2

ANSWERS of C matches:
1 d
2 c
3 a
4 b
5 c
6 a
7 d

ANIMAL REPRODUCTION – II

A. MULTIPLE CHOICE QUESTIONS

1. Unfertilized ovum remains for months in the oviduct of -------species
a) sow b) **mare** c) ewe and doe d) bitch
2. In sows, maternal recognition of pregnancy is mainly due to the action of
a) Interferon tau b) Oxytocin c) **Estrogen** d) Prostaglandins
3. * Ovulation of "primary oocyte" occurs in
a) **mareandbitch** b) sow c) cow and doe d) all of the above
4. Centric type of nidation or implantation occurs in
a) rodents b) primates c) **ruminants** d) none of the above
5. Chemical structure of GnRH, a decapeptide, was determined by
a) Green and Harris b) Cole and Hart c) Gorski d) **ShalleyandGuellemin**
6. Endometrial cups are formed from
a) **chorionicgirdle** (**fetalorigin**) b) maternal caruncles c) endometrium (maternal origin) d) none of the above
7. In sow, the villi near the endometrial glands are enlarged and specialized to form structures called
a) Hippomanes b) amniotic plaques c) **areolae** d) placentomes
8. Most of the developmental anomalies occur during
a) **periodofembryo** b) period of ovum c) period of fetus d) during birth
9. Low land abortion or Marsh land abortion is due to
a) Fescue poisoning b) Leptospirosis c) **nitratepoisoning** d)None of the above
10. Transformation of secondary spermatocytes to spermatids
a) spermatocytegenesis b) **spermateliosis** c) spermiogenesis d) spermiation
11. Attachment of sperm to the ovum occurs initially at -------segment of sperm head
a) apical b) post-acrosomal c) principal d) **equitorial**
12. Diffuse arm like structure of microtubules in the sperm tail are made of proteins
a) flactin b) tubulin c) spermosin d) **dynein**
13. In boars, seminal vesicles produces ----------which acts as chief osmotic pressure regulator in the semen
a) ergothionine b) citrate c) **inocitol** d) fructose
14. **pH of TRIS extender is
a) **slightlyacidic** b) slightly alkaline c) neutral d) alkaline

• * ovulation of secondary oocyte in other species
• ** pH 6.8

B. FILL IN THE BLANKS

1) Ovary of mare is ----------shaped

2) Cervix is poorly defined in ----------species

3) Progesterone concentration at oestrus fluctuates below---------ng/ml

4) Irregular long oestrous cycles are mainly due to ----------

5) In----------species, ovulation occurs in metoestrus

6) *PgF2α has local effect on ovary in all species except----------

7) Fertile life span of stallion spermatozoa----------

8) Abnormal fertilization in which only male pronucleus develops------

9) In rabbits, -------substance plays role in embryonic nutrition

10) ----------is a polypeptide hormone produced by ovary

11) hCG is produced by ----------cells of the placenta

12) **Number of carbon atoms in estrogen----------

13) ---------- is a unique species in which epididymis can produce testosterone

14) Ultrasonography for pregnancy diagnosis is based on ----phenomenon

15) Maintenance of CL and Progesterone from CL are necessary throughout the gestation in ---------

16) In cows, metoestral bleeding is associated with withdrawal of -------- hormone

17) Fertile life of ova in bitch ----------

18) Shape of CL in mare----------

19) Cystic follicles are common in---------

20) Potato soup pyometra or post service pyometra is characteristic of ----------infection

21) Failure to expel the second polar body resulting in triploid zygote ---------

22) ***In cow, mare and ewe, new CL is refractory for -----days of ovulation

23) Antimicrobial constituent of semen

24) Sigmoid flexure is pre-scrotal in ---------sp.

25) In Yolkmedia for buck semen, seminal plasma must be removed to prevent yolk coagulation due to the action of ------

26) Generally semen of ------sp. doesn't respond to freezing

27) From oogenesis onwards diplotene nucleus of oocyte remains in resting stage called----

28) Growth of follicle upto the stage of antrum is ----------

29) The cell layer of trophoectoderm covering the inner cellmass--------

30) Split oestrus is common in ----------

31) Percentage of spermatozoa in semen ----------

32) ---------- is the most important maternal cause of dystocia in ewe

33) ---------- is the most important maternal cause of dystocia in sow

34) First successful embryo transfer in cow was done by…….

35) --------ions are necessary for optimum sperm motility

36) Most important spermicidal heavy metals……..

37) Normal fructolysis index of semen ranges from----------

38) ------cells in are more common in severe testicular hypoplasia

39) Sperm specific LDH localized in midpiece

40) Glyceryl phosphoryl choline, carnitine and sialic acid in semen are secreted from------

41) Dag defect is more common in -----sp. and is associated with high level of---------metal

42) Optimum temperature for preservation of boar semen is----------

43) -----percentage of sodium citrate dehydrate is isotonic to semen

44) First A.I was done by --------- in beagle bitch

45) First A.I in India was done by--------in Mysore Palace Dairy farm

46) Osmotic pressure of semen ranges from----------

47) Examples for penetrating or intracellular cryoprotectants are---------

48) Examples for non-penetrating or extracellular cryoprotectants are---------

49) ---------gland is the source of antiagglutinin in sperm

50) Semen freezes at -------temperature

51) Level of ascorbic acid in semen----------

52) Trichomonas abortion is more common in -----trimester of pregnancy

53) -------is the most widely used extender for frozen semen

54) High catalase activity, reduced fructose and high pH in semen are indicative of --------

55) ----------is a β-blocking agent used to shorten parturition

56) ---------is a β-adrenergic agent used to delay parturition

ANSWERS:

1) Kidney shaped

2) bitch

3) 1 ng/ml

4) early embryonic mortality

5) cattle and buffaloes

6) Mare (*In mare, PgF2α has systemic action)

7) 70 to 120 hours

8) androgenesis

9) Blastokinin or uteroglobulin

10) relaxin

11) syncytiotrophoblastic cells

12) 18 carbon atoms (**Testosterone-19C steroid and progesterone-21C steroid)

13) stallion

14) Doppler phenomenon

15) swine

16) estrogen

17) 4 to 8 days

18) cauliflower shaped

19) sow

20) Trichomonas infection

21) polygyny

22) 3 to 5 days (*** 11 to 12 days in sow)

23) seminal plasmin

24) boar

25) phospholipase or triacyl glycerol lipase

26) Boar semen

27) Dictyate stage

28) Gonadotropin independent

29) Rauber cells

30) Mare

31) 10%

32) ring womb

33) uterine inertia

34) Willet in 1951

35) Potassium

36) Cu and Fe

37) 1.4 to 2 mg/hr

38) medussa cells and giant cells

39) LDH-X

40) Epididymis

41) Danish Jersey, Zn

42) 15 to 18°C

43) 2.94%

44) Lazzaro Spallanzani

45) Dr.Sampathkumaran

46) 280 to 300 milliOsmol

47) Glyserol, DMSO and Ethylene glycol

48) Raffinose, sucrose, PVP and glycine

49) Prostate

50) -0.53°C

51) 3 to 8 mg/ 100ml

52) first trimester

53) Yolk citrate

54) Seminal vesiculitis

55) Carazolol

56) clenbuterol

BIOCHEMISTRY

1. The network of interrelated catabolic and anabolic pathways in cells is referred to as _____

2. A system that exchanges both energy and material with its surrounding is said to be _____

3. _____ is a type of weak interaction that stabilizes the native conformation of a biomolecule or supramolecular complex.

4. The monomeric subunits of _____ are ribonucleotides.

5. The stretching and breaking of bonds that occurs during the conversion of a reactant to a product creates a _____ state.

6. _____ is a measure of randomness.

7. Enzymes enhance the rate of chemical reactions by lowering the _____ energy that constitutes an energy barrier between reactants and products.

8. mRNA molecules with two or more attached ribosomes are called _____

9. _____ is a component of eukaryotic cells consisting of microtubules, actin filaments, and intermediate filaments.

10. _____ and _____ are the two groups of extant prokaryotes.

11. The role of _____ is to produce large number of ribosomes needed by the cell and have DNA that contain many copies of ribosomal RNA coding genes.

12. _____ helps in the condensation of DNA molecule.

13. _____, _____ and _____ are three classes of cytoskeletal proteins.

14. _____ is a complex of RNA and protein.

15. _____ are molecular complexes of DNA plus associated histone and nonhistone proteins.

16. _____ are compounds having electron-deficient functional groups; they tend to bond to electron-rich sites.

17. _____ are steroisomers that cannot be superimposed.

18. _____ are a pair of stereoisomers that are not mirror images of each other.

19. _____ is the energy or heat content of a system.

20. Henderson-Hasselbalch equation = _____.

21. The glycan portion of glycoprotein is known as a _____ group.

22. A covalent bond between two adjacent cysteines in a polypeptide chain is a _____ bond.

23. All stereoisomers must have at least one _____ centre.

24. _____ procedure provides information about a protein's primary structure.

25. The whole assortment of proteins in an organism.

26. _____ are cellular agents that assist in protein folding at elevated temperatures.

27. _____ is stable arrangement of few secondary structures.

28. _____ is an amino acid which can either accept protons or donate them at a pH that is close to physiological pH values.

29. _____ interactions are thought to be the driving force behind the formation of "molten globule" during protein folding.

30. Individual amino acids in a protein is called a _____.

31. _____ refers to the portion of a protein that is often composed of noncontiguous amino acid sequences and is usually defined on the basis of its contribution to protein function.

32. _____ is a type of secondary protein structure that extends 0.15 nm per amino acid residue.

33. _____ is a type of secondary protein structure that extends 0.35nm per amino acid residue.

34. Disrupting the hydrophobic interactions of a single subunit protein would have the greatest effect on the _____ structure of that protein.

35. Proteins that belong to a _____ have related structural features though they are unrelated based on their amino acid sequences.

36. The alpha-beta subunits in hemoglobin comprise a single_____; the intact haemoglobin tetramer contains two of these.

37. The saddle conformation is a _____ structure.

38. alpha-Keratin is referred to as a _____ _____ of protein subunits; haemoglobin with only four subunits is referred to as a(n) _____

39. Beta turn is an example of _____ structure.

40. _____ occurs when the binding of one ligand increases or decreases the binding of additional ligands.

41. The _____ immune system protects against bacterial infections.

42. _____ has a hyperbolic oxygen binding curve, no quarternary structure and serves as an oxygen "reservoir" in muscle cells.

43. _____ has a sigmoid oxygen binding curve and has a quaternary structure.

44. _____ is also called programmed cell death.

45. The metabolic intermediate _____ binds to haemoglobin with a stoichiometry of 1:1 and promotes the release of oxygen.

46. A helper T cell can signal nearby lymphocytes by secretion of a signal protein called _____

47. The contribution of lactic acid in muscle tissue contributes to the _____ effect, which explains the link between lactate production and an increased release of oxygen from haemoglobin.

48. RBCs transport carbon dioxide produced by respiring tissues in two forms: as bicarbonate ions and as _____

49. _____ are small molecules covalently attached to large proteins in the laboratory in order to elicit an immune response.

50. _____ is a particular molecular structure within antigen that binds an individual antibody.

51. Michaelis-Menten equation = _____

52. kcat is known as the _____ number. At saturating substrate concentrations kcat=Vmax/Et.

53. _____ inhibitor alters the Km of an enzyme without altering Vmax.

54. An enzyme without a prosthetic group is called _____.

55. The common structural motifs recognized by specific protein kinases are known as _____ sequences.

56. _____ is the enzyme that contains Ni2+ as a cofactor and was the first enzyme crystallized by Sumner. It enhances the rate of the reaction by ____.

57. A molecule essential to the functioning of an enzyme, but not part of the enzyme protein itself is called _____

58. _____ inhibitor binds only to the ES complex and does not bind to the substrate-binding site.

59. A specific, rare type of mixed inhibitor that alters Vmax without affecting Km is _____ inhibitor.

60. _____ of a substrate occurs when hydrogen bonds between a substrate molecule and water are replaced by noncovalent interactions between the substrate molecule and an enzyme.

61. _____ is an allosteric enzyme whose activity is regulated by a modulator other than its substrate whereas _____ is an allosteric enzyme whose substrate is also a modulator of activity.

62. When the K'eq=one, $\Delta G'^{\circ}$=_____

63. Inhibitors that rreversibly bind to an enzyme are known as _____ inactivators.

64. The regulation of enzyme activity by the reversible binding of a phosphoryl group is an example of regulation by _____ modification.

65. Allosteric enzymes_____(do/do not) follow Michaelis-Menten kinetics and some show _____ kinetic behaviour in the velocity versus substrate concentration plot which reflects cooperativity.

66. The plot of an enzyme kinetic reaction eventually plateaus as the active site is saturated with substrate. [T or F]

67. Six membered ring form of sugars are called _____ and five-membered ring form of sugars are called _____

68. Lectins are proteins that bind to specific _____

69. An isomer that differs at only one of two or more chiral centres are called _____

70. The process that interconverts isomers of pyranoses

71. _____ DNA is the dehydrated compact form of DNA.

72. _____ DNA is a structure containing polypurine tracts and mirror repeats and forms a triple helix.

73. _____ pairing or Non-Watson-Crick pairing allows the formation of triplex DNAs.

74. ____ of purine and ____ of pyrimidines is linked to C1 of ribose.

75. The increase in UV light absorption when double-stranded DNA is denatured is referred to as the _____ effect.

76. Purine or pyrimidine base covalently bound to furanose through and _____

77. _____ bonds are covalent bonds tht link the individual nucleotide residues in DNA and RNA.

78. The deamination product of :

a) Cytosine = _____

b) Guanine = _____

c) 5-methyl cytosine =_____

d) Adenine = _____

79. _____ is an extremely hydrophobic isoprenoid compound that anchors sugars to cell membranes.

80. The polar head group of cholesterol is _____ group.

81. _____ is a lipid seen in beeswax.

82. Lignoceric acid is a/an _____ free fatty acid with _____ carbon atoms.

83. The fatty acid 20:4(Δ5,8,11,14) is commonly called _____ which is a precursor of _____

84. Match the following :

A	B
1. Testosterone and cortisol	a. fatty acid derivatives that act on the tissue in which they are produced.
2. Phosphatidylinositol and its derivatives	b. isoprenoids that must be obtained from the diet
3. Eicosanoids	c. intracellular messengers that are components of the plasma membrane.
4.Vitamin K and Vitamin E	d. steroid hormones that are produced in a tissue and carried via blood stream to target tissues.

85. _____ are lipids stored in adipocytes

ANSWER –

1) Metabolism
2) Open
3) non-covalent interaction
4) RNA
5) Transition
6) Entropy
7) Activation
8) Polysomes
9) Cytoskeleton
10) archaebacteria and eubacteria
11) nucleolus
12) nucleosome
13) actin/microfilament; microtubules;intermediate filaments
14) ribosome
15) chromatin
16) electrophiles
17) enantiomers
18) diastermers
19) enthalpy
20) pH=pKa+log[proton acceptor]/[proton donor]
21) prosthetic
22) disulfide
23) chiral
24) Edman degradation
25) Proteome
26) Chaperones
27) Motif
28) Histidine
29) Hydrophobic
30) Residue
31) Domain
32) alpha helix
33) beta pleated sheet/beta conformation
34) tertiary
35) superfamily
36) protomer
37) supersecondary
38) supramolecular complex; oligomer
39) secondary
40) cooperativity
41) humoral
42) myoglobin
43) haemoglobin
44) apoptosis
45) 2,3-bisphosphoglycerate
46) Interleukin
47) Bohr
48) Carbaminohaemoglobin

49) Hapten

50) Epitope

51) Vo = Vmax + [S]/ Km + [S]

52) Turnover

53) Competitive

54) apoenzyme

55) Consensus

56) urease; 10^14

57) cofactor

58) uncompetitive

59) noncompetitive

60) desolvation

61) heterotropic/homotropic

62) zero

63) suicide

64) covalent

65) do not; sigmoid

66) T

67) pyranoses; furanoses

68) oligosaccharides

69) epimers

70) mutarotation

71) A-DNA

72) H-DNA

73) Hoogsteen

74) N9;N1

75) Hyperchromic

76) N-β-glycosidic bond

77) Phosphodiester

78) a. uracil; b. xanthine; c. thymine; d. Hypoxanthine

79) Dolichols

80) Hydroxyl

81) Triacontanylpalmitate

82) saturated/unsaturated; saturated;24

83) arachidonic acid; eicosanoids – an example: prostaglandins

84) 1.d; 2.c;3.a;4.b

85) Triacylglycerol

GENETICS

1. Scientist who coined the term Genetics

2. What is the contribution of Wilhem Johanssen to Genetics?

3. Theory of pangenesis was proposed by ----------

4. The concept of Genotype and Phenotype was introduced by -----

5. Chromosome theory of heredity was proposed by

6. Germ plasm theory was put forward by

7. The nationality of Gregor Mendel who is regarded as “father of genetics”

8. In 1900, Mendel’s work were rediscovered by -------

9. Law of Segregation is also known as-------

10. Human blood group type is an example of -----

11. ------ and ------- are two recessive traits that are inherited.

12. What is the ratio due to double recessive epistasis?

13. Linkage was first observed by--------- in sweet pea.

14. Crossing over occurs in the --------- stage of meiosis.

15. Chromosome number in fowl is ---------

16. Epistasis works at------ level where as Dominance always work at the ------level

17. What is penetrance ?

18. The degree to which a genotype is expressed phenotypically is called

19. Name the scientist who first discovered chromosomes

20. Who coined the term Chromosomes?

21. The organelle from which the r-RNA is synthesized

22. Metacentric chromosomes assume which shape?

23. Pairing of the homologous chromosomes takes place at ------- stage

24. Coiled filament that runs throughout the length of the chromosome is called

25. Darkly stained regions of the chromosomes at prophase is called ----

26. Sex chromatin are rich in ----------

27. Where are Lampbrush chromosomes found?

28. The Octate structure in the nucleosome consists of ----

29. Balbiani rings or Chromosomal puffing are present in----------

30. Interphase of the cell cycle consists of ---------

31. Complete synaptonemal complex is found in which stage?

32. Sythesis of DNA is completed in -----stage of Meiosis

33. The unit representing a map unit between the linked gene……

34. Phenomenon by which crossing over in one region suppresses crossing over in adjacent region----

35. What is coefficient of coincidence ?

36. ----- is measured using coefficient of coincidence ?

37. In fowl females are heterogametic T / F

38. Barred plumage in poultry is a type of ----

39. Genic balance theory of sex determination was proposed by -------

40. ----- confirms the presence of barr body in female somatic cells.

41. -------syndrome which is caused by deletion of short arm of chromosome no 5

42. Point mutation was first noticed by ------- in Ancon sheep?

43. World's first chromosome map was produced by-------

44. The no . of chromosomes in Drosophila is --------

45. Haploid-Diploid type of sex determination is seen in ---------

46. In Drosophila sex is determined by the ratio of X chromosome to --------

47. Polyploids created by chromosome duplication is called --------

48. The presence of extra chromosome sets in a cell is called as ----------

49. which is the stain used for G banding----

50. The chart of images of chromosomes is called ----------

ANSWERS :-

1.William Bateson
2.Coined 'allele' and 'genes'
3.Darwin
4.W Johanssen
5.W S Sutton
6.Weismann
7.Austria
8.Hugo de Vries, Carl Correns Eric von Tschermack
9.Law of purity of gametes
10.Multiple alleles
11.Alkaptonuria and Phenylketonuria
12.9:7
13.Bateson and Punnet
14.Pachytene
15.78
16.Intergenic, Intragenic
17. % of individuals with a given genotypes which exhibits the related phenotypes.
18.Expressivity
19.Strassburger
20.Waldeyer
21.Nucleolus
22." V " shape
23. Zygotene
24.chromonema
25.heterochromatin
26.Heterochromatin
27. Primary oocytes of amphibians and spermatocyte of Drosophila.
28. Two molecules each of H2A, H2B, H3 and H4.
29.Salivary gland cells of Drosophila.
30.G_1, S and G_2
31.Zygotene
32.Zygotene
33.CentiMorgan
34.Interference
35.% of observed cross overs/ % of expected crossovers (RATIO)
36. Degree of interference
37.T
38.Sex linked character
39.C.B.Bridges
40.Lyon's hypothesis
41.Cridu-chat syndrome
42.Seth Wright
43.Alfred Sturtevant
44.8
45.Honey bees and wasps
46.Autosomes
47.Autopolyploid

48.Polyploidy 50.Karyotype
49.Giemsa

PART.A: ANIMAL GENETICS - OBJECTIVE

1. Germ Plasm theory was postulated by

a) Lamark b) **Weisman** c) Kolliker d) Hertwig

2. The ability of a given gene or gene combination to be expressed phenotypically to any degree

a) **Penetrance** b) expressivity c) pleiotropism d) prepotency

3) Linkage group in swamp buffalo

a) 25 b) 30 c) **24** d) 26

4. Total number of genotypes in human ABO blood group system

a) 3 b) 12 c) **6** d) 4

5. Eye colour in drosophila is an example of

a) **Sexlinkedinheritance** b) sex limited inheritance c) sex influenced inheritance d) incomplete dominance

6. If the X/A ratio is 0.5, the individual will be

a) Intersex b) normal female c) super female d) **normalmale**

7) Total number of barr bodies in an individual with Turner's syndrome

a) **0** b) 1 c) 2 d) none of the above

8. In translocation, the exchange of chromosomal segments occurs

a) With in the same chromosome b) between homologous chromosomes c) **betweennonhomologouschromosomes** d) both b and c

9. If a woman heterozygous for colour blindness marries a colour blind man, what is the probability that their first child will be colour blind daughter?

a) 50% b) **25** % c) 75% c) 100%

10. If the centromere is located close to the end, and giving a very short arm and an exceptionally long arm, the chromosome is called

a) **acrocentric** b) telocentric c)submetacentric d)none of the above

11. Shortest phase in mitosis is

a) prophase b) **anaphase** c) metaphase d) telophase

12. Soluble RNA (sRNA) is

a) **tRNA** b) rRNA c)mRNA d)mitochondrial RNA

13. The theory of epigenesis was proposed by

a) **K.F. Wolf** b) Charles Darwin c) Swammerdam d) Kolliker

14. Phenotypic F2 ratio of duplicative recessive epistasis (complementary gene interaction) is

a) 12:3:1 b) **9:7** c) 9:6:1 d) 9:3:3:1

15. Source of energy in nucleus is

a) **glycolysisonly** b) TCA cycle only c) both a and b d) none of the above

16. Crossing over taking place at

a) mitosis b) meiosis ll c) **meiosis** l d)all of the above

17. Xanthine is deaminated product of

a) adenine b) thymine c) cytosine d) **guanine**

18. The types of phenotypes in F2 generation is

a) $\mathbf{2^n}$ b) 3^n c) n^2 d) n^3

19. Sum total of genes in a population is

a) genotype b) karyotype c) **genepool** d) gene frequency

20. Rho factor is required for the termination of

a) Replication b) **transcription** c) translation d) transversion

21. The types of histone proteins present in eukaryotic chromosome are

a) 4 b) **5** c) 6 d) 7

22. The classical test cross ratio in dihybrid is

a) 7:1:1:7 b) 1:7:7:1 c) **1:1:1:1** d) both a and b

23. Chromatin consists of

a) DNA & protein only b) RNA & protein only c) RNA & protein only d) **DNA**,**RNA**&**protein**

24. Chromosome number of domestic pig is

a) **38** b) 78 c) 62 d) 54

25. Epistasis is …… type of interaction

a) **inter allelic** b) intra allelic c) allelic genetic d) both a and c

26. Sickle cell anemia is due to point mutation, in which
a) **glu. is replaced by val**. b) val. is replaced by glu. c) his. is replaced by val. d) val. is replaced by his.
(Note: val-valine,glu-glutamic acid)

27. MN blood group system in humans is an example of

a) multiple allelism b) **co dominance** c) incomplete dominance d) pleiotropism

28. If the number multiple alleles for a trait is 5, then what is the total number of genotypes

a) 9 b) 16 c) 12 d) **15**

29. Chromosome theory of linkage was proposed by

a) Beadle and Tatum b) Bateson and Punnett c**) Morgan and Castle** d)Sutton and Bovery

30. Barred condition in poultry is an example of

a) **sex linked inheritance** b) sex limited inheritance c) multiple allelism d) sex influenced inheritance

PART.B**: ANIMAL BREEDING**

1. Quantitative traits are controlled by
a) major genes b) minor genes c) poly genes d) **both b and c**

2. Breeding value (BV) is
a) equal to the TA b**) twice the TA** c) 1/2 of TA d) 1/4 of TA

3. Heritability in narrow sense is
a) **VA/VP** b) VE/VP c) VG/VP d) VA+VG/VP

4. Repeatability value set in ……of heritability
a) lower limit of h^2 b) **upperlimitofh^2** c) intermediate of h^2 d) both a and b

5. The most effective method of selection
a) mass selection b) pedigree selection c) **progeny testing** d) selection index

6. Quantitative traits shows
a)**continuousvariation** b)discontinuous variation c)both a and b d)none of the above

7. Genotypic frequency of progeny depends on
a) genotypic freq. of parent b) genotypic freq. of population c) **genefreq**. **ofparent** d) both a and c

8. In a population sex linked genes are carried by homogametic sex is ……..of the total sex linked genes in the population
a) 1/2 b) 1/4 c) 1/3 d**) 2/3**

9. Type of gene action in general combining ability (GCA) is
a) **additive** b) non additive c) both a and b d) none of the above

10.Range of h^2 and fitness is
a) 0 to 1 b) -1 to +1 c) 0 to infinity d) 0 to x^n

11. The proportion of population which shows genetic death is
a) genetic sterility b) genetic linkage c) **geneticload** d) genetic drift

12. For inbreeding, mated individuals should have common ancestors with in
a) 2-3 generations b) **4-6 generations** c) 6-7 generations d) more than 10 generations

13. Inbreeding coefficients of progenies produced by self mating, parent offspring mating, full sibs and half sibs are in the order
a) 1,0.5,0.25,0.125 b) 0.5,0.5,0.25,0.125 c) 1,0.5,0.5,0.25 d) **0.5,0.25,0.25,0.125**

14. Hissardale is the cross of
a) Merino ewe x Bikaneri ram b) Lincoln ram x Rambouillet ewe c) **Merino ram x Bikaneri ewe** d) Lincoln ewe x Rambouillet ram

15. In the second generation, hybrid vigor will be
a) same as the first b) doubled the first c) **half of the first** d)none of the above

16. Crossing of two inbred lines of the same breed is
a) **Incrossing** c) Incross breeding c) top incrossing d) top incross breeding

17. The intensity of selection depends with number traits considered 'n' is
a) 1/n b) $1/n^2$ c) n d**) 1/√n**

18. Non additive gene action include,
a) epistasis b) dominance c) interaction d) **alloftheabove**

19. Mildest form of out breeding is
a) Cross breeding b) close breeding c) **outcrossing** d) rotational crossing

20. The dispersive process mainly occurs in small population in which,
a) only direction can be predicted not amount b) **onlyamountcanbepredictednotdirection**
c) both amount and direction can be predicted c) direction and amount cannot be predicted

21. The contribution of offspring to the next generation is called
a) fitness b) adaptive value c) selective value d) **alloftheabove**

22. Genotypic correlation is due to
a) polymorphism b) linkage c) pleiotropism d) **both b and c**

23. Carcass quality and quantity is an example of
a) non additive gene interaction b) **additive gene interaction** c) both a &b d)none of the above

24. In MN blood group system, genotypes are MM = 153, MN = 260, NN = 87, then the gene frequencies of M and N alleles are
a) 0.64, 0.36 b) 0.5, 0.5 c) **0.566, 0.434** d) 0.518, 0.482

25. A new breed can be evolved by
a) out crossing b) **cross breeding** c) grading up d) none of the above

26. If the coefficient of selection is 0.25, then the fitness is
a) 1 b) 0.25 c**) 0.75** d)0.5

27. Father of modern animal breeding
a) Robert Bakewell b) S.Wright c**)J.L. Lush** d)Gauss

28. Reproductive traits in animals usually follow …… type h^2
a) High b) medium c) **low** d) none of the above

29. The goat breed, toggenberg originated from
a) Spain b) Denmark c) **Switzerland** d) France

30. Grading up produces pure breed in how many generations
a) 2-4 b) 4-5 c) 10-12 d) **7-8**

MEAT SCIENCE

1. Muscle fibers of meat animals with diameters of 50 microns contains ----- no. of Myofibrils

2. The unit of myofibril between two adjacent Z discs is called -----

3.A typical mammalian muscle at rest has a sarcomere length of -------

4. Actin molecule has a --------- shape

5. Myosin constitutes approx --------% of myofibrillar proteins

6. --------- is the most abundant protein in animal body

7. --------- is the most abundant amino acid of collagen

8. Glycine constitute about -----% of amino acids of collagen

9. ---------- is the structural unit of collagen fibril

10. The cervical ligament of neck is made of --------fibers

11. --------- is the amino acid present in the greatest quantity in elastin

12. -------- & --------- are two unique amino acids present in elastin

13. The color of brown fat is due to high content of --------- in mitochondria

14. A primary muscle contains approx ------ number of muscle fibers

15. Intramuscular fat is called ---------- of meat

16. Intermuscular fat is also called --------- fat

17. The element which constitutes maximum % of animal body weight is--------

18. ---------- is the most abundant fatty acid in animal body

19. The most abundant carbohydrate in muscles----------

20. Average protein percentage of mammalian skeletal muscles-----

21. A genetic condition of cattle causing unusually thick bulging muscles.

22. Excessive fat infiltration in muscle fibers is called--------

23. An action potential enters the interior of a muscle fibers along ---------

24.Only about --------% of total blood volume can be removed via exsanguination.

25. The range of ultimate pH of meat is --------

26. The period of time during which the muscle is extensible and elastic is called---phase of rigor mortis.

27. ATP complexed with --------is required for a muscle to maintain a relaxed state

28. The decrease in tension with time is described as ------- of rigor mortis.

29. Holding carcass at refrigeration temperature after initial chilling is called--------in US &-----in other countries

30. In------- condition of meat, there is lowered processing yield, increased cooking loss and reduced juiciness.

31. Cold shortening develops when muscle is chilled below --------before onset of rigor mortis.

32. Thaw rigor shortening is approx. ------- % of original length of muscles.

33.Marked shortening and early onset of rigor induced by maintaining muscles at high temp is called-------

34. Lipid oxidation in muscles is measured as -----values.

35. Loss of weight during storage of meat is called ----------

36. Lack of space for water molecules within protein structures is known as -------effects.

37. In well bled muscles, Myoglobin constitutes ------% of the total pigments.

38. The typical color of meat from pork is -------

39. The bright red color development of meat is due to oxymyoglobin is called

40. Oxidized myoglobin is called------

41. The bright pink color characteristic of cured meat is due to ---------

42. The amount of nitrite permitted in finished products by US meat inspection regulation is ----ppm

43. The sodium salts of ------- or -------- acids are most widely used cure accelerators.

44. The greening of cured meat pigment by excessive use of nitrites----------

45. Large fat particles coalesce at the end of the sausages to form -------

46. -----flavor develops due to lipid oxidation in pre-cooked frozen meat.

47. The heat resistance of microrganisms is usually expressed as ---------

48. To stabilize meat products, a radiation dosage of ----- megarads is used.

49, Loss of tenderness occuring in the first few hours postmortem is called--------toughning.

50. Cooked testicle of lambs, calves and turkeys are commonly called ------

ANSWERS -

1. 1000-2000

2. Sarcomere

3. 2.5 microns

4. Globular

5. 45

6. Collagen

7. Glycine

8. 33

9. Tropocollagen

10. Elastin

11. Glycine

12. Desmosine and Isodesmosine

13. Cytochrome

14. 20 to 40

15. Marbling

16. Seam

17. Oxygen-65%

18. Oleic acid

19. Glycogen

20. 18.5%

21.Double Muscling

22. Steatosis

23. T-tubules

24. 50%

25. 5.3-5.7

26. Delay

27. Mg2+

28. Resolution

29. Aging , conditioning

30. PSE

31. 15-16 degrees

32. 60%

33. Heat Rigor

34. Thiobarbituric Acid

35. Shrinkage

36.Steric

37. 80-90%

38. Grayish Pink

39. Bloom

40. Metmyoglobin

41. Nitrosyl Haemochromogen

42. 200

43. Ascorbic or Erythorbic

44. Nitrite Burn

45. Fat Caps

46. Warmed Over

47.Thermal death time

48. 4.5

49. Actomyosin

50. Mountain Oysters

DAIRY SCIENCE

1. Cottage cheese is a soft, unripened cheese usually made from **Skim milk**

2. Operation flood was started in the year **1970**

3. Plastic cream contains **65-85 per cent milk fat**

4. According to PFA Rules the milk fat content of khoa should not be less than **20 per cent of finished product.**

5. The average specific gravity of skim milk ranges from **1.035 to 1.037**

6. According to the PFA Rules the mixed milk should contain minimum per cent of milk fat and milk SNF respectively **4.5, 8.5**

7. The chairman of NDDB, has become the first Indian to be elected to the board of the International Dairy Federation (IDF) **Dr. (Ms) Amrita Patel**

8. Daily per capita milk consumption recommended by the Medical Authorities is **280g**

9. According to the PFA Rules chhana should not contain more than **70 per cent moisture**

10. The acidity in mastitic milk is **Lower than normal milk**

11. The starter organisms for yoghurt a**re Streptococcus thermophilus** a**nd Lactobacillus delbruekii subsp. bulgaricus**

12. Natural acidity of milk is due to **casein,acid phosphates and citrates**

13. Temperature and time of flash pasteurization **720Cfor 15 second**

14. Pizza is prepared from **mozzarella** cheese

15. National Dairy Development Board, Anand ,Gujarat was set-up in the year**1965**

16. Soft ice cream is usually drawn from the freezer at around - 8 to -7°C. The overrun may be in the range of **30 to 50** per cent.

17. Pasteuization refers to the process of heating every particle of milk to at least **63ºCfor 30 min** or heating to **72ºC for 15 sec.**

18. The time-temperature combinations used for producing sterilized milk are **145ºC and 3 sec.**

19. The low temperature storage of raw milk prior to processing is likely to increase **Psychrotrophic** counts.

20. The spores of **B. stearothermophilus** are known to withstand UHT treatment.

21. **Sterilizing effect** refers to the number of decimal reductions that the heat treatment is able to effect in milk.

22. For aseptic packaging of UHT milk, **Tetra pack, Tetra-Brick** etc are used as packaging materials

23. The common groups of post-pasteurization contaminants include **Coliforms and psychrotrophs**

24. The thermal destruction of bacteria in milk is based on the principle of **Protein denaturation**

25. **Pseudomonas putrefaciens** causes surface taints in butter.

26. The **gas producing organisms** may enter milk chiefly from soil and manure.

27. The blue discolouration in milk is caused by the associative action of **Ps. Syncyanea and S. lactis.**

28. Slime production in milk is mainly caused by **Leuconostoc** genus of lactic acid bacteria.

29. Ropiness in milk is mainly caused by **Alcaligenes viscolactis**

30. Coliforms cause **Early** blowing in cheese.

31. The two types of materials responsible for ropiness are **Gums, and Mucins**

32. The three types of rancidity in milk are **Hydrolytic, oxidative and ketonic**

33. The fruity aroma of milk produced by Ps. fragi is due to the production of **Esters;**

34. Malty flavour produced by S. lactis var. maltigenes in milk is due to the production of **Aldehydes** .

35. Unclean flavour in milk may be due to microbial production of **Dimethyl sulfide** by Gram-negative psychrotrophic bacteria.

36. Faecal coliforms in dairy products are detected by **Eijkman test** test.

37. The common indicator organisms used for determining faecal contamination in frozen and thermized foods are **Enterococci**

38. The tentative standards for bacterial count of environment in butter section are **300 cfu/m3.**

39. The aflatoxin **B1** in dairy animal feed is transformed into aflatoxin M1 and is secreted into milk.

40. The efficiency of dairy sanitizers is determined by **Capacity and suspension** tests.

41. Food-borne intoxications through dairy products are mainly caused by **Staph.aureus**

42. **Widal** test is used for the detection of Salmonella in dairy products.

43. E.coli forms typical **Dark centered with green metallic sheen** colonies on Eosin Methylene Blue (EMB) agar.

44. Indian Standards Institution (ISI) has been renamed as **Bureau of Indian Standards**

45. ICMSF stands of **International Commission on Microbiological Specifications for Foods;**

46. Indole is produced from tryptophan by the action of **Tryptophanase** enzyme of micro-organisms during IMViC test.

47. Milk with titratable acidity more than **0.17** % (LA) gives a positive COB test.

48. A special pipette called **Breed's pipette** is used for performing direct microscopic count (DMC).

49. For staining milk smear during direct microscopic count, a special stain, a special stain called **Newman's stain** is used.

50. The oxidation-reduction potential of resazurin is **0.34 V** whereas it is **0.1 V or les** for dihydroresorufin.

POULTRY SCIENCE

1. Fibrous proteins contains the .....which are the main proteins of .....
2. The chemical name of vitamin D2 is .....whereas D3 is .....
3. .....concerned with night vision is a .....pigment
4. The enzyme like .....breakdown fat into .....and.....
5. The inorganic element present in the arginase is ..... It splits arginine into .....and .....
6. Antivitamin K activity is exhibited by (a) biotin (b) dicumarol (c) sulfanilamide (d) caproic acid
7. Gossypol of cotton seed meal react with (a) zinc (b) manganese (c) iron (d) selenium
8. Nutritional roup is due to deficiency of (a) vit A (b) vit B6 (c) vit K (d) vit E
9. Pastures are classified in (a) silage (b) roughage (c) additives (d) succulent forages
10. A calorie is the amount of heat required to raise the temperature of 1g water from (a) 12.5 to 13.5 (b) 14.5 to 15.5 (c) 15.7 to 16.7 (d) 10.2 to 11.2
11. For determination of metabolizable energy instrument used is (a) metabolizable energy meter (b) bomb calorimeter (c) barometer (d) energy thermometer
12. Keratin are proteins of (a) arteries (b) DNA (c) hairs (d) connective tissue
13. Protamines are basic proteins associated with nucleic acids are rich in (a) tyrosine (b) tryptophan (c) methionine (d) arginine
14. weight gain per unit weight of protein consumed refers to (a) biological value (b) gross protein value (c) protein efficiency ratio (d) essential amino acid index
15. denaturation of proteins in chicken occurs in (a) oesophagus (b) proventriculus and gizzard (c) crop and pancreas (d) small and large intestine
16. vitamin E was discovered by (a) Funk (b) Hopkins (c) Evans and Bishop (d) Mc Collum and Davis
17. Maintenance of normal cerebrospinal fluid pressure is physiological function of (a) riboflavin (b) pyrodoxin (c) retinol (d) folic acid
18. selenium is an essential component of enzyme (a) coenzyme A (b) D aminoacid oxidase (c) glutathione peroxidase (d) choline esterase
19. "clubbed down condition" occur due to deficiency of (a) pterylglutamic acid (b) riboflavin (c) menaquinone (d) cholecalciferol
20. vitamin H is the old name of (a) nicotinic acid (b) folic acid (c) tocoferol (d) biotin

21. laying hens most efficiently utilized phosphorus from which of the following sources (a) phytate phosphorus (b) phosphorus of cereal grains (c) disodium phosphate (d) dicalcium phosphate
22. which of the fowl has a single medium wattle (a) red jungle fowl (b) ceylon jungle fowl (c) grey jungle fowl (d) javan jungle fowl
23. white leghorn are white because (a) no colour gene (b) a dominant gene which inhibits color (c) recessive white gene (d) they have silver gene
24. the best breed for using as male line in broiler production is (a) white rock (b) Cornish (c) New Hampshire (d) Australorp
25. the wild .....is the ancestor of all domestic duck breeds
26. immature ducks up to age of 8-11 weeks are called.....
27. the black and white barring in barred Plymouth rock is due to .....barring gene
28. in a sex-linked cross involving barring, the female parent is a .....
29. in a sex-linked cross involving silver and gold, the silver gene carrying .....parent is used
30. in a sex-linked cross involving silver and gold, the gold gene carrying .....parent is used
31. in a sex-linked cross involving feathering gene, a late feathering .....parent is used
32. which one is sex linked (a) dwarfism (b) nakedness (c) albinism (d) rapid feathering
33. egg shell treatment is done to reduce the rate of .....loss
34. shank length and width is a good indicator of .....
35. blood meal is deficient in essential aminoacid.....
36. maximum level of molasses which can be included in chick feed.....
37. metablizable energy value of maize grain.....
38. the best protein source among the plant protein sources.....
39. poultry need one more essential aminoacid .....than cattle
40. eggs are pasteurized primarily to destroy bacteria pathogenic to humans especially.....
41. eggs act as .....agent in baked foods
42. hens egg contains about.....grams of protein
43. a component of egg white having antibacterial activity
44. compared to red meats, poultry meat contain a higher proportion of .....(saturated/unsaturated fatty acids)
45. which of the following is not a glucan (a) starch (b) inulin (c) cellulose (d) dextrins
46. which of the following was considered lately as an essential mineral for poultry (a) molybdenum (b) zinc (c) selenium (d) chromium
47. weight loss of broiler between farm and processing plant is .....%
48. darkening of egg yolk in hard boiled eggs is due to .....formation
49. .....is done for recycling of birds to get another cycle of egg production
50. conalbumen complex with .....
51. .....is the trypsin inhibitor in egg
52. avidin complexes with.....in egg
53 one molecule of avidin complexe with.....molecules of biotin
54. hen become sexually active at the age of .....weeks
55. length of ovulatory cycle in birds is .....

56. within a clutch, the interval from oviposition to the following ovulation averages about.....
57. abolishing 'bearing down reflex' results in .....
58. minimum time from spermatocyte stage to the production of mature spermatozoa is.....
59. the daily turn over of calcium in the normal laying hens is .....% of her total body calcium
60. if the left ovary of a 15 days old chick is removed, the right ovary will become an .....
61. the sperm host glands of avian oviduct are located at .....of oviduct
62. chicken sperms are able to utilize.....for energy purpose
63. the fertilized chicken egg when laid contains an embryo at .....stage
64. the avian testes are soft because they lack .....commonly found in mammals
65. extra retinal .....present in birds produce the effects of light in blinded birds
66. Body temperature of fowl is.....
67. Upper lethal temperature of fowl is .....
68. Fresh poultry excreta contains.....% water
69. Threshold photoperiod for poultry.....
70. For maximum egg production, the photoperiod is .....

ANSWERS -

1. collagens, connective tissue
2. ergocalciferol, cholecalciferol
3. rhodopsin, bright red
4. lipase, fatty acids and glycerol
5. magnesium, ornithine and urea
6. dicumarol
7. iron
8. vitamin A
9. succualnt forage
10. 14.5 to 15.5
11. bomb calorimeter
12. hairs
13. arginine
14. protein efficiency ratio
15. proventriculus and gizzard
16. Evans and Bishop
17. Retinol
18. glutatione peroxidase
19. riboflavin
20. biotin
21. disodium phosphate
22. Javan jungle fowl
23. dominant gene that inhibits color
24. Cornish
25. mallard
26. green duck
27. sex linked
28. barred Plymouth rock
29. female
30. male
31. female
32. rapid feathering
33. carbon dioxide
34. skeleton size
35. isoleucine
36. 5%
37. 3300 kcal/kg
38. soybean meal
39. glycine
40. salmonella
41. leavening agents
42. 6-7
43. lysozyme
44. unsaturated
45. inulin
46. chromium
47. 5-10
48. ferrous sulfide

49. forced/induced moulting
50. iron
51. ovomucoid
52. biotin
53. 4 (avidin has 4 subunits and each subunit complex with one molecule of biotin)
54. 18-20
55. 25-26 hrs
56. 35 minutes
57. delay in oviposition
58. 12 days
59. 10
60. ovotestis
61. uterovaginal junction
62. glucose
63. gastrula
64. connective tissue septa
65. photo receptors
66. 40.6-41.7 degrees Celsius
67. 47 degrees Celsius
68. 70-80%
69. 9-10 hours
70. 14 hours

IMPS *for* **Poultry**

Present day production potential of commercial broilers and layers

commercial broiler

body wt at 42 days of age- 2 kg
feed intake to 4 days age 4.2 kg
livability- 95%

commercial layer

livability upto 18 weeks- 95%
no of eggs- hen housed- 310
body wt at 76 weeks age- 1.6 kg
feed intake during laying period- 48-52g
livability (18-76wk)- 92%

BIS Requirements of chicken feeds IS 1374:1992 (fourth revision)

characteristic	*requirements for (*to be declared (on dry matter basis)					
	broiler starter (0-5 wk)	**broiler finisher (after 5 wk)**	**chick feed (0-8 wk)**	**growing chicken feed (8-20 wk)**	**laying chicken feed**	**breeder layer feed**
moisture perent by mass, max.	11	11	11	11	11	11
crude protein (Nx6.25) percent by mass, Min	23	20	20	16	18	18
crude fibre, percent by mass, Max.	6	6	7	8	8	8
acid insoluble ash, percent by mass, max.	3	3	4	4	4	4
salt (as NaCl), percent by mass, Max.	0.6	0.6	0.6	0.6	0.6	0.6
calcium percent by mass, min.	1.2	1.2	1.0	1.0	3.0	3.0

available phosphorus, percent by mass, min.	0.5	0.5	0.5	0.5	0.5	0.5
metabolizable energy, Kcal/kg, Min	2800	2900	2600	2500	2600	2600

ANIMAL NUTRITION

1. □ □ Father of nutrition- Antoine Lavoisier
2. □ □ The yeast variety commonly known as "fodder yeast"-*Torulopsis utilis*
3. □ □ Water content in the body of new bone calf is-80%
4. □ □ In Van Soest method of feed estimation the ADF comprises of----cellulose and
5. lignin
6. □ □ The only true ketogenic amino acid-leucine
7. □ □ Fat contains-----% carbon-77
8. □ □ A dietry excess of Tyrosine cause-eye lesions
9. □ □ Dietry excess of Methionine produces-inhibition of ATP synthesis
10. □ □ Zinc forms an integral part of enzyme- Carbonic anhydrase
11. □ □ About 96% of plasma copper is bound to an alpha-2 globulin called-
12. Ceruloplasmin
13. □ □ Organic acids promotes the absorption of calcium
14. □ □ Curled toe paralysis is caused by the deficiency of-Riboflavin
15. □ □ One IU of vitamin A is equivalent to 0.6mcg of beta carotene
16. □ □ Vitamin A promotes muco-polysaccharide synthesis by- activating sulphate
17. molecule
18. □ □ 'Ito cells' in the liver is the storage site of-Vitamin E
19. □ □ Vitamin E is involved in the synthesis of-Ascorbic acid and ubiquinine
20. □ □ Ascorbic acid was first isolated by-Szent Gyorgi
21. □ □ A demin or vitamin H is-Pyridoxine
22. □ □ Niacin requirements can be compensated with-Tryptophan
23. □ □ The entire process of citric acid cycle take place in side mitochondria-under
24. aerobic condition
25. □ □ Branching enzyme in glycogen synthesis is- Glycosyl 4,6 transferase
26. □ □ Rate limiting step in glycogen synthesis is-addition of activated glycosyl units
27. □ □ Apart from liver cells which other body tissue is capable of producing glucose-intestinal
28. cells
29. □ □ "Alkali disease" or "blind staggers" is caused by the toxicity of-Selenium
30. □ □ Glutathione and insulin contains-Sulfur
31. □ □ Chromium deficiency may lead to- Impaired glucose tolerance
32. □ □ Nickel is essential for urease activity of rumen microbes.

33. □ □ Jerusalem antichoke contains the main reserve carbohydrate- Inulin
34. □ □ The term "*protein*" is coined by-Mulder
35. □ □ Who introduced the balance and thermometer in to nutrition studies for the first
36. time?-Antoine Lavoisier
37. □ □ Pinnaglobulin contains Manganese and hemocyanin contains copper
38. □ □ Legumes are exceptionally rich in- Calcium
39. □ □ Germinating Barley contains a starch digesting enzyme called -Diastase
40. □ □ Skim milk is the feed ingredient which can said to be rich in both- Calcium and
41. Phosphorus
42. □ □ First accurate respiration calorimeter was constructed by-Rubner
43. □ □ Starch equivalent system was designed by-Kellner
44. □ □ According to NRC, the ME=DE x 0.85
45. □ □ Physiological fuel values were devised by-Atwater
46. □ □ Heat increment consists of-Heat of fermentation and Heat of nutrient metabolism
47. □ □ Feces is the main route of phosphorus excretion in herbivores and urine is in case
48. of carnivores.
49. □ □ Citrate ,lactate ,pyruvate ,ascorbate etc enhance the absorption of-Iron
50. □ □ RUMENSIN, MONENSIN modifies rumen fermentation by-promoting
51. propionate producing microbes
52. □ □ In hibernating animals the RQ is- less than 0.7
53. □ □ Whole blood contains from 35-45mg % phosphorus
54. □ □ Glucosyl transferase needed in mucopoly sacharide synthesis depend on-
55. Manganese
56. □ □ 'Degnala disease' is caused by-Selenium toxicity
57. □ □ Net gain of ATP while one mole of glucose is oxidized completely-36
58. □ □ Scandinavian feeding system based on barley as the standard is introduced by-
59. Hanssen
60. □ □ Urea toxicity results when the rumen ammonia level exceeds-80mg/100ml
61. □ □ Leaves of plants contain *galactolipid* as the major lipid

I.Indicate True or False

1. Albumins are not soluble in water.- **F**
2. Elastins are fibrous proteins. - **T**
3. Triglycerides are known as fat.- **T**
4. G.E. content of fat is about 4 kcal/g.- **F**
5. Net yield of ATP per mole of glycerol is 21.--**T**
6. Thaer developed the first feeding standard.--**T**
7. Sucrose is sweetest of all the sugars. - **F**
8. Maltose is a reducing sugar. - **T**
9. Starch equivalent of wheat bran is 45. - **T**
10. Antibiotics are essential for large ruminants in feed. -- **F**
11. NFE is determined by analysis. - **F**
12. BMR declines about 8% per year of age.**T**
13. Vitamin E deficiency causes crazy chick disease.-- **T**
14. VanSoest system of feed analysis was proposed in 1967.-- **T**
15. Activity increment of cattle, sheep and swine is less when compared to poultry. - **T**
16. R.Q. for carbohydrate is 0.7. -- **F**
17. Blood meal is deficient in isoleucine but rich in lysine. -**T**
18. Soybean meal is rich in methionine.**F**

19. The pH of silage in A. I. V. method is kept below 4.**T**
20. For guinea pig the Vitamin C requirement is 222 mg/kg DM of diet. - **T**
21. Zone of thermal neutrality for pig is 20-260C. --**T**
22. Chief route of phosphorus excretion in ruminants is urine.-- **F**
23. Molybdenum deficiency in chicken causes femoral head necrosis.---**T**
24. Plasma calcium level is 4-5 mg/dL in most species…. **F**
25. Chromium deficiency causes impaired glucose tolerance.-- **T**
26. Diammonium phosphate contains 18% Nitrogen and 20% Phosphorus.--**T**
27. Iron requirement for pig is 80mg/kg diet.--**T**
28. 1 IU of Vitamin E is equal to 1 mg α tocopherol acetate.--**T**
29. Menadione is both water-soluble and fat-soluble.--**T**
30. *Fibrobacter succinogens* is the chief fibre degrading bacteria in the rumen.--**T**
31. Fungal count in rumen is 103 to 105/ml of rumen liquor.---**T**
32. Specific function of rumen fungi is substrate penetration.---**T**
33. Sequestration is function of holotrich protozoa.---**T**
34. Microbe with highest protease activity in rumen is bacteria--- **F**
35. Majority of rumen bacteria are Gram positive.---**F**
36. *Butyrivibrio fibrisolvens* is a hemicellulose degrading bacteria.--**T**
37. Defaunation causes increase in bacterial and fungal biomass.--- **T**
38. Yeast is a probiotic.--**T**
39. Trypsin acts on the peptide linkage involving aromatic amino acids.--**F**
40. Secretion of Brunners gland is alkaline.--**T**
41. Amino peptidase and di peptidase is secreted from small intestine.--**T**
42. Monensin supplementation increases methane production in ruminants.--**F**
43. The chief end product of purine metabolism in ruminants is allantoin.--**T**
44. Prehensile organ of cattle is lip.--**F**
45. MFN has no relationship with feed intake.--**F**
46. Maintenance requirement of dogs is 132 kcal/kgW0.75. --**T**
47. Haecker showed that nutritive requirements varied with quality and quantity of milk produced in dairy cattle.--**T**
48. Microbial digestion in rabbits takes place in proximal colon and caecum.--**T**
49. Armsby developed surface area law.--**F**
50. As per NRC, protein content in hamster diet should be 15%.--**T**
51. Methane is the chief rumen gas.--**F**
52. Struvite is Magnesium Ammonium Phosphate.--**T**
53. In dairy cows grazing resulted in a maintenance requirement that was 40% greater than when they were fed in the barn.--**T**
54. Terpenes yield isoprene moiety on degradation.--**T**
55. Lymph draining the intestine is always milky in ruminants.--**T**
56. Availability of calcium is 45%.--**T**
57. β oxidation of fat takes place in endoplasmic reticulum.-- **F**
58. 1000 ppm TDS is ideal for water.--**T**
59. Cats are very sensitive to deficiency of arginine.--**T**
60. Metabolic water comprises 20-25% of total water intake of domestic animals.--**F**

II. Fill in the blanks

1. Taurine deficiency in cats results in .....
2. Lignin is associated with ..... in plants.
3. The true stomach of ruminants is .....
4. Cat cannot convert β Carotene to Vitamin A as it lacks the enzyme.....
5. Animal starch is .....
6. Hay cannot be stored if the moisture content is above .....

7. Ether extract in solvent extracted cake is .....%.
8. .....are the main proteins of connective tissue.
9. Toxic amino acid present in subabul .....
10. Cereals are deficient in the amino acid .....
11. 1 calorie =.....J
12. Methane contains .....kcal energy /g.
13. Chief VFA in rumen is .....
14. The practice of feeding extra concentrate in last 6-8 weeks of pregnancy is called .....
16. DCP requirement for milk production in goats is .....
17. Urea can replace about .....% of DCP requirement.
18. Optimum DM content of silage premix is .....
19. The mineral associated with the enzyme tyrosinase is .....
20. Safe upper limit of fluoride in water is .....ppm.
21. Dissecting aneurysm in chicken is due to deficiency of .....
22. Aflatoxin content in the feed of duck should not exceed .....ppm.
23. Minimum CP content of BIS Type I cattle feed is .....%.
24. ..... is the only VFA found in appreciable quantities in peripheral circulation.
25. Vitamin required in propionic acid metabolism is .....
26. Pica is due to deficiency of .....
27. An adult elephant requires .....kg green per day.
28. ..... is a measure of amount of water soluble steam volatile fatty acids.
29. Calcium deficiency in bitches results in .....
30. Grass staggers is due to deficiency of .....
31. N S P present in wheat is .....
32. Thumps in piglets is due to deficiency of .....
33. Father of the science of Nutrition is .....
34. Parakeratosis in swine is due to deficiency of .....
35. Optimum pH of silage is .....
36. ATP produced from 1 mole of propionate is .....
37. The enzyme Alcohol dehydrogenase has the mineral .....
38. The enzyme Arginase contains the mineral .....
39. Specific function of rumen bacteria is .....
40. Protozoa used for the evaluation of protein quality in feeds is .....

ANSWER :-

1. Feline Central Retinal Degeneration (FCRD)
2. Cellulose
3. Abomasum
4. β Carotene dioxygenase
5. Glycogen
6. 15%
7. 0.5-1
8. Collagen
9. Mimosine
10. Lysine
11. 4.184
12. 13.34
13. Acetic acid
14. Steaming up
15. 2.5-3
16. 70 g/kg milk produced
17. 30 %
18. 35 %
19. Copper
20. 2 ppm
21. Copper
22. 0.03 ppm
23. 22%
24. Acetate
25. Vitamin B12
26. Phosphorus
27. 200 kg
28. Reichert-Meissl Number
29. Eclampsia
30. Magnesium
31. Arabinoxylan
32. Iron
33. Lavoisier
34. Zinc
35. 3.8-4.2
36. 17 ATP
37. Zinc
38. Manganese
39. Methanogenesis
40. *Tetrahymena pyriformis*

1. Chairman of the scientific panel set up for the development of the first edition of feeding standard published by ICAR in 1985?
   N. D. Kehar

2. A scientist from KAU, who was a member of the sub-committee for drafting ICAR feeding standards for goats?
   M. Shivaraman

3. Feeding standards in U. K. is developed by?
   A R C

4. Starch digestibility in rumen ranges from?
   63-70%

5. Chief cellulose degrading bacteria of rumen?
   Fibrobacter succinogens

6. Only VFA present in appreciable quantity in peripheral blood as an important energy source?
   Acetate

7. Berseem is a plant from?
   Egypt

8. A I V method of silage making uses the acids?
   Sulphuric acid and Hydrochloric acid

9. Flieg index is a commonly used method for evaluation of?
   Silage quality

10. Silo-fillers disease is an illness of farm workers that is caused by inhalation of the oxides of?
    Nitrogen

11. "Vana Mahotsava" the annual festival of trees was inaugurated in?
    1950

12. Beneficial effect of condensed tannin in legumes is attributed to their ability to?
    Protect protein

13. Name two tannin complexing agents?
    Polyethylene glycol (PEG) and Polyvinylpyrrolidone (PVP)

14. 3,4 DHP (dihydroxypyridone) and 2, 3 DHP are the break down products of the antinutritional factor …….?
    Mimosin

15. Chief endproduct of purine metabolism in ruminants?
    Allantoin

16. A naturally occurring fatty acid found in ruminant products which has beneficial health attributes like anticarcinogenic activity, anti obesity and anti atherogenic activity?
    Conjugated linoleic acid (CLA)

17. Plants belonging to genus Brassica has the antinutritional factor……?
    Glucosinolates

18. Slobber syndrome and facial eczema in cattle is caused by the consumption of….?
    Mycotoxins (slaframine and swainsonine)

19. Hydrated sodium calcium aluminosilicates (HSCAS) are added in feed for?
    Binding mycotoxins

20. Maximum permitted level of aflatoxin in animal feeds (as per Prevention of food adulteration act)?
    30 ppb (0.03 ppm)

21. BT cotton has the gene from the bacterium?
    Bacillus thuringiensis

22. Plant which is named Biodiesel?
    Jatropha

23. The oil seed crop that is produced in the largest amount in the world is?
Soybean

24. Domesticated avian species having high requirement for Niacin?
Duck

25. Mineral which is present in glucose tolerant factor?
Chromium

26. Central Research Institute for Dry land Agricuture (CRIDA) is located at?
Hyderabad

27. Tree loppings or prunings available as feed in silvipastoral system is termed?
Top feeds

28. Name a selenium accumulator plant?
Astragalus

29. N : S ratio of wool?
5:1

30. The pathway of propionate production in animal consuming high fibrous diet?
Succinate pathway

31. Term metabolizability denotes?
ME/GE

32. Vitamin C requirement for guinea pig diet?
200 mg/kg feed

33. Fodder feed is?
Cow pea

34. VFA having maximum absorption rate is?
Butyrate

35. Zinc deficiency causes infertility in males because it is a component of the enzyme……..?
Thymidine kinase

36. Preferred source of enzyme for estimating degradability of protein in French PDI system?
S. griseus (protease)

37. Alkaloid in legume which predispose bloat?
Saponin

38. If no green grass is fed to ruminants the concentrate mixture should have Vitamin A at the rate of ……..?
5000 IU/Kg

39. Other than HMP shunt, the conversion of …..to …… is a source of NADP in non ruminants?
Malate to Pyruvate

40. Phosphorus content of bran?
1.2-1.5%

41. Carprice reaction is concerned with the estimation of?
Vitamin A

42. Antimetabolite of folic acid?
Aminopterine

43. Fatal syncope in calves and pigs is due to deficiency of?
Vitamin E

44. First discovered amino acid?
Aspargine

45. Chief acid of silage is?
Lactic acid

46. Silo with minimum spoilage is?
Upright silo

47. Scotopsin is rich in the amino acid?
Lysine

48. Meskawi is a common variety of the plant?
Berseeem

49. Domesticated ruminant with highest BMR?
Goat

50. Deficiency disease in which ceroid pigment is accumulated in adipose tissue of cats?

Yellow fat disease/Pansteatitis (Vitamin E deficiency)

51. Colour of pure vitamin A?
Colourless

52. Reference standard in a Bomb calorimeter?
Benzoic acid

53. Brouwer equation is used to estimate?
Heat production

54. A fungal enzyme added in poultry feeds containing barley?
ß glucanase

55. Ruminant which is most prone to both cobalt deficiency and copper toxicity?
Sheep

56. Biological value of microbial protein?
80

57. (DCP + DTP)/2 is ?
Protein Equivalent

58. The pathway occurring in plants which is responsible for the conversion of fat to carbohydrate?
Glyoxylate cycle

59. First two enzymes of urea cycle is located in?
Mitochondria

60. Cell organelle involved in initial steps of alkoxy-phospholipid biosynthesis which leads to the production of plasmalogens?
Peroxisomes

61. Aminoacid required for the production of carnitine?
Lysine

62. ……..% of the nitrogen of milk is NPN?
5%

63. Hammer mill works on the principle of/
Impact grinding

64. Major pathway for ATP synthesis in tissues lacking mitochondria like RBC, cornea and lens?
Glycolysis

65. Metals inhibiting pyruvate dehydrogenase complex?
Arsenic and Mercury

Multiple Choice Questions

1. Efficiency of conversion of ß carotene to vitamin A is in the order?
a. Rat>Ruminants> Pig> Poultry
b. Rat>Poultry>Pig>Ruminants
c. **Rat>Poultry>Ruminants>Pig**
d. Pig>Poultry>Ruminants>Rat

2. Rumen degradable protein content is highest for?
a. Soybean meal
b. Coconut cake
c. **Groundnut cake**
d. Fish meal

3. The feed which is fed "whole" to poultry but "crushed" to cattle and pig?
a. **Pearl Millet**
b. Great Millet
c. Barley
d. Jowar

4. Experimental animals for determining GPV of a feed?
a. Rats
b. Rabbit
c. Guinea pig
d. **Chick**

5. Order of the efficiency of conversion of Tryptophan to Niacin?
a. Pig>Chicken>Duck>Cat
b. Cat>Chicken>Duck>Pig
c. **Chicken>Pig>Duck>Cat**
d. Duck>Chicken>Pig>Cat

6. Which of the following is common to salseed, sorghum and jowar?
a. Mucilage

b. **Tannin**
c. Glucosinolate
d. Mimosine

7. Colour of ruminant bile?
a. **Green**
b. Golden yellow
c. Orange
d. Colourless

8. DCP% is highest for?
a. **Lucerne hay**
b. Berseem hay
c. Oat hay
d. Wheat straw

9. Which of the following is required for Ubiquinone synthesis?
a. Vitamin A and Copper
b. Vitamin E and Selenium
c. Vitamin E and Copper
d. **Vitamin C and Selenium**

10. The order of toxicity is?
a. Tyrosin>Threonine>Methionine
b. Methionine>Threonine>Tyrosine
c. Threonine>Tyrosine>Methionine
d. **Methionine>Tyrosine>Threonine**

11. Which of the following is most important in inhibiting the digestibility of paddy straw?
a. Lignin
b. **Silica**
c. Hemicellulose
d. Oxalate

12. Concentration of Ammonia and Total VFA in rumen is highest for?
a. **Goat**
b. Buffalo
c. Sheep
d. Cattle

13. Most promising initial symptom of Vitamin A deficiency in cows and horses?
a. **Copius lacrymation**
b. Copius salivation
c. Xeropthalmia
d. Night blindness

14. …….% NDF in total ration is critical for maintenance of normal milk fat?
a. 66%
b. 18%
c. 73%
d. **36%**

15. Urea treatment of straw increases?
a. CP and DCP
b. TDN
c. Dry matter digestibility and feed intake
d. **All the above**

16. Pregnancy toxemia is seen in?
a. Sheep and Goat
b. Sheep and Rat
c. **Sheep and Guinea pig**
d. Sheep and Rabbit

17. Taurine requirement of cats is ……..mg/kg DM in diet?
a. 200
b. **500**
c. 800
d. 1000

18. Amino acid precursor of lignin?
a. **Phenylalanine**
b. Tyrosine
c. Alanine
d. Glycine

19. Mineral needed for acetate incorporation in cholesterol biosynthesis?
a. Calcium
b. Copper
c. **Manganese**
d. Magnesium

20. Microbe in rumen capable of breaking lignocellulosic bond?
a. Bacteria
b. Protozoa
c. **Fungi**
d. None

21. Protease activity in rumen is highest for?
a. Bacteria
b. **Protozoa**
c. Fungi
d. Bacteriophage

22. Naturally occurring fatty acid has ……..configuration?
a. **Cis**
b. Trans

c. Both
d. None

23. Which of the following is common in nature?
a. D sugars and D amino acids
b. L sugars and L amino acids
c. **D sugars and L amino acids**
d. L sugars and D amino acids

24. The order of salt tolerance?
a. **Sheep>Cattle>Pig>Poultry**
b. Sheep>Pig>Cattle>Poultry
c. Cattle>Sheep>Pig>Poultry
d. Pig>Cattle>Sheep>Poultry

25. Urea supplementation is not recommended if CP content of ruminant diet is above?
a. 18%
b. 25%
c. 7%
d. **13%**

26. Which of the following deficiency contribute to perosis?
a. Manganese and Choline
b. Biotin and Folic acid
c. Thiamine, Manganese, Choline, Biotin and Folic acid
d. **Vitamin B_{12}, Manganese, Choline, Biotin and Folic acid**

27. Order of tolerance of aflatoxin?
a. Chicken>Guinea fowl>Duck
b. Duck>Guinea fowl>Chicken
c. **Guinea fowl>Chicken>Duck**
d. Chicken>Duck>Guinea fowl

28. Arrange the susceptibility to aflatoxin by domestic animals in descending order?
a. **Rabbit> Pig> Cattle>Sheep>Chicken**
b. Pig>Rabbit>Sheep>Chicken>Cattle
c. Chicken>Rabbit>Pig>Sheep>Cattle
d. Cattle>Sheep>Rabbit>Pig>Chicken

29. Which of the following is used as energy source (not protein source)?
a. Linseed meal
b. **Salseed meal**
c. Mustard cake
d. Sunflower cake

30. All reactions in TCA cycle are reversible except the formation of?
a. **Succinyl CoA**
b. Succinate
c. α keto glutarate
d. Fumarate

31. Which of the following cereal has more lysine content?
a. Rice
b. Wheat
c. Corn
d. **Oats**

32. β oxidation can occur in?
a.Mitochondria
b. Peroxisomes
c. Both
d. Endoplasmic reticulum

33. Glycosphingolipids and glycoproteins are synthesized in?
a. Golgi body
b. Mitochondria
c. Endoplasmic reticulum
d. Glyoxysomes

34. Rate limiting enzyme in cholesterol biosynthesis?
a. α 1-4 glucosidase
b. HMG CoA reductase
c. Squalene synthetase
d. 7 α hydroxylase

35. For fatty acid synthesis, Acetyl CoA comes from mitochondria to cytoplasm as?
a. Carnitine
b. Malate
c. Citrate
d. Oxaloacetate

BIOTECHNOLOGY

1. Chemical synthesis of DNA was devised by- H. G. Khorana
2. Most commonly used type of restriction enzymes are of- Type II

3. Major complement component present in serum is- C3
4. PCR technique was developed by – Kary. B. Mullis
5. Major DNA polymerase involved in replication in prokaryotes is- DNAP III
6. Most abundant polysaccharide among living system- Cellulose
7. Recombinant DNA technology developed by – Cohen and Boyer
8. No: of assymetrical carbon atoms in Ribulose- 2
9. Semi-conservative replication of DNA was proved by- Meselson and Stahl
10. Protein part of an enzyme is termed as- Apoenzyme
11. During replication, the enzyme that prevents torsion by breaking DNA
12. strands- Topoisomerase.
13. Eukaryotic DNAP for mitochondrial DNA replication is- DNAP-gamma.
14. Monoclonal antibody technique developed by- Kohler and Milstein
15. The most stable form of DNA and RNA seen under physiological condition is-
16. B-DNA and A-RNA respectively
17. Type II restriction enzymes were discovered by – Hamilton Smith (1970)
18. In prokaryotes, the DNA polymerase having 5'-3' exonuclease activity-
19. DNAP I.
20. Concept of Transformation was proved by- Griffith
21. During replication of DNA the separation of double strands is done by-
22. Helicases.
23. DNA replication takes place from 5'-3' direction.
24. Cracking of genetic code was performed by- Nirenberg and Mathaei.
25. Nucleotide sequence within a gene that is transcribed into RNA but excised
26. before translation in called- Introns.
27. Jumping genes or transposons were first reported by – Barbara McClintock.
28. One gene-One Enzyme hypothesis was proposed by- Beadle and Tatum.
29. Operon concept was proposed by- Jacob and Monod.
30. The major form of super coiling found in chromatin is- Solenoidal.
31. Phenomenon of Conjugation was put forth by- Lederberg and Tatum.
32. Histones are rich in amino acids arginine and lysine.
33. Wobble hypothesis was proposed by- Francis Crick
34. Bacterial DNA is compacted in a structure called- Nucleoid.
35. Transfer RNA is produced by - RNApolymerase III.
36. Chemical method of DNA sequencing was developed by- Maxam and Gilbert.
37. 'Molecular beacons' are probes used in detection system for - Real Time PCR.
38. Reverse transcriptase was first discovered by- Temin and Baltimore.
39. The enzyme employed for amplification of specific genes in PCR technique is-
40. *Taq* DNA polymerase.
41. In Agarose gel electrophoresis, the movement of proteins is based on-
42. Charge:Mass ratio.
43. Phenomenon of transduction was proposed by- Zinder and Lederberg.
44. The medium used for selecting myeloma cells in hybridoma technology is-
45. HAT medium.
46. Amino acid that does not exhibit optical activity is- Glycine.
47. In nucleotides, both types of pentoses are in beta-furanose form.
48. In alkaline conditions, RNA is rapidly hydrolyzed due to the presence of 2' -
49. OH group.
50. Hinge region of IgG is rich in - Proline.
51. Imidazole group is present in the amino acid- Histidine.
52. In SDS-PAGE, the movement of proteins is based on- Mass.
53. Separation of proteins in iso-electric focusing is based on- Isoelectric point of
54. the particular protein.
55. The reagent developed by Sanger to identify the amino terminal amino acid is-
56. 1-fluoro-2,4- Dinitrobenzene.

57. 'Beta turn' is a secondary structure of protein.
58. The most abundant amino acid present in collagen is- Glycine.
59. Hershey and Chase first reported that DNA is the genetic material.
60. In reversible competitive inhibition of an enzymatic reaction, Vmax remains
61. same but Km increases.
62. Co-factor for Glutathione peroxidase is – Selenium.
63. In Agarose gel electrophoresis the DNA is visualized using- Ethidium
64. bromide.
65. Megaloblastic anemia often occurs due to deficiency of -Folic acid.
66. The prosthetic group present in amino transferases is- Pyridoxal phosphate.
67. Reverse transcriptases are present in – Retroviruses and Hepadna viruses.
68. A diploid cell line of human origin is- HeLa.
69. Vero cell lines are obtained from -African green monkey.
70. Cell lines are commonly preserved in- Liquid Nitrogen.
71. Viruses commonly used for production of vector vaccines are- Fowl pox virus,
72. Retrovirus and Herpesvirus.
73. Size of a prokaryotic cell generally ranges from- 1-10 microns.

Solve it by own

1. Which of the following inhibits aggregation of platelets
o Aspirin; Thromboxane A_2; Urokinase; Streptokinase
2. The longest muscle in animal body is:
o Biceps femoris; Longissimus dorsi; Longissimus costarum; Levator costarum
3. Epithelial pearls are seen in
o Basal cell carcinoma; Adenocarcinoma; Trichoepithelioma; Squamous cell Carcinoma
4. Motility of bacteria is due to
o Plasmid; Flagella; Pili; None
5. The organ needs to be examined for *Trichinella spiralis* in routine PM examination
o Lungs; Diaphragm; Spleen; Intestine

6. The following have branching except:
o *Actinomycetes; Nocardia; Mycobacterium; Listeria*
7. The zoonotic disease involving birds playing an important role in the transmission:
o Salmonellosis; Campylobacterosis; Influenza; All
8. GnRH is secreted from:
o Hypothalamus; Hypophysis; Ovary; Uterus
9. Thawing is done at:
o 30^0C-30s; 37^0C-30s; 40^0C-30s; 25^0C-20s
10. Hjarre's disease in poultry is due to
o *E coli; Shigella; Salmonella; Proteus*
11. Type of lenses in electron microscope:
o Glass; Electrostatic; Quartz; None
12. Average volume of semen ejaculate in boar (ml) is:
o 10; 100; 250; 500
13. The anaesthesia which facilitates the examination of penis and prepuce
o Epidural; Pudental; Paravertebral; High Epidural
14. Brcella ovis infection in ram is causes
o Posthitis; Epididymitis; Orchitis; Prostatitis
15. Calcitonin is secreted by
o Parathyroid; Adrenal; Thyroid; Ovary
16. Type of WBC most numerous in cows is
o Eosinophils; Lymphocytes; Neutrophils; Monocytes
17. Duration of spermatogenesis (days) in buffalo bulls:
o 64; 54; 48; 40
18. The antibiotic doesn't have dose dependent antibacterial action
o OTC; Amikacin; Enrofloxacin; Sulfadiazine
19. The estrogen antagonist used to treat mammary and endometrial carcinoma in bitch
o Megestral acetate; Tamoxifen citrate; Estradiol cypionate; Mitotane
20. Cyclozoonosis is related to:
o Brucellosis; Echinococcosis; Leishmaniosis; None
21. Subacute glomerulonephritis is groslly described as
o White Spotted Kidney; Large White Kidney; Small Granular Contracted Kidney; Flea Bitten Kidney
22. Vagus nerve is:
o Sensory Nerve; Motor Nerve; Mixed Nerve; Spinal Nerve
23. Ovulation takes place at the end of estrus period in:
o Canine; Bovine; Ovine; Caprine
24. The following is to be injected prior to any major surgery/ wound management in horses
o Antibiotics; Styptics; NSAIDs; Tetanus toxoid
25. The following produces Aflatoxin:
o *Penicillum notatum; Penicillium rubri; Aspergillus fumigates; Trichophyton* sp.
26. Acute gangrenous myositis is characteristic pathological lesion of:
o Anthrax; BQ; Leptospirosis; Pasteurellosis
27. Type of Nucleic acid present in virus:
o DNA; RNA; Both; Either
28. World environment day falls on:
o February 12; April 8; June 5; October 4
29. Lobulation of the lungs is distinct in:
o Cow; Horse; Dog; Fowl
30. The number of Lumbar vertebrae in dog is:
o 6; 5; 7; 8
31. Mode of hook worm infection is mainly through
o Oral; Skin Penetration; Lactogenic; All
32. The nucleated thrombocytes are present in blood of:
o Horse; Camel; Fowl; Cow

33. The disease not produced by Mycoplasma
- CRD; CBPP; CCPP; BSE

34. The following species not affected by FMD
- Elephant; Gaur; Rhino; Wild Boar

35. Type of animals equines are:
- Polyestrus; Seasonally Polyestrus; Monoestrus; None

36. Bitterness of milk is due to
- Proteolysis; Lipolysis; Autolysis; All

37. The important vitamin that inactivates free radicals
- Vitamin A; Vitamin B; Vitamin D; Vitamin E

38. Which of the following diseases in poultry is not vertically transmitted?
- EDS 76; Mycoplasmosis; Lymphoid Leucosis; New Castle Disease

39. The ingredient of blister is:
- Mag sulph; Bin Iodide of mercury; Copper sulph; Iodine

40. The vector through which Trypanosomes are transmitted
- *Tabanus; Anopheles; Culicoides; Boophilus*

41. Camel is
- Spontaneous Ovulator; Induced Ovulator; Silent Ovulator; None

42. The largest immunoglobulin
- Ig G; Ig M; Ig A; Ig D

43. An example of long duration local anaesthetic
- Bupivacaine; Lignocaine; Lidocaine; Paracaine

44. The chemical used to control snail population
- Copper sulph; Pot hydroxide; Carbon tetrachloride; None

45. The infective stage of *Schistosoma* spps.
- Eggs; Sporocyst; Cercaria; Metacercaria

46. Reserpine is obtained from
- *Ocimum sanctum; Adhatoda vasica; Leptadena Reticulare; Rauwolffia serpentine*

47. Soil erosion is due to:
- Deforestation; Soil Formation; Soil Conservation; All

48. Diffuse suppuration in the sub cutaneous tissue is
- Pustule; Phlegmon; Acne; Furuncle

49. During second stage of parturition there is a release of an extra amount of
- Oestrogen; Progesterone; Oxytocin; PGF_2 alfa

50. *Brucella* organisms multiply in the presence of the alcohol
- Glucose; Galactose; Erythritiol; Fructose

51. Domestic sewage contains the following
- Chemicals; Organic Matter; Highly Toxic Substances; All

52. Gasping is a symptom in:
- ILT; Avian Influenza; Avian Leucosis; Ranikhet Disease

53. The sporadic disease is:
- HS; Tetanus; FMD; Avian Influenza

54. The leucocytic granules more toxic to parasites
- Eosinophils; neutrophils; basophils; lymphocytes

55. The target organ of shock in dogs is
- Liver; Lungs; Intestine; Heart

56. Electrical stunning is widely used in
- Cattle, Poultry; Pig, Poultry; Buffalo, Poultry; Sheep

57. The vector for *Leishmania* is
- *Phlebotomus; Culicoides; Tabanus; Musca*

58. The presentation of fetus in breech presentation is
- Anterio Longitudinal; Posterior Longitudinal; Dorso Transverse; Ventro Transverse

59. During recent outbreak of Avian Influenza in South East countries, subtype has been identified
- H5N1; H5N2; H2N9; H1N5

60. Garlic like odour of gastrointestinal contents is suggestive of poisoning with
o Nitrate ; HCN; Alkali; Phosphorus
61. The extracellular parasite
o *Babesia*; *Theileria*; *Anaplasma*; *Trypanosome*
62. Occupational radiation hazards can be prevented by wearing an apron of
o Aluminium; Copper; Lead; Silver
63. The largest deer found in india
o Sambar; Nilgai; Spotted Deer; Barasingah
64. The state bird of Gujarat
o King Vulture; Saras Crane; Pea Fowl; Flamingo
65. Campylobacterosis is diagnosed by
o Milk Ring Test; HA; Intradermal Inoculation; Vaginal Mucous Agglutination Test
66. Cubonis test is used to diagnose pregnancy in
o Bitch; Mare; Sow; Cow
67. Programmed cell death is called
o Phagocytosis; Mytosis; Necrosis; Apoptosis
68. Rodent control is very much effective in control of
o Leptospirosis; Plague; Salmonellosis; All
69. The term epsilon is associated with
o Brucellosis; Enterotoxaemia; Marek's Disease; Erysipelas
70. Blow gun rifle is fairly accurate for the target up to the distance of
o 40 metres; 80 feets; 80 metres; 40 feets
71. A live vaccine among the following
o HS; *Brucella* S19; BQ; Rabies
72. A well established protozoal disease transmitted by way of milk
o Toxoplasmosis; Giardiosis; Cryptosporidiosis; None
73. Cells spermatids are
o Haploids; Diploids; Tetraploids; Triploids
74. Navicular bone in horses
o Patella; Proximal Sesamoids; Febella; Distal Sesamoids
75. Length of gestation in mares
o 9 months 9 days; 8 months 8 days; 10 months 10 days; 11 months 11 days
76. Ingestion of *Lantana* foliage causes
o Hepatotoxicity And Secondary Photosensitization; Acute Enteritis; Pulmonary Haemorrhage; Nephrotoxicity
77. Parasite of pulmonary artery
o *Sarcoptes; Cysticercus; Toxoplasma; Dirofilaria immitis*
78. Irritant and non isotonic drug solution are injected by which route
o Intravenous; Intramuscular; Sub Cutaneous; Intraperitoneal
79. Deaths among clinically affected animals indicates
o Incident Rates; Morbidity Rate; Fatality Rate; Prevalence Rate
80. The stomach fluke disease is caused in cattle due to
o *Paramphistomum cervi; Moniezia expansa; Fasciola hepatica; Neoascaris vitulorum*
81. In paraffin block making technique fat/lipid is dissolved by
o Formaline; Xylene; Paraffin; Alcohol
82. Electron microscope was invented by
o Leewenhock; Pastuer; Knoll and Ruska; Elford
83. The characteristic lesion in brain of cow affected by mad cow disease
o Neuronal Degeneration; Neuronal Vacuolation; Inclusion Bodies in Neurons; Encephalitis
84. Antihypertensive drug with angiotensin converting enzyme inhibiting action
o Prazosin; Verapamil; Frusemide; Captopril
85. Apex of bovine heart is attached by
o Cardio thoracic ligament; Pericardio sternal ligament; Cardiac phrenic ligament; Coronary ligament
86. Purkinjee cells are noted in the

o Myocardium; Cerebellum; Cerebrum; Myometrium
87. Michael Bishop and Harold Varmus were awarded Nobel Prize in 1989 for their work on
o Monoclonal Antibodies; Proto Oncogenes; Chemical Carcinogens; Apoptosis
88. Bioterrorism is associated with
o Echinococcosis; Anthrax; Leishmaniosis; Tuberculosis
89. Caecal coccidiosis is caused by
o *E acervulina; E magna; E tenella; E necatrix*
90. Name the drug of choice for treatment of Thieleriosis
o Suramin; Buparvaquon; Nitrothiozol; Clopidol
91. An antibiotic that interferes with bacterial cell wall synthesis
o Gentamicin; Penicillin; Sulphonamide; None
92. Fundamental germ layer
o Ectoderm; Mesoderm; Endoderm; Mesenchymal Cells
93. Agar is composed of
o Protein; Lipids; Carbohydrates; Mixture of all three
94. Rabies virus is
o Viscerotropic; Neurotropic; Dermotropic; None
95. Reverse transcriptase enzyme is present in the virus family of
o Pox; Adeno; Retro; Irido
96. The drug active against cestodes
o Pyrantel; Thiophanate; Hexachlorophene; Praziquantel
97. The desirable limit of fluoride (mg/l) in human drinking water is
o 1; 3; 5; 7
98. The inflammation of hoof of horse is called
o Synovitis; Bursitis; Naviculitis; Laminitis
99. The brachicephalic breed of dog
o Collie; Pug; Doberman; German Shepherd
100. Warfarin poisoning is treated by administration of Vitamin
o K; E; A; C
101. Lemberts pattern is not used for sutured
o Uterus; Urinary Bladder; Oesophagus; Rumen
102. The smallest virus
o Fowlpox; FMD; Ranikhet Disease; Avian Leukosis
103. Atropine :
o Reduces metabolic rate;
o Reduces salivary, gastric and bronchial secretion;
o Reduces body temperature
o Decrease intestinal motility
104. The larva that causes VLM
o *Toxocara canis; Ascaris suum; Ancylostoma caninum; Dirofilaria immitis*
105. The microchromosomes are seen in
o Cattle; Horse; Poultry; Dog
106. Othaematoma is the haematoma involoving
o Eye and Ear; Ear; Eye; None
107. Punched ulcers in abomassum is caused by
o *Babesia bigemina; Theileria annulata; Anaplasma marginale; Babesia bovis*
108. Death of animal suffering from rabies occurs due to
o Neuritis; Gastritis; Asphyxia; Paralysis
109. Cattle genome is made up of how many organic bases
o 2.9-3.1 trillion; 2.9-3.1 billion; 2.9-3.1 million; 2.9-3.1 lakh
110. Brooder pneumonia is caused by
o Aspergillus flavus; Aspergillus ochroreceal; Aspergillus parasiticus; Aspergillus fumigatus
111. Paralysis of hind quarter is termed as
o Hemiplegia; Diplegia; Quadriplegia; Paraplegia

112. Teat surgery is more successful during which stage
o Lactating Stage; Dry Stage; Post Pubertal Stage; None
113. Pipe stem liver condition is seen in which of the following infection
o *Fasciola hepatica; Moneizia expansa; Dicrocelium dentriticum;* None
114. The diabetes insipidus develops due to deficiency of
o ADH; Glucagon; Insulin; Aldosterone
115. An important source of biofuel is (Ethanol)
o Jowar; Oat; Sugarcane; Rice
116. Main immunoglobulin protecting mucosal surface is:
o Ig M; Ig A; Ig G; All
117. Surgical removal of stones from the urinary bladder is known as
o Nephrectomy; Cystotomy; Penectomy; Nephrotomy
118. The reference test for diagnosis of rabies
o FAT; AGPT; Agglutination; ELISA
119. Toxic principle present in cotton seed is
o Sinigrin; Gossypol; Tannin; Mimosin
120. Microglia cells are present in
o Blood; Bone Marrow; Pancreas; Brain
121. Suturing of the uterus after the Caesarean section starts from
o Ovarian end; Cervical end; Middle of the uterus; Either of end
122. Anaesthesia is produced when the blood concentration of chloroform reaches to level of
o 0.035%; 0.35%; 0.053%; 1.035%
123. Surgical operation for providing drainage from middle ear is known as
o Zepps Operation; Hyovertebrotomy; Ventriculectomy; Bulla osteotomy
124. T lymphocytes get maturity in organ
o Liver; Thymus; Spleen; Bursa
125. Antibacterial drug associated with nephrotoxicity is
o Tetracycline; Chloramphenicol; Streptomycin; Levofloxacin
126. Kohler and Mihlstein are known for the achievement in
o Hybridoma; Nucleotide sequencing; Viral Culture; Prion discovery
127. Bronze discoloration of liver is characteristic feature of
o Pullorum Disease; Fowl Cholera; Fowl Typhoid; Spirochaetosis
128. Double stranded RNA is found in
o Retro Virus; Reo Virus; Pox Virus; Parvo Virus
129. The total dry matter requirement of cow
o 3% of body wt; 3% of metabolic body wt; 5% of body wt; 1% of body wt
130. Raw egg feeding in dog may produce deficiency of
o Biotin; Cholin; Niacin; Pantothenic acid
131. Catgut is prepared from the intestine of
o Rabbit; Sheep; Pig; Cat
132. Sodium calcium EDTA is used as antidote in poisoning of
o Arsenic; Mercury; Lead; Copper
133. The common infectious disease affecting snake
o Brucellosis; Pasteurellosis; Salmonellosis; Tuberculosis
134. WTO is related with
o Environment; Biodiversity; International tourism; International trade
135. Nervous sign in ketosis is due to
o Hypocalcemia; Hypoproteinemia; Hypoglycemia; Hypophosphatemia
136. Amputation of horn in goats can be done by blocking of
o Cornual nerve; Infraorbital; Cornual and Infraorbital; None
137. The range of pH of rumen liquor
o 2-3; 5-7; 7-8; 3-5
138. Highly toxic poison has oral LD_{50} value of
o <1 mg/kg; 1-50 mg/kg; 50-100 mg/kg; 1-50 mg/kg

139. The molecules is an endogenous antigen
o MHC Type I; MHC Type II; MHC Type III; MHC Type E
140. Thin membranous partition between lateral ventricles of brain
o Tapetum lucidum; Septum lucidum; Intradorsal septum; Inter ventricular septum
141. Whales and dolphins breathe through
o Gills; Spiracles; Body surface; Lungs
142. The following characteristic palpable through the rectal examination for the pregnancy diagnosis in 35 days in cattle
o Asymmetry of uterine horn; CL on ovary; Slipping of foetal membrane; All of above
143. To relieve the right side uterine torsion, animal should be cast in
o Left side; Right side; Dorsal recumbency; Sternal recumbency
144. The ligament surgically cut for correction of subluxation of patella in bovine
o Dorsal; Ventral; Middle; Medial
145. Dilated pupils and fish eye appearance is observed in which stage of anaesthesia
o Stage 3; Stage 1; Stage 2; Stage 4

Cross matching type questions.

DISEASES	**RELATED TERMS**
(i) Mastitis	(A) Wart hog disease
(ii) Strangles	(B) *Multiceps multiceps*
(iii) African swine fever	(C) BTB Test
(iv) Gid	(D) Blue eye
(v) Infectious Canine Hepatitis	(E) Equine Distemper

DISEASES	**ETIOLOGY**
(i) Hard pad disease	(A) *Borrelia anserina*
(ii) Wool sorter disease	(B) *Bacillus anthracis*
(iii) IBR	(C) *Coxiella burnetti*
(iv) Q fever	(D) Bovine Herpes Virus
(v) Fowl Spirochaetosis	(E) Canine Distemper virus

ITEMS	**RELATED TERMS**
(i) Brucellosis control	(A) Progesterone
(ii) Campylobacterosis	(B) Metronidazole
(iii) Trichomoniosis	(C) Estrogen
(iv) Follicale	(D) Vaccine S 19
(v) Corpus Luteum	(E) StreptoPenicillin

ITEMS	**RELATED TERMS**

(i)	Meloxicam	(A) Xylazine antagonist
(ii)	Congenital	(B) Equithesin
(iii)	Yohimbine	(C) Recto vaginal fistula
(iv)	Pudental nerve block	(D) NSAID
(v)	Anaesthesia for horse	(E) Ischio rectal fossa

DRUGS	**RELATED TERMS**
(i) Xylazine	(A) Inhalant Anaesthesia
(ii) Largactil	(B) Muscle Relaxant
(iii) Ether	(C) Osmotic Diuretic
(iv) Mephenesin	(D) Sedative
(v) Mannitol	(E) Chlorpromazine HCl

ITEMS	**RELATED TERMS**
(i) Gastrulation	(A) Ear Ossicle
(ii) Malleus	(B) Prostate
(iii) Sex gland male dog	(C) Cock
(iv)Synsarcosis	(D) Trilaminar Embryo
(v) Spur	(E) Muscular Joint-Forelimb

ORGANISM	**SELECTIVE MEDIUM**
(i) *Salmonella*	(A) Mannitol salt Agar
(ii) *Staph. aureus*	(B) LJ Medium
(iii) *Hemophilus*	(C) Chocolate Agar
(iv) *E coli*	(D) Brilliant Green Agar
(v) *Mycobacterium tuberculosis*	(E) EMB Agar

SPECIES	**SPERM CONCENTRATION**
(i) Buffalo bull	(A) 3000 million/ml
(ii) Ram	(B) 3600 million/ml
(iii) Stallion	(C) 250 million/ml
(iv) Cock	(D) 1000 million/ml
(v) Boar	(E) 150 million/ml

SOURCE	**ANTIBACTERIAL AGENT**
(i) *Strept. venezulae*	(A) Polymyxin / Colistin
(ii) *Micromonospora purpurea*	(B) Neomycin
(iii) *Bacillus colistinus*	(C) Gentamicin
(iv)*Bacillus subtilis*	(D) Bacitracin
(v) *Strept. fradiae*	(E) Chloramphenicol

DISEASES	**RELATED TERMS**
(i) Shipping fever	(A) Brucellosis
(ii) Tick fever	(B) Pasteurellosis
(iii) Spleenic fever	(C) Salmonellosis
(iv)Malta fever	(D) Ehrlichiosis
(v) Enteric fever	(E) Anthrax

SET- 1

1. Study of tumors is called as-
   a) Etiology
   b) Oncology
   c) Pathology
   d) None of the above.
2. Which of the following is not a anomaly related to reproductive system-
   a) Freemartin
   b) Pseudo hermaphrodite
   c) Monster
   d) Hermaphrodite.
3. Which of the following disease is not transmitted by droplet infection-
   a) CBPP
   b) Tuberculosis
   c) Glanders
   d) Tetanus.
4. In which disease mechanical carrier doesn't play role in its spread-
   a) Anthrax
   b) Surra
   c) Tuberculosis
   d) All of the above.
5. Indiscriminate use of drugs or overmedication favors the spreading of which disease in poultry-
   a) Coccidiosis
   b) Fowl typhoid
   c) HPS
   d) IBD.
6. Who termed the plasma membrane as 'Unit Membrane'-
   a) Robertson
   b) Rudolph Virchow
   c) Metchnikoff
   d) John hunter
7. ER is not evident in-
   a) Liver cells
   b) Brain cells
   c) Kidney cells
   d) Muscle cells.
8. Which of the following is resistant cell against irritant-
   a) Hepatic cell
   b) Renal cell
   c) Fibroblast
   d) Brain cell
9. Cloudy swelling less likely to appear in which cells-
   a) Cardiac muscle
   b) Tubular cells of kidney
   c) Brain
   d) Liver cells.
10. Pox and FMD are characterized by-
    a) Paranchymatous degeneration
    b) Hyaline degeneration
    c) Amyloid degeneration
    d) Hydropic degeneration.
11. A condition of cells and connective tissue which become converted into a homogeneous, glassy material is called as-
    a) Paranchymatous degeneration
    b) Hyaline degeneration
    c) Amyloid degeneration
    d) Hydropic degeneration.
12. Mucin takes which colour in PAS stain-
    a) Blue
    b) Purplish red
    c) Black
    d) Green
13. Cystadenoma of ovary contains a viscid material, called as-
    a) Mucin
    b) Serous fluid
    c) Pseudomucin
    d) Fibrin
14. Which of the following also termed as waxy degeneration-
    a) Paranchymatous degeneration
    b) Hyaline degeneration
    c) Amyloid degeneration
    d) Hydropic degeneration.
15. Amyloid degeneration is most commonly seen in-
    a) Cattle and swine

b) Swine and poultry
c) Dog and cattle
d) Dog and horse

16. Amylodoisis of spleen is met in tuberculosis in-
a) Poultry
b) Dog
c) Cattle
d) Horse

17. Diffuse and focal amyloid infiltration of spleen is termed as-
a) Bacon spleen and sago spleen respectively
b) Sago spleen and bacon spleen respectively
c) Ham spleen and sago spleen respectively
d) Bacon spleen and ham spleen respectively

18. Gout occurs in poultry due to deficiency of-
a) Vitamin C
b) Vitamin D
c) Vitamin A
d) Vitamin K

19. Which of the following are lipotropic factors whose imbalance leads to fatty changes in liver-
a) Serine and choline
b) Choline and methionine
c) Serine and methionine
d) Methionine and glysine.

20. Ketone bodies can be demonstrated in urine by-
a) Hunter test
b) Rothra's test
c) Benedict test
d) Gmelins test.

21. In caseous necrosis cracks on nucleus appears and its fragments scattered, is called as-
a) Karyolysis
b) Pyknosis
c) Chromatolysis
d) Karyoschisis

22. Type of necrosis in which cellular details are lost and architectural details are preserved-
a) Caseative
b) Liquifactive
c) Fat necrosis
d) Coagulative

23. In which of the following liquifactive necrosis is **not** due to the action of autolytic enzymes -
a) Abscess
b) Thiamine deficiency
c) Cyanide toxicity
d) Crazy chick disease.

24. In which organ autolytic changes are slow-
a) Brain
b) Kidney
c) Liver
d) Bone marrow

25. Action of alkali causes-
a) Dry gangrene
b) Gas gangrene
c) Moist gangrene
d) All of the above.

26. Which of the following statement regarding gangrene is **incorrect**-
a) In moist gangrene demarcation between live and dead tissue is visible
b) In dry gangrene demarcation between live and dead tissue is visible
c) Gas gangrene is mainly caused by anaerobes
d) Crackling sound is evident in gangrene produced by anaerobic bacteria.

27. In anthrax clotting of blood is absent because-
a) Hypostatic congestion occurs
b) Polypeptide capsule is present in bacteria
c) Polysaccharide capsule is present in bacteria
d) Fibrinolysin produced by bacteria causes lysis of fibrin

28. During circulatory changes in inflammation axial stream contains-
a) Plasma
b) RBC's and WBC's

c) Blood constituents except plasma
d) Platelets only

29. Which of the chemical mediator only present in mast cell of rat and mouse-
    a) 5-HT
    b) Histamine
    c) Kinin
    d) Globulin permeability factor
30. Which cells are referred as microphages of Metchinkoff-
    a) Macrophages
    b) Lymphocytes
    c) Basophils
    d) Neutrophils
31. Phagocytic cells of body are-
    a) Macrophages and lymphocytes
    b) Macrophages and neutrophils
    c) Neutrophils and lymphocytes
    d) Macrophages, neutrophils and lymphocytes
32. Which sentence regarding plasma cell is incorrect-
    a) They are non-phagocytic
    b) Possess cart wheel shape nucleus
    c) Present in blood and tissue both
    d) Present in tissue only.
33. Infectious feline enteritis and malignant catarrhal fever are characterized by-
    a) Catarrhal inflammation
    b) Serous inflammation
    c) Fibrinous inflammation
    d) Suppurative inflammation
34. Croupous and diphtheric membrane are seen in-
    a) Catarrhal inflammation
    b) Serous inflammation
    c) Fibrinous inflammation
    d) Suppurative inflammation
35. When membrane is not easily peeled away from underlying tissue and is firm, is called as-
    a) Peudo membrane
    b) Croupous membrane
    c) Diphtheric membrane
    d) False membrane
36. The animal in which serum is particularly rich in antienzyme, poor in leucocytes and suppurative conditions is not commonly seen, is-
    a) Fowl
    b) Hamster
    c) Guinea pig
    d) Rabbit
37. Small suppurative inflammation in the skin which involves a hair follicle is called as-
    a) Sinus
    b) Boil
    c) Pustule
    d) Phlegmon
38. In which disease inclusion bodies are intranuclear only-
    a) Pox
    b) Rabies
    c) Canine distemper
    d) Infectious canine hepatitis
39. Which cells are included in labile cells-
    a) Fibroblast
    b) Nerve cells
    c) Muscle cells
    d) Skin cells
40. Which is a feature of viral inflammation-
    a) Suppuration
    b) Presence of neutrophils
    c) Presence of lymphocytes
    d) All of the above.
41. Autolysis of dead tissue by enzymes derived from inflammatory leucocytes is called as-
    a) Autolysis
    b) Chromatolysis
    c) Heterolysis
    d) Lysis
42. Connective tissue continues to grow under the scar even after the epithelium covers it, is called as-
    a) Proud flesh
    b) Trephone
    c) Keloid
    d) Granulation tissue
43. Which is necessary in diet for early wound healing-
    a) Mn

b) Mg
c) Cu
d) Zn

44. Which of the following regenerates by fibrous tissue proliferation-
    a) Smooth muscle
    b) Skeletal muscle
    c) Cardiac muscle
    d) None of the above.
45. The peripheral nerve undergoes a series of retrogressive changes known as-
    a) Zenker's degeneration
    b) Hyaline degeneration
    c) Wallerian degeneration
    d) None of the above
46. Which of the following cell **doesn't** produce any endogenous pyrogen-
    a) Lymphocyte and macrophage
    b) Neutrophil
    c) Monocyte
    d) Lymphocyte and eosinophil
47. In fever which stage is termed as 'Fastigium'-
    a) Cold stage
    b) Hot stage
    c) Sweating stage
    d) None of the above.
48. Hypoplasia means-
    a) Organ has a beginning but due to some reason it had failed to develop
    b) Organ fail to develop to their full normal size though there was a beginning
    c) Decrease in number of cells in a tissue
    d) Complete absence of organ and there is no beginning
49. Which of the following statement is correct-
    a) In hypertrophy cells size increases and there is disruption of normal architecture
    b) In hyperplasia cells number increases and there is no disruption of normal architecture
    c) In hypertrophy cells size increases and there is no disruption of normal architecture
    d) In hyperplasia cells size increases and there is disruption of normal architecture
50. Transformation of one type of cell into another is called as-
    a) Metaplasia
    b) Dysplasia
    c) Hyperplasia
    d) Anaplasia
51. Alteration in the size, shape and orientation of adult cells is called as-
    a) Metaplasia
    b) Dysplasia
    c) Hyperplasia
    d) Anaplasia
52. Local deficiency of arterial blood in an organ is called as-
    a) Hyperemia
    b) Congestion
    c) Ischemia
    d) Induration
53. Thrombosis of spleen is seen in-
    a) Strangles
    b) Glanders
    c) Swine fever
    d) Infectious bovine rhinotracheitis
54. Thrombi found in auricles of heart is called as-
    a) Mural thrombi
    b) Valvular thrombi
    c) Saddle thrombi
    d) Ball thrombi
55. When Occlusive thrombi develop a passage through which partial blood supply is maintained, is called as-
    a) Laminated thrombi
    b) Saddle thrombi
    c) Canalized thrombi
    d) Propagating thrombi
56. Thrombi at bifurcation of an artery is called as-
    a) Laminated thrombi
    b) Saddle thrombi
    c) Canalized thrombi
    d) Propagating thrombi
57. Arterial thrombi is seen in-
    a) *Strongylus vulgaris* infection

b) *Spirocercalupi* infection
c) *Onchocercaarmillata* infection
d) All of the above

58. Which of the following statement is true-
a) Lines of zahn is seen in post-mortem clot
b) Post mortem clot is friable, dry and crumbles when pressed
c) Surface of thrombus is smooth and glistening
d) Thrombus is firmly attached to endothelium and may fills the vessel.

59. Emboli are rarely present in-
a) Veins
b) Arteries
c) Capillaries
d) None of the above

60. A cat is met with an accident and there is crushing injury to the femur and tibia-fibula bones, the emboli most likely to occur in circulation will be-
a) Air emboli
b) Paradoxical emboli
c) Fat emboli
d) Lymphatic emboli

61. The emboli that passes directly into the left auricle from the right auricle through a patent foramen ovale, is called as-
a) Amniotic emboli
b) Paradoxical emboli
c) Air emboli
d) Parasitic emboli

62. Infraction is an area of-
a) Caseative necrosis
b) Liquifactive necrosis
c) Coagulative necrosis
d) Fat necrosis

63. Infracts of brain will produce-
a) Apoplectic cyst
b) Dentigerous cyst
c) Hydatid cyst
d) All of the above

64. Which of the following is **not** a cause of edema-
a) Increase in hydrostatic pressure of blood
b) Increase in osmotic pressure of blood
c) Obstruction of lymph vessels
d) Increase permeability of capillary endothelium

65. Most radiosensitive organ among the following is-
a) Liver
b) Bone
c) Brain
d) Bone marrow

66. Most susceptible animals for salt toxicity-
a) Fowl and pigs
b) Fowl and horses
c) Fowl and cattle
d) Fowl and cats

67. Calcification which is due to necrosis or degeneration of cells and calcium level of blood is normal, is called as-
a) Metastatic calcification'
b) Dystrophic calcification
c) Pathological calcification
d) None of the above

68. In south africa 'Lamsiekte' disease which means lame sickness is caused due to deficiency of-
a) Ca
b) P
c) Mg
d) Fe

69. Grass tetany is caused due to deficiency of-
a) Ca
b) Cu
c) Mg
d) Mn

70. Perosis or slipped tendon in fowl is caused due to deficiency of-
a) Mg
b) Fe
c) Mn
d) Cu

71. Which of the following is a **not** a disease of swine-
a) Hog cholera
b) Diamond skin disease
c) Glanders

d) African swine fever

72. Allotriophagy in animals is due to deficiency of-
    a) Ca
    b) P
    c) Mg
    d) Se
73. Which of the following regarding piglet anemia is correct-
    a) It occurs in baby pigs which are reared on soil because it is deficient in Fe
    b) It is a macrocytic hypochromic type of anemia
    c) Piglets reared on cement floors easily fulfill their Fe requirement and not suffers from anemia
    d) It is microcytic hypochromic type of anemia
74. Which of the following is **not** due to copper deficiency-
    a) Sway back
    b) Enzootic marasmus
    c) Fatal syncope in cattle
    d) Achromotrichia
75. Which of the following pair is incorrectly matched-
    a) Steely wool- Zinc
    b) Stiff lamb disease- Vitamin E
    c) Exudative diathesis- Vitamin E
    d) Nutritional roup- Vitamin A
76. Shifting lameness is seen in toxicity of-
    a) Ergot alkaloids
    b) Zinc
    c) Fluorine
    d) Iodine
77. Chronic selenium toxicity produces-
    a) Alkali disease
    b) Sway back disease
    c) White muscle disease
    d) Blind staggers
78. Peat scour is caused by-
    a) Molybdenum toxicity
    b) Copper deficiency
    c) Both of the above
    d) Copper toxicity
79. Bran like scales on skin due to vitamin A deficiency is called as-
    a) Keratomalacia
    b) Pityriais
    c) Hyperkeratosis
    d) Parakeratosis
80. Battery sickness in poultry which causes paralysis and atrophy of striated muscles is caused by-
    a) Vitamin C
    b) Vitamin D
    c) Vitamin E
    d) Vitamin K
81. Polyneuritis and star grazing attitude in poultry is due to deficiency of-
    a) Vitamin B1
    b) Vitamin B2
    c) Vitamin B6
    d) Vitamin B12
82. Black tongue or Stuttgart disease in canines is due to deficiency of-
    a) Pantothenic acid
    b) Niacin
    c) Riboflavin
    d) Thiamine
83. Goose stepping gait in pigs is due to deficiency of-
    a) Pantothenic acid
    b) Niacin
    c) Riboflavin
    d) Thiamine
84. In poultry development of feathers are retarded and dermatitis and broken feathers are seen in deficiency of-
    a) Pantothenic acid
    b) Niacin
    c) Riboflavin
    d) Thiamine
85. Folic acid deficiency causes-
    a) Macrocytic anemia
    b) Microcytic anemia
    c) Normocytic anemia
    d) None of the above.

86. Poikilocytosis means-

a) Variation in shape of RBC
b) Variation in size of RBC
c) Variation in number of RBC
d) None of the above

87. Pregnancy toxemia in ewes is due to deficiency of-
a) Folic acid
b) Choline
c) Biotin
d) Riboflavin

88. Chastek paralysis is caused due to deficiency of-
a) Niacin
b) Thiamine
c) Mn
d) Vitamin K

89. Hydrocele means accumulation of fluid in-
a) Thorax
b) Tunica vaginalis
c) Oviduct
d) Peritoneal cavity

90. Starling's hypothesis is related with-
a) Thrombosis
b) Infraction
c) Edema
d) Shock

91. Which of the following is not included in endogenous pigmentation-
a) Plumbism
b) Melanosis
c) Hemosiderosis
d) None of the above

92. Van den bergh test is indirect in-
a) Hemolytic jaundice
b) Obstructive jaundice
c) Toxic jaundice
d) None of the above

93. Which substance play major role in brucellosis-
a) Proline
b) Erythriotol
c) Hyaluronic acid
d) Estrogen

94. Deposition of silver particles in body is called as-
a) Siderosis
b) Anthracosis
c) Silverosis
d) Argyria

95. Common term for deposition of exogenous pigmentation in body is called as-
a) Anthracosis
b) Plumbism
c) Argyria
d) Pneumoconiosis

96. Which of the following statement is true-
a) Metastasis occurs in benign tumors
b) Necrosis is more evident in malignant tumors
c) Rhabdomyoma is benign tumor of smooth muscle
d) Sarcoma always refers to benign tumors

97. Neural lymphomatosis is also called as-
a) Avian leucosis complex
b) Infectious bursal disease
c) Fowl typhoid
d) Marek's disease

98. Which is **incorrect** regarding avian leucosis complex-
a) Caused by RNA virus
b) Nodular tumors in bursa of fabricus are seen
c) Nerves are commonly affected
d) Occular lesions are not present

99. Epithelial pearls are seen in-
a) Basal cell carcinoma
b) Seminoma
c) Cholangiocellular carcinoma
d) Squamous cell carcinoma

100. Which of the following is a tumor of adrenal medulla-
a) Dysgerminoma
b) Arrhenoblastoma
c) Pheochromocytoma
d) Interstitial cell adenoma.

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ANSWERS

1. **b**
2. **c**
3. **d**
4. **c**
5. **a**
6. **a**
7. **c**
8. **c**
9. **c**
10. **d**
11. **b**
12. **b**
13. **c**
14. **c**
15. **d**
16. **a**
17. **a**
18. **c**
19. **b**
20. **b**
21. **d**
22. **d**
23. **a**
24. **a**
25. **c**
26. **a**
27. **d**
28. **c**
29. **a**
30. **d**
31. **b**
32. **c**
33. **c**
34. **c**
35. **c**
36. **d**
37. **b**
38. **d**
39. **d**
40. **c**
41. **c**
42. **c**
43. **d**
44. **b**
45. **c**
46. **d**
47. **b**
48. **b**
49. **c**
50. **a**
51. **b**
52. **c**
53. **c**
54. **d**
55. **c**
56. **b**
57. **d**
58. **d**
59. **a**
60. **c**
61. **b**
62. **c**
63. **a**
64. **b**
65. **d**
66. **a**
67. **b**
68. **b**
69. **c**
70. **c**
71. **c**
72. **b**
73. **d**
74. **b**
75. **a**
76. **c**
77. **a**
78. **c**
79. **b**
80. **a**
81. **a**
82. **b**
83. **a**
84. **a**
85. **a**
86. **a**
87. **b**
88. **b**
89. **b**
90. **c**
91. **a**
92. **a**
93. **b**
94. **d**

95. d
96. b
97. d
98. c
99. d
100. c

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****

SET-2

1. Condition in which local loss of pigment occurs, is called as-
   a) Albinism
   b) Hemosiderosis
   c) Leucoderma
   d) Acanthosisnigricans
2. Large quantity of hemosiderin is deposited in liver and kidneys in-
   a) Babesiosis
   b) Leptospirosis
   c) Equine infectious anemia
   d) Dicroceliumdendriticum
3. In vitamin E deficient animals, a peculiar wax-like acidfast material accumulates in uterine muscle fibers, ovary and testes, is-
   a) Amyloid
   b) Byssinosis
   c) Hematoidin
   d) Ceroid
4. Transport of pigment particles by macrophages to the connective tissue in the corium is called as-
   a) Phagocytosis
   b) Mosaicism
   c) Tatooing
   d) Euploidy
5. Porphyria is most commonly seen in-
   a) Cattle and swine
   b) Sheep and goats
   c) Laboratory animals
   d) Horses and dogs
6. Papilliferouscystadenoma of bile duct epithelium in rabbits is caused by-
   a) Gongylonemaneoplasticum
   b) Eimeriastiedae
   c) Spirocercalupi
   d) Cysticercusfasciolaris
7. Model virus for tumor research work is-
   a) Polyoma virus
   b) Rous sarcoma virus
   c) Shope papilloma virus
   d) Reo virus
8. Tumor originating from all germinal layers is-
   a) Neurofibromata
   b) Dermoid cyst
   c) Teratoma
   d) Sertolicell tumor
9. In myxomatosis of rabbit inclusion bodies are-
   a) Intranuclear
   b) Intracytoplasmic
   c) Both
   d) None of the above
10. Which tumor is called as gaint cell tumor-
    a) Osteoma
    b) Osteosarcoma
    c) Osteoclastoma
    d) Osteomyxoma
11. Dilatation of liver sinusoids is called as-
    a) Hamartomas
    b) Telangietasis
    c) Recklinghausen's disease
    d) Myxomatosis
12. Astrocytoma is single in all animal species EXCEPT-
    a) Pig
    b) Cattle
    c) Fowl
    d) Horse
13. Which disease is also called as 'Avian Reticulitis'-

a) Avian leucosis complex
b) Ranikhet disease
c) Marek's disease
d) Infectious bursal disease

14. Which disease is also called as 'Big Liver Disease'-
a) Avian leucosis complex
b) Ranikhet disease
c) Marek's disease
d) Infectious bursal disease

15. Sciatic nerve is affected unilaterally in-
a) Avian leucosis complex
b) Ranikhet disease
c) Marek's disease
d) Infectious bursal disease

16. Tumors of parathyroid gland produces condition called as-
a) Lumpy jaw
b) Rubber jaw
c) Lock jaw
d) Bottle jaw

17. A pathological condition in which a shunt connects the pulmonary artery and the aorta is called as-
a) Intraventricular foramina
b) Tetrology of fallot
c) Patent foramen ovale
d) Patent ductusarteriosus

18. A pathological condition in which right atrium communicates with left atrium is called as-
a) Intraventricular foramina
b) Tetrology of fallot
c) Patent foramen ovale
d) Patent ductusarteriosus

19. Macrophages laden with lipoids seen in atherosclerosis are called as-
a) Gitter cells
b) Limmocytes
c) Foam cells
d) Microglial cells

20. Term used for hardening of artery is-
a) Atherosclerosis
b) Arteriosclerosis
c) Arteritis
d) None of the above

21. Local dilatation of artery is called as-
a) Arteritis
b) Aneurysm
c) Thromboangitis
d) Polyarteritisnodusa

22. Type of aneurysm in which a pouch is formed on one side of the wall, is-
a) Fusiform aneurysm
b) Circoid aneurysm
c) Saccular aneurysm
d) Arteriovenous aneurysm

23. Stagnation of blood in the dilated veins causes pain is called as-
a) Phlebolith
b) Phlebitis
c) Aneurysm
d) Varicose veins

24. Aneurysm of minute arteries is called as-
a) Berry aneurysm
b) Polyarteritisnodusa
c) Arteriovenous aneurysm
d) None of the above

25. Lymphadenitis is inflammation of-
a) Lymph node
b) Lymph vessel
c) Both of the above
d) None of the above

26. Erythropoiesis is intravascular in-
a) Swine
b) Cattle
c) Dog
d) Fowl

27. Erythrocytes that have a narrow rim of hemoglobin surrounding a large pale area are called as-
a) Cabot rings
b) Anisocytosis
c) Annulocytes
d) Leptocytes

28. Bluish thread like rings in RBC's and which are nuclear remnants are called as-
a) Crenation
b) Pessary cells
c) Cabot rings
d) Basophilic stippling

29. Abnormal notching of the erythrocytes is called as-
    a) Crenation
    b) Pessary cells
    c) Cabot rings
    d) Basophilic stippling
30. Refractile inclusions found in RBC's of horses that undergo phenothiazine therapy are called as-
    a) Howell-Jolly bodies
    b) Annulocytes
    c) Drepanocytes
    d) Heinz-bodies
31. Thin erythrocytes with larger surface without increase in volume is called as-
    a) Drepanocytes
    b) Leptocytes
    c) Annulocytes
    d) Microcytes
32. Crescent shaped RBC's characteristic of sickle cell anemia are called as-
    a) Leptocytes
    b) Annulocytes
    c) Drepanocytes
    d) Macrocytes
33. Ovalocytes(elliptical RBC's) are present in-
    a) Fowl
    b) Camel
    c) Cattle
    d) Dog
34. Anemia which is due to failure of erythrocyte maturation factor is called as-
    a) Dyshemopoietic anemia
    b) Macrocytic hypochromic anemia
    c) Aplastic anemia
    d) Hemolytic anemia
35. Anemia which is due to replacement of bone marrow by other tissues is called as
    a) Dyshemopoietic anemia
    b) Macrocytic hypochromic anemia
    c) Aplastic anemia
    d) Myelophthisic anemia
36. Acute hemorrhagic anemia is caused by-
    a) Anaplasmosis
    b) Snake venom
    c) Deficiency of folic acid
    d) Sweet clover toxicity
37. Which of the following pair is correctly matched-
    a) Excess onion- Haemorragic anemia
    b) Aplastic anemia- Ionising radiation
    c) Deficiency of folic acid- Microcytic anemia
    d) Defecieny of iron- Macrocytic anemia
38. Active toxic principle in onion which causes anemia is-
    a) n-propyl disulphide
    b) Ricin
    c) Both of the above
    d) None of the above
39. In hemorrhagic anemia the type of anemia will be-
    a) Macrocytic normochromic
    b) Microcytic hypochromic
    c) Normocytic normochromic
    d) Microcytic normochromic
40. Hemophilia is found in both sexes and not sex linked in
    a) Fowl
    b) Swine
    c) Horse
    d) Cattle
41. Ruptured immature neutrophils are called as-
    a) Pessary cells
    b) Dust cells
    c) Basket cells
    d) Dohle's bodies
42. Which of the following doesn't have lymph nodes-
    a) Fowl
    b) Camel
    c) Swine
    d) All of the above
43. Granulomatous lymphadenitis with caseation and calcification occurs in all of the following EXCEPT-
    a) Tuberculosis
    b) Glanders
    c) Johne's disease
    d) Strangles
44. Splenomegaly in fowl is seen in-
    a) ALC

b) Spirochetosis
c) Both of the above
d) None of the above

45. Excessive phagocytic activity of the spleen is called as-
a) Hypersplenism
b) Splenomegaly
c) Any term can be used
d) None of the above

46. Chronic suppurative inflammation of young pigs caused by *Spherophorusnecrophorus*is called as-
a) Rhinitis
b) Nasal granuloma
c) Rhinohyperplasia
d) Atrophic rhinitis

47. Infectious sinusitis caused by *Mycoplasma sp.* is most commonly seen in-
a) Chicken
b) Dog
c) Turkey
d) Sheep

48. Which condition is termed as 'Broken-wind' or 'Heaves' in horses-
a) Chronic alveolar emphysema
b) Acute alveolar emphysema
c) Chronic bronchitis
d) Pulmonary hemorrhage

49. Which of the following statement is true-
a) Pneumonitis specifically means inflammation of alveolar wall
b) Pneumonia specifically means inflammation of alveolar lumen
c) In animals lobular pneumonia is common
d) All of the above

50. Pneumonia in rarely met in-
a) Swine
b) Cattle
c) Cat
d) Dog

51. Verminous pneumonia in horse is caused by-
a) Dictyocaulusfilaria
b) Dictyocaulus viviparous
c) Dictyocaulusarnifieldi
d) All of the above

52. The type of pneumonia in which alveolar septa are affected is called as-
a) Bronchopneumonia
b) Interstitial pneumonia
c) Verminous pneumonia
d) Mycotic pneumonia

53. Psittacosis organism in birds causes-
a) Bronchopneumonia
b) Metastatic suppurative pneumonia
c) Pulmonary adenomatosis
d) Interstitial pneumonia

54. Asteroid body in lungs is seen in-
a) Bronchopneumonia
b) Pulmonary adenomatosis
c) Verminous pneumonia
d) Mycotic pneumonia

55. The condition in which exudate is absent in alveoli is seen in-
a) Bronchopneumonia
b) Pulmonary adenomatosis
c) Verminous pneumonia
d) Mycotic pneumonia

56. Which of the following statement is **incorrect**-
a) Inclusion bodies are present in Maedi affected lung
b) Absence of rhinitis is seen in pulmonary adenomatosis
c) Lymph nodes are affected in Jaagsiekte
d) The course of disease in Maedi is longer.

57. Inflammation of pleura is called as-
a) Pleuritis
b) Pleurisy
c) Both terms are correct
d) None of the above

58. Glossitis is inflammation of-
a) Gums
b) Palate
c) Lips
d) Tongue

59. Inflammation of palate is called as-
a) Cheilitis
b) Ranula
c) Lampas
d) Glossitis

60. Epulis is fibroblastic tumor of-

a) Gums
b) Lips
c) Palate
d) Tongue

61. Pathologic processes are very rarely found in-
a) Salivary glands
b) Brain
c) Liver
d) Kidney

62. Salivary calculi is very common in-
a) Cattle
b) Horse
c) Dog
d) Swine

63. Dilatation of esophagus is termed as-
a) Ranula
b) Epulis
c) Acheresia
d) Ectasia

64. Diphthericingluvitis is seen in-
a) Fowl pox
b) Fowl cholera
c) Fowl typhoid
d) Fowl pest

65. Gastritis in which stomach mucosa thrown into polypoid folds seen in-
a) Bacterial gastritis
b) Parasitic gastritis
c) Viral gastritis
d) Fungal gastritis

66. Twisting of intestine on its own axis is called as-
a) Volvulus
b) Intussusception
c) Incarceration
d) Torsion

67. Twisting of bowel on itself when it passes through a tear in the mesentery, is called as-
a) Volvulus
b) Intussusception
c) Incarceration
d) Torsion

68. In cattle torsion is common in-
a) Abomasum
b) Caecum
c) Colon
d) All of the above

69. Telescoping of a portion of intestine into another is called as-
a) Volvulus
b) Intussusception
c) Incarceration
d) Torsion

70. Hernia of intestine is common in-
a) Pigs and horses
b) Dogs and cats
c) Cattle and horses
d) Pigs and buffalo

71. **Enteritis** term usually applied for inflammation of-
a) Small intestine
b) Large intestine
c) Both of the above
d) Stomach

72. Enteroliths are formed of-
a) Triple phosphate
b) Calcium carbonate
c) Calcium oxalate
d) None of the above

73. Enteroliths are more commonly seen in-
a) Small intestine in horses
b) Small intestine in pigs
c) Large intestine in horses
d) Large intestine in pigs

74. Difference between lesions of coli-granuloma and tuberculosis is-
a) Coli granuloma lesions are not single
b) Coli granuloma lesions are found in spleen and bones
c) Tuberculosis lesions are found in spleen and bones
d) All of the above

75. Which type of necrosis of liver is seen in phosphorous poisoning-
a) Periportal necrosis
b) Mid zonal necrosis
c) Paracentral necrosis
d) Centrilobular necrosis

76. Which of the following is absent in cirrhosis-
a) Hyperplasia
b) Degeneration

c) Fibrosis
d) Hypertrophy

77. Glycosuria in sheep is sequlae of-
a) Enterotoxaemia
b) Braxy
c) Anthrax
d) Fluke infestation

78. Chronic venous congestion is characterized by-
a) Biliary cirrhosis
b) Cardiac cirrhosis
c) Portal cirrhosis
d) Multinodular cirrhosis

79. Appearance of fresh blood in stools is called as-
a) Melana
b) Hematuria
c) Hemophilia
d) Haematochezia

80. Choleliths are more common seen in-
a) Cattle
b) Horse
c) Pig
d) Fowl

81. Degenerative renal lesions are known as-
a) Nephritis
b) Nephrocalcinosis
c) Nephrosis
d) None of the above

82. Inflammation of all parts of kidney involving the pelvis and parenchyma is known as-
a) Embolic nephritis
b) Pyelonephritis
c) Interstitial nephritis
d) Glomerulonephritis

83. White spotted kidney is main lesion seen in-
a) Focal interstitial nephritis
b) Diffuse interstitial nephritis
c) Glomerulonephritis
d) None of the above

84. Large white kidney is seen in-
a) Acute glomerulonephritis
b) Subacute glomerulonephritis
c) Chronic glomerulonephritis
d) Interstitial nephritis

85. High specific gravity of urine will be observed in-
a) Acute glomerulonephritis
b) Subacute glomerulonephritis
c) Chronic glomerulonephritis
d) Interstitial nephritis

86. Which type of crystals are seen in acidic urine-
a) Carbonate
b) Phosphate
c) Oxalate
d) All of the above

87. Presence of calculi in ducts of Bellini in kidney is called as-
a) Piloconcretions
b) Microconcretions
c) Urinary calculi
d) Nephrolithiasis

88. Presence of calculi in pelvis of kidney is called as-
a) Piloconcretions
b) Microconcretions
c) Urinary calculi
d) Nephrolithiasis

89. Presence of cast in urine is called as-
a) Cylindruria
b) Calculi
c) Cylindroids
d) Any of the above

90. Gliosis refers to-
a) Increase in astrocytes
b) Increase in microglial cells
c) Increase in oligodendrocytes
d) All of the above

91. Microglia after engulfing become foamy containing lipids, are called as-
a) Gitter cells
b) Gemiocytes
c) Leptocytes
d) Plasma cells

92. Exencephalus means-
a) Protrusion of meninges
b) Absence of cranial vault exposing the brain
c) An abnormal small brain
d) Absence of most of the brain

93. Rachicele is hernia of-

a) Spinal cord
b) Brain
c) Abomasum
d) Intestine

94. Abnormal accumulation of CSF in and around the brain is called as-
a) Hydronephrosis
b) Hydrocephalus
c) Hydropericardium
d) Cerebellar hypoplasia

95. Calcification is more commonly seen in-
a) Meninges
b) Brain
c) Spinal cord
d) All of the above

96. Inflammation of duramater is called as-
a) Encephalomyelitis
b) Pachymeningitis
c) Leptomeningitis
d) Meningoencephalomyelitis

97. In rabies negri bodies are seen in-
a) Hippocampus and cerebrum
b) Hippocampus and cerebellum
c) Medulla and hippocampus
d) Cerebrum and medulla

98. Which of the following statement is **incorrect**-
a) Neuritis refers to inflammation of peripheral nerves
b) Wallerian degeneration occurs in muscle fibers
c) Wallerian degeneration occurs in nerve fibers
d) Inflammation of uterus is termed as metritis

99. Presence of blood in tunica vaginalis is called as-
a) Hematocele
b) Hydrocele
c) Rachicele
d) Pachicele

100. Brucellosis in rams causes-
a) Orchitis
b) Epididymitis
c) Keratitis
d) None of the above

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ANSWERS

1. c
2. c
3. d
4. c
5. a
6. b
7. a
8. c
9. b
10. c
11. b
12. c
13. c
14. a
15. c
16. b
17. d
18. c
19. c
20. b
21. b
22. c
23. d
24. a
25. a
26. d
27. c
28. c
29. a
30. d
31. b
32. c
33. b
34. a
35. d
36. d
37. b
38. a
39. c
40. b
41. c
42. a

43. d
44. c
45. a
46. c
47. c
48. a
49. d
50. c
51. c
52. b
53. d
54. d
55. b
56. c
57. c
58. d
59. c
60. a
61. a
62. b
63. d
64. a
65. b
66. d
67. a
68. b
69. b
70. a
71. a
72. a
73. c
74. c
75. a
76. d
77. a
78. b
79. d
80. a
81. c
82. b
83. a
84. b
85. a
86. c
87. b
88. d
89. a
90. a
91. a
92. b
93. a
94. b
95. a
96. b
97. b
98. b
99. a
100. b

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SET-3

1. The degenerative changes of cells depends on which factors
   a) Kinds of cells
   b) Quality of injurious agent
   c) Quantity of injurious agent
   d) All of the above
2. Most common cause of cloudy swelling
   a) Hypoxia
   b) Alteration in the physical state of the protein
   c) Toxins
   d) None of the above
3. "Ground glass" appearance of the cytoplasm of cell seen in
   a) Parenchymatous degeneration
   b) Cloudy swelling
   c) Albuminous degeneration
   d) All of the above
4. Vesicles form in Pox diseases is example of
   a) Cloudy swelling
   b) Hydropic degeneration
   c) Hyline degeneration
   d) Amyloid infiltration
5. Which ion is present in extra cellular fluid in high concentration?
   a) Potassium

b) Bicarbonate
c) Sodium
d) None of the above

6. In which diseases, the hydropic degeneration occurs most commonly?
   a) Pox disease
   b) Foot and Mouth disease
   c) Carbon tetrachloride poisoning
   d) All of the above
7. Which is/ are the common example/s of hyaline degeneration?
   a) Zenker's degeneration of muscle
   b) Equine azoturia
   c) White muscle disease in calves
   d) All of the above
8. How muscle looks in hyaline degeneration?
   a) Fish-flesh resemble
   b) Fibrillar appearance
   c) Cooked meat appearance
   d) All of the above
9. Hyperkeratosis seen in deficiency of
   a) Vitamin K
   b) Vitamin C
   c) Vitamin A
   d) None of the above
10. Hyperkeratosis seen in which following hyaline degeneration?
    a) Connective tissue hyaline degeneration
    b) Epithelial hyaoine degeneration
    c) Muscle hyaline degeneration
    d) All of the above
11. Chemically, what is mucin or mucous?
    a) Lipid
    b) Glycogen
    c) Protein only
    d) Glycoprotein
12. Which organelle is produced mucin?
    a) Mitochondria
    b) Golgi apparatus
    c) Endoplasmic reticulum
    d) Lysosome
13. Waxy degeneration is also known as
    a) Cloudy swelling
    b) Hydropic degeneration
    c) Amyloid infiltration
    d) All of the above
14. Which one of the following is made up of branching fibres?
    a) Galactose
    b) Maltose
    c) Amyloid
    d) Amylopectin
15. Focal accumulation of amyloid in spleen called
    a) Bacon spleen
    b) Sago spleen
    c) Both
    d) None of the above
16. Diffuse accumulation of amyloid in spleen called
    a) Bacon spleen
    b) Sago spleen
    c) Both
    d) None of the above
17. Special staining technique is used for amyloid is
    a) Oil red O
    b) Sudan I
    c) Congo red
    d) All of the above
18. Isolated deposition of amyloid material in a neoplastic form in the heart is called
    a) Sago spleen
    b) Amyloidoma
    c) Bacon spleen
    d) None of the above
19. End product/s which excreted by human in urine?
    a) Urea
    b) Uric acid
    c) Ammonia
    d) All of the above
20. End product/s which excreted by bird in urine?
    a) Urea
    b) Uric acid
    c) Ammonia
    d) All of the above
21. End product/s which excreted by fish in urine?

a) Urea
b) Uric acid
c) Ammonia
d) All of the above

22. Which is glucogenic fatty acid?
a) Acetic aced
b) Butyric acid
c) Propionic acid
d) None of the above

23. Local death of cells or tissue in a living body?
a) Necrosis
b) Gangrene
c) Somatic death
d) None of the above

24. The death of the body as a whole is called
a) Physiological death
b) Somatic death
c) Both
d) None of the above

25. Nucleus becomes smaller, rounded and condensed is called
a) Karyolysis
b) Karyorrhexis
c) Pyknosis
d) Chromatolysis

26. Here names of fatty acids are given.
I) Acetic acid
II) Butyric acid
III) Propionic acid
Which are ketogenic fatty acids in ruminant?
a) I and II
b) II and III
c) I and III
d) I, II and III

27. Which cells are more resistant to ischemia?
a) Tubular epithelial cells
b) Connective tissue cells
c) Brain cells
d) All of the above

28. Which statement is correct for coagulative necrosis?
a) Cellular details and architectural details both are maintained.
b) Only cellular details are maintained.
c) Only architectural details are maintained.
d) Cellular details and architectural details both are lost.

29. Tuberculosis is the example of which necrosis?
a) Coagulative necrosis
b) Caseative necrosis
c) Fat necrosis
d) Liquefactive necrosis

30. Which is the good example for liquefactive necrosis?
a) White muscle disease
b) Tuberculosis
c) Abscess
d) Adipose tissue trauma

31. Which organ is most commonly affected to liquefactive necrosis?
a) Kidney
b) Intestine
c) Lung
d) Brain

32. Death of tissues with putrefaction by saprophytic bacteria is called
a) Autolysis
b) Gangrene
c) Autopsy
d) Necrosis

33. Which is the most common site for dry gangrene?
a) Internal organs
b) Muscles
c) Extremities
d) All of the above

34. Which compound gives greenish or blackish colour to the gangrenous area?
a) Hydrogen peroxide
b) Hydrogen sulphide
c) hydrogen chloride
d) sulfur oxide

35. Which type of gangrene is most dangerous among all type of gangrene?
a) Moist gangrene
b) Dry gangrene
c) Gas gangrene

d) None of the above

36. Which compounds give foul smelling affected by moist gangrene?
    a) Indol
    b) Skatol
    c) Hydrogen sulphide
    d) Both (a) and (b)
37. Which is the example of gas gangrene?
    a) Black quarter
    b) Black disease
    c) Malignant edema
    d) All of the above
38. Which organism is cause gas gangrene?
    a) Aerobic
    b) Anaerobic
    c) Capnophilic
    d) All of the above
39. Algor mortis means
    a) Cooling of the body
    b) Stiffening of the body
    c) Softening of the body
    d) None of the above
40. Black quarter is characterized by
    a) Crackling noise
    b) Metallic seen of affected muscle
    c) Necrotizing myositis
    d) All of the above
41. In postmortem clotting of blood, WBC clot is called as
    a) Current jelly
    b) Chicken fat
    c) Chicken jelly
    d) All of the above
42. Who discovered the fifth cardinal sign of inflammation?
    a) Celsus
    b) Galen
    c) Rudolf wirchow
    d) None of the above
43. The adherence of the leucocytes to the wall is called
    a) Pavementing
    b) Extravasation
    c) Emigration
    d) All of the above
44. The process of leucocytes moving outside the vessels is called as
    a) Pavementing
    b) Emigration
    c) Extravasation
    d) Redistribution
45. Escape of RBC from intact wall of the blood vessels is called as
    a) Diapedesis
    b) Rhexis
    c) Echymotic
    d) Petechie
46. First line of cellular defense in inflammation is
    a) Monocyte
    b) Macrophage
    c) Lymphocyte
    d) Neutrophil
47. An increase in the number of leucocytes in the blood is
    a) Leukocytopenia
    b) Leukophillia
    c) Leukocytosis
    d) Lymphocytosis
48. The granulopoietin control the production of neutrophils called as
    a) Leukopoetin
    b) Leukocytosis inducing factor
    c) Colony stimulating factor
    d) All of the above
49. Release of neutrophils from the bone marrow is promoted by a factor in the plasma is called as
    a) Leukopoetin
    b) Leukocytosis inducing factor
    c) Colony stimulating factor
    d) All of the above
50. What is the normal value of neutrophil in dog in percentage?
    a) 55-70
    b) 30-45
    c) 20-40
    d) 70-85
51. Normal range of neutrophil in cattle in percentage?
    a) 50-75
    b) 25-45
    c) 15-25
    d) 70-85

52. The crystalline proteins derived from the nucleus of eosinophils seen in the sputum of man is called as
    a) Reed Stenberg cell
    b) Touton giant cell
    c) Charcot leydon cell
    d) None of the above
53. In tissue mast cell is derived from
    a) Monocyte
    b) Neutrophil
    c) Lymphocyte
    d) Basophil
54. Perivascular cuffing is seen in poisoning of
    a) Ammonia
    b) Salt
    c) Cyanide
    d) Urea
55. Plasma cell is derived from
    a) B-lymphocyte
    b) T-lymphocyte
    c) Basophil
    d) Monocyte
56. Which lymphocyte is responsible for cell mediated immunological reaction?
    a) B-lymphocyte
    b) T-lymphocyte
    c) Both of above
    d) None of the above
57. Plasma cell found in
    a) Blood
    b) Urine
    c) Saliva
    d) Tissue
58. Which is the second line of defense in inflammation?
    a) Histiocyte
    b) Macrophage
    c) Resting wandering cell
    d) All of the above
59. Macrophage is derived from
    a) Monocyte
    b) Lymphocyte
    c) Neutrophil
    d) Plasma cell
60. Which cell is knows as microphage
    a) Monocyte
    b) Neutrophil
    c) Basophil
    d) Macrophage
61. Suppurative inflammation of hair follicle or sebaceous gland in the skin is called
    a) Furuncle
    b) Pustule
    c) Papule
    d) Dermatitis
62. Eosinophillia is seen in
    a) Allergic condition
    b) Parasitic condition
    c) Hypersensitivity reaction
    d) All of the above
63. The granulation tissue continues getting produced and present in abnormally large amounts called as
    a) Proud flesh
    b) Keloid
    c) Scar
    d) All of the above
64. Mass of proliferating connective tissue is called as
    a) Proud flesh
    b) Keloid
    c) Scar
    d) All of the above
65. The organs fail to develop to their full normal size though there was a beginning is called as
    a) Aplasia
    b) Hypoplasia
    c) Atrophy
    d) None of the above
66. The decrease in the size of a tissue after it has attained its full growth is called
    a) Aplasia
    b) Hypoplasia
    c) Atrophy
    d) None of the above
67. The transformation of one type of tissue into another is called as
    a) Anaplasia
    b) Metaplasia

c) Dysplasia
d) Hyperplasia

68. Which vitamin deficiency leads conversion of simple columnar to squamous stratified cell?
a) Vitamin A
b) Vitamin C
c) Vitamin E
d) All of the above

69. The enlargement of tissue due to increased size of the individual cell is called as
a) Hypertrophy
b) Hyperplasia
c) Neoplasm
d) Hypoplasia

70. The enlargement of tissue due to increased number of the individual cell is called as
a) Hypertrophy
b) Hyperplasia
c) Neoplasm
d) Hypoplasia

71. The dilatation of alveoli is called as
a) Emphysema
b) Atelectasis
c) Pneumonia
d) Pneumoconiosis

72. The coalence of alveoli is called as
a) Emphysema
b) Atelectasis
c) Pneumonia
d) Pneumoconiosis

73. Iron particle can be stained by
a) Masons trichrome method
b) Van kossa method
c) Perl's Prussian blue method
d) None of the above

74. Hemosiderin ladein macrophage is called as
a) Heart failure cell
b) Dust cell
c) Mast cell
d) All of the above

75. The pigment gives a brownish colour caused by chronic venous congestion is called as
a) Brown induration
b) Pneumoconiosis
c) Consolidation
d) None of the above

76. Nut meg liver is seen in
a) Rupture of aorta
b) Passive venous congestion
c) Right side heart failure
d) Dilatation of coronary artery

77. Bleeding from nose is known as
a) Epistaxis
b) Hemoptysis
c) Melena
d) Apoplexy

78. Blood in vomit is
a) Hemoptysis
b) Hematesis
c) Melena
d) Apoplexy

79. Blood in sputum is
a) Epistaxis
b) Hemoptysis
c) Melena
d) Apoplexy

80. Blood in stool is
a) Epistaxis
b) Hemoptysis
c) Melena
d) Apoplexy

81. Hemorrhage into the brain is called as
a) Epistaxis
b) Hemoptysis
c) Melena
d) Apoplexy

82. Small pin point hemorrhage is known as
a) Petechiae
b) Ecchymoses
c) Rhexis
d) Diapedesis

83. Extensive hemorrhages on the surface
a) Rhexis
b) Petechiae
c) Echymoses
d) Diapedesis

84. Extensive hemorrhages in the tissue is called as
a) Extravasation

b) Rhexis
c) Petechiae
d) Diapedesis

85. The mechanism by which foreign material is transported through the circulatory system is called as
    a) Embolism
    b) Thrombus
    c) Oedema
    d) Shock
86. Which type of necrosis occurs in infarction?
    a) Liquefactive necrosis
    b) Caseative necrosis
    c) Fat necrosis
    d) Coagulative necrosis
87. Generalized subcutaneous edema is knows as
    a) Dropsy
    b) Hydrops
    c) Anasarca
    d) Ascites
88. Hydrocele means
    a) Oedema of brain
    b) Oedema of cerebellum
    c) Oedema of tunica vaginalis
    d) Oedema of oviduct
89. Which shock is occurring in excessive anaesthesia?
    a) Hypovolumic shock
    b) Neurogenic shock
    c) Septic shock
    d) All of the above
90. Which condition occurs due to deficiency of calcium?
    a) Parturient paresis
    b) Pica
    c) Allotriophagy
    d) Enzootic marasmus
91. Which disease is caused by phosphorus deficiency?
    a) Big head disease
    b) Miller's disease
    c) Bran disease
    d) All of the above
92. Grass tetany is caused by deficiency of
    a) Magnesium
    b) Manganese
    c) Sulphur
    d) Iron
93. Steely wool is caused by
    a) Deficiency of copper
    b) Deficiency of molybdenum
    c) Toxicity of molybdenum
    d) Both (a) and (c)
94. Parakeratosis is caused by
    a) Excessive eating of calcium and phosphorus
    b) Deficiency of fatty acid
    c) Deficiency of zinc
    d) All of the above
95. Find out which is not correctly match.
    a) Calcium – Vitamin D
    b) Phosphorus – Parathormon
    c) Calcium – Calcitonin
    d) Selenium – Vitamin E
96. Where is vitamin A stored?
    a) Eye
    b) Liver
    c) Intestine
    d) Adipose tissue
97. Which vitamin knows as anti-infection vitamin?
    a) Vitamin A
    b) Vitamin D
    c) Vitamin C
    d) Vitamin K
98. Which vitamin knows as Vitamin A sparer?
    a) Vitamin A
    b) Vitamin E
    c) Vitamin D
    d) Vitamin C
99. Which diseases occur by Vitamin E deficiency?
    a) Crazy-chick disease
    b) Exudative diathesis
    c) Nutritional muscular dystrophy
    d) All of the above

100. Which disease is caused by niacin deficiency?
    a) Canine pellagra
    b) Encephalomalacia
    c) Allotriphagy
    d) Enzootic marasmus
101. Vitamin K is required for the formation of
    a) Prothrombin
    b) Factor IX
    c) Factor X
    d) All of the above

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ANSWERS

1. **d**
2. **a**
3. **d**
4. **b**
5. **c**
6. **d**
7. **d**
8. **a**
9. **c**
10. **b**
11. **d**
12. **a**
13. **c**
14. **d**
15. **b**
16. **a**
17. **c**
18. **b**
19. **a**
20. **b**
21. **c**
22. **c**
23. **a**
24. **b**
25. **c**
26. **a**
27. **b**
28. **c**
29. **b**
30. **c**
31. **d**
32. **b**
33. **c**
34. **b**
35. **a**
36. **d**
37. **d**
38. **b**
39. **a**
40. **d**
41. **b**
42. **c**
43. **a**
44. **b**
45. **a**
46. **d**
47. **c**
48. **c**
49. **b**
50. **a**
51. **b**
52. **c**
53. **d**
54. **b**
55. **a**
56. **b**
57. **d**
58. **d**
59. **a**
60. **b**
61. **a**
62. **d**
63. **a**
64. **b**
65. **b**
66. **c**
67. **b**
68. **a**
69. **a**
70. **b**
71. **a**
72. **b**
73. **c**
74. **a**
75. **a**
76. **b**

77. a
78. b
79. b
80. c
81. d
82. a
83. c
84. a
85. a
86. d
87. c
88. c
89. b
90. a
91. d
92. a
93. d
94. d
95. b
96. b
97. a
98. b
99. d
100. a
101. d

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SET-4

1. Bronze discolouration of Liver in poultry is caused by-
(A) Pasteurellosis
(B) IBD Virus
(C) Leptospirosis
(D) Salmonellosis
2. Fragmentation of nucleus in a cell is termed as-
(A) Pyknosis
(B) Karyorrhexis
(C) Karyolysis
(D) Chromatolysis
3. Infectious Necrotic Hepatitis in sheep is caused by-
(A) *Leptospira sp.*
(B*) Fasciola hepatica*
(C) *Clostridium sp.*
(D)*Heterakisgallinarum*
4. The animal susceptible to Atherosclerosis is-
(A) Cattle
(B) Swine
(C) Rabbit
(D) Poultry.
5. Tumour which Metastasize in different organ is-
(A) Lipoma
(B) Angioma
(C) Seminoma
(D) Sqamous cell carcinoma.
6. Haemoglobinuria is seen in-
(A) Theileriosis
(B) Leptospirosis
(C) Salmonellosis
(D) Pasturellosis.
7. Who is the father of Cellular Pathology?
(A) John Hunter
(B) Robert Koch
(C) Rudolph Virchow
(D) K.Cohnhiem.
8. Pseudo Rabies is caused by-
(A) Lyssa virus
(B) Picorna virus
(C) Paramyxo virus
(D) Herpes virus.
9. Pulpy Kidney Disease is caused by-
(A) Clostridium perfringens
(B) Clostridium septicum
(C) Clostridium novyi
(D) Clostridium tetani
10. Turkey Egg Kidney is seen in-
(A) Swine Pox
(B) Swine Influenza
(C) Swine Fever
(D) Swine Erysipelas.
11. Poll evil in Horse is caused by-
(A) *Clostridium tetani*
(B) Actinomycesbovis
(C) Brucellaabortus

(D) Both (B) and (C).

12. Nutritional roup in Poultry is caused due to deficiency of-

(A) Vitamin B
(B) Vitamin C
(C) Vitamin E
(D) Vitamin A.

13. Epithelial Pearls are seen in-

(A) Sebaceous cell Adenoma
(B) Squamous cell carcinoma
(C) Melanoma
(D) Venereal granuloma.

14. Blue Tongue in sheep is caused by-

(A) Herpes virus
(B) Birna virus
(C) Picorna virus
(D) Orbi virus.

15. Most common Serotype of FMD virus in India is-

(A) A
(B) C
(C) Asia-1
(D) O.

16. In which disease post mortem of carcass is prohibited?

(A) Haemorragic septicemia
(B) Rinder pest
(C) Anthrax
(D) Brucellosis.

17. Mad itch is mostly a disease of-

(A) Caprine
(B) Bovine
(C) Swine
(D) Ovine

18. Tigroid Heart is seen in cattle affected with-

(A) Bovine malignant catarrhal
(B) Botulism
(C) Bovine viral diarrhea
(D) Foot and mouth disease.

19. Wooden Tongue in cattle is seen in-

(A) Actinomycosis
(B) Botriomycosis
(C) Haemorrhagic Septicemia
(D) Actinobacillosis.

20. Mode of transmission of IBR virus is-

(A) Venereal
(B) Inhalation
(C) Both
(D) None of the above.

21. Section size in tissue microtome is-

(A) 25-30 micron
(B) 4-6 micron
(C) 15-20 micron
(D) 8-10 micron

22. Collagen fiber gives which colour in Masson's tricome stain-

(A) Black
(B) Red
(C) Blue
(D) Green

23. Maedi is primarily a disease of-

(A) Sheep affecting respiratory system
(B) Cattle affecting reproductive system
(C) Sheep affecting nervous system
(D) Cattle affecting nervous system.

24. Equine Plague is also called as-

(A) Equine viral arteritis
(B) Glanders
(C) Strangles
(D) African Horse sickness.

25. Sore mouth in cattle is seen in-

(A) Blue tongue
(B) Bovine malignant catarrh
(C) Rinder pest
(D) Vesicular Stomatitis

26. Disease caused by *Clostridium septicum* is-

(A) Black Quarter
(B) Enterotoxaemia
(C) Braxy
(D) Tetanus

27. Sulphur granules in yellowish pus is seen in-

(A) Glanders
(B) Strangles
(C) Staphylococcosis
(D) Actinomycosis

28. Toxins of organism causes peripheral nerve paralysis in cattle-

(A) Botulism
(B) Tetanus
(C) Both
(D) None of the above

29. Diamond skin disease is primarily a disease of-
(A) Horse
(B) Lion
(C) Sow
(D) Turkey
30. In Johne's disease, corrugation is not the feature in-
(A) Cattle
(B) Sheep
(C) Horse
(D) Dog
31. Most susceptible species for Hemorrhagic septicemia-
(A) Sheep
(B) Buffalo
(C) Cattle
(D) Pig
32. Erythritol sugar plays important role in pathogenesis of-
(A) *Clostridium spp.*
(B) Brucella spp.
(C) Bacillus spp.
(D) Corynebacterium spp.
33. Substance responsible for increase penetration of Lyssa virus-
(A) Hyaluronidase
(B) Erythriol
(C) Protagen
(D) Amylase
34. Crop mycosis in poultry is caused by-
(A) Bacteria
(B) Mycoplasma
(C) Fungi
(D) Virus
35. Brooder's pneumonia in poultry is caused by-
(A) *Candida albicans*
(B) Aspergillusfumigatus
(C) Haemophilusparagallinarum
(D) Pasturellamultocida
36. Circling disease in cattle is caused by-
(A) *Listeria monocytogenes*
(B) Erysipelothrixrhusiopathiae
(C) Streptococcus equi
(D) Chlamydia psittacii
37. Intranuclear inclusion bodies are seen in-
(A) Pox diseases
(B) Herpes virus infection
(C) Adeno virus infection
(D) Lyssa virus infection
38. Negri bodies are seen in Rabies which are-
(A) Intranuclear
(B) Intracytoplasmic
(C) Both
(D) May be intranuclear or intracytoplasmic
39. Enlargement of Bursa of fabricius in poultry is seen in-
(A) CRD
(B) IB
(C) RD
(D) IBD
40. Zebra marking is predominant feature of-
(A) Johne's disease
(B) Tuberculosis
(C) Rinder pest
(D) Both (A) and (C)
41. CBPP differs from CCPP in-
(A) Both occur in same species
(B) Sequestra formation
(C) Mode of transmission
(D) Pathogenesis
42. Which bacterium is predisposed by *Fasiola hepatica*infestation-
(A) *Bacillus spp.*
(B) Clostridium spp.
(C) Leptospira spp.
(D) Pasturella spp.
43. Which is the most potent aflatoxin-
(A) M1
(B) M2
(C) B1
(D) B2
44. Curled toe paralysis in chicken is due to deficiency of-
(A) Vitamin B12
(B) Vitamin B1
(C) Niacin
(D) Vitamin B2
45. Mn deficiency is chicken will lead to-
(A) Pica
(B) Star grazing condition
(C) Crazy chick disease

(D) Slipped Tendon

46. Phosphorous deficiency in soil will predispose the cattle to-

(A) Hemorrhagic septicemia
(B) Botulism
(C) Anthrax
(D) Mucosal disease

47. Black head disease is predominately a disease of-

(A) Cattle caused by Parasite
(B) Poultry caused by Parasite
(C) Horse caused by Virus
(D) Pig caused by Virus

48. Which of the following is correctly matched-

(A) Tubercular lesions are calcified-Buffalo
(B) Johne's disease-Foul smelling diarrhea
(C) Avian spp.- Dry pus
(D) Lamb dysentery- *Clostridium perfringens*type D

49. Post mortem of chick shows foul smelling yellow-brown watery Yolk, fibrinous perihepatitis and pericarditis, suspect the disease

(A)Infectious Coryza
(B) Fowl Typhoid
(C) Coli Bacillosis
(D) Infectious Bronchitis

50. Haemorrhages at the tip of the proventricular gland is the pathognomic lesion seen in-

(A)Ranikhet disease
(B) Chronic respiratory disease
(C) Infectious bursal disease
(D) Avian influenza

51. Which of the following is **not** correctly matched-?

(A) Zn deficiency-Pig
(B) Epidemic tremor-Virus
(C) Siderosis-Silica dust
(D) Alkali disease-Se

52. Pachymeningitis is inflammation of-

(A) Piamater
(B) Brain
(C) Duramater
(D) Spinal cord

53. Liquifactive necrosis is most commonly seen in-

(A) Kidney
(B) Liver
(C) Heart
(D) Brain

54. Which of the following is correctly matched-

(A) Picorna virus-Ranikhet disease
(B) Lumpy skin disease- Pox virus
(C) Diamond skin disease-Herpes virus
(D) Paramyxo virus-FMD

55. Enlargement of Sciatic nerve is seen in-

(A) Ranikhet disease
(B) Marek's disease
(C) Chronic respiratory disease
(D) Infectious Coryza

56. Apennosis is-

(A) Intracellular edema of epidermis
(B) Congenital lack of feathers in fowl
(C) Absence of pineal gland
(D) Lack of cell differentiation during embryogenesis

57. Which is **incorrect** about avian tuberculosis-?

(A) Calcification absent
(B) Liver and bones are most commonly affected
(C) Lungs are most commonly affected
(D) Intradermal test is performed on wattle.

58. Post mortem of cattle reveals too much emaciated carcass,mucosa of intestine thrown into corrugated folds, most probable cause will be-

(A) Rinder pest
(B) Johne's disease
(C) Tuberculosis
(D) Pasterellosis.

59. Spondylitis is inflammation of-

(A) Prepuce
(B) Vertebrae
(C) Bone

(D) Spermatic cord

60. Which of the following is correct regarding poultry diseases-

(A) In pullorum disease, green constant diarrhea is seen

(B) Face is swollen and edematous in *Haemophilus* infection

(C) Bloody mucous expelled from trachea in Infectious Bronchitis

(D) In pullorum disease, nervous signs are seen along with diarrhoea

61. In which outbreak at poultry farm maximum mortality of birds will be expected-

(A) Ranikhet disease

(B) Infectious Bronchitis

(C) Infectious Lanyngiotracheitis

(D) Avain Encephalomyelitis

62. Dohle's bodies are toxic granules of-

(A) Macrophages

(B) Eosinophils

(C) Neutrophils

(D) Lymphocytes

63. East coast fever is caused by-

(A) *Theleriaparva*

(B) Theleriaannulata

(C) Babesiabovis

64. Edema consisting of gelatinous material in neck and brisket region seen in cattle in-

(A) Black Quarter

(B) Deganala disease

(C) Botulism

(D) HaemorrhagicSepticemia

65. Which is the main chemical mediator of inflammation-?

(A) Serotonin

(B) Bradykinin

(C) Histamin

(D) Interleukin-1

66. Big liver disease is also known as-

(A) IBD

(B) ALC

(C) Fowl cholera

(D) Fowl typhoid

67. In Angara disease, the pathological finding is-

(A) Haemopericardium

(B) Hydropericardium

(C) Myocarditis

(D) Pneumopericardium

68. In Left side heart failure, the heart failure cells are seen in-

(A) Lungs

(B) Heart

(C) Kidney

(D) Spleen

69. Sway back condition is seen due to deficiency of-

(A) Cu

(B) Co

(C) Mn

(D) Se

70. Most pathogenic species/disease affecting Snakes-

(A) Pasteurellosis

(B) Histomoniasis

(C) Salmonellosis

(D) Listeriosis.

71. Increase in number of immature lymphoid cells in blood is known as-

(A)Shift to left

(B) Shift to right

(C) Leukemia

(D) Leukocytosis

72. Oval and nucleated RBC's are present in-

(A) Parrot

(B) Cobra

(C) Camel

(D) Both (A) and (B)

73. Spleen with diffuse Amyloidosis is known as-

(A) Sago spleen

(B) Bacon spleen

(C) Ham spleen

(D) Pulpy spleen

74. Which of the following statement is **incorrect**-

(A) FMD doesn't occur in Elephant

(B) Star grazing in chicken is due to vitamin B1 deficiency

(C) Actinomycosis mostly affects hard tissues in animals

(D) In Anthrax rigor mortis is absent.

75. Which of the following pair is **incorrectly**matched-
(A) Haemoptysis- Blood in Vomit
(B) Pyelonephritis- Suppuration in kidney
(C) White muscle disease- Vitamin E
(D) Glanders- Mallein test
76. Which vitamin is act as antioxidant-
(A) Vit.B
(B) Vit. D
(C) Vit. E
(D) Vit. A
77. Localized loss of melanin is known as-
(A) Vitiligo
(B) Leucoderma
(C) Acanthosisnigricans
(D) All of above
78. Macrophage in spleen are known as-
(A) Septal cell
(B) Kuffer cell
(C) Alveolar cell
(D) All of above
79. Macrophage laden with haemosiderin pigment is-
(A) Kuffer cell
(B) Foam cell
(C) Heart failure cell
(D) None of above

80. Toxic jaundis is also known as-
(A) Post hepatic jaundice
(B) Hepatic jaundice
(C) Pre hepatjc jaundice
(D) Obstructive jaundice
81. Siderosis means-
(A) Deposition of calcium in lung
(B) Deposition of iron in lung
(C) Deposition of silicon in lung
(D) Deposition of silver particle in lung
82. Van den Bergh test for obstructive jaundice-
(A) Direct
(B) Indirect
(C) Biphasic
(D) Both (B) & (C)
83. In abscess which type of necrosis is seen?
(A) Coagulative necrosis
(B) Liquifective necrosis
(C) Caseative necrosis
(D) Fat necrosis
84..First change after death is-
(A) Algor mortis
(B) Rigor mortis
(C) Formation of bloat
(D) Both (B) & (C)
85..Inflammation of crop is-
(A) Blephritis
(B) Ingluvitis
(C) Typhlitis
(D) Gonitis
86.Cart wheel shape nucleus found in-
(A) Plasma cell
(B) Basophils
(C) Eosinophils
(D) Monocyte

87. Extreme elevation of leucocytes in peripheral blood is known as-
(A) Shift to left
(B) Leukamoid reaction
(C) Right shift
(D) Both (A) & (C)
88.Blood in vomitus is known as-
(A) Haematamiasis
(B) Haemoptysis
(C) Epistaxis
(D) Melena
89. Bleeding from the oviduct is designated as:
(A) Epitaxis
(B) Hemosalpinx
(C) Hematocele
(D) Hematemasis
90. Condition which is hereditary and sex linked in which clotting is delayed:
(A) Apoplexy
(B) Hemophilia
(C) Brown induration
(D) Epistaxis
91. Transformation of one type of cell into another is known as:

(A) Dysplasia
(B) Metaplasia
(C) Hyperplasia
(D) Aplasia

92. Capillary rupture and hemorrhage occurs due to deficiency of:
(A) Vitamin B
(B) Vitamin C
(C) Thyroxin
(D) Vitamin A

93. Healing by first intention occurs in:
(A) Closed wound
(B) Open wound
(C) None of the above
(D) All of above

94. The mass of proliferating connective tissue under scar is known as:
(A) Keloid
(B) Proud flesh
(C) Cyst
(D) Scar

95. Pulmonary adenomatosis is characterized by:
(A) Hyperplasia of epithelium
(B) Hypertrophy of epithelium
(C) Both of the above
(D) None of above

96. Nucleus becoming smaller and condensed is called as-
(A) Necrosis
(B) Pyknosis
(C) Chromatolysis
(D) Keratolysis

97. Closure of lumen of hollow organ is called:
(A) Fissure
(B) Hypoplasia
(C) Atresia
(D) Sinus

98. Serum gives Direct Van Den Bergh test in-
(A) Diabetes
(B) Obstructive jaundice
(C) Hemorrhage
(D) Toxic jaundice

99. Granulomatous inflammation is seen in-
(A) Tuberculosis
(B) Salmonellosis
(C) Pasteurellosis
(D) Listeriosis

100. Big head disease is caused by-
(A) *Heterakisgallinarum*
(B) *Salmonella gallinarum*
(C) *Haemophilusparagallinarum*
(D) Excess of Phosporous feeding

ANSWERS

1. D
2. B
3. C
4. B
5. D
6. B
7. C
8. D
9. A
10. C
11. D
12. D
13. B
14. D
15. D
16. C
17. C
18. D
19. D
20. C
21. B
22. C
23. A
24. D
25. D
26. C

27. D
28. B
29. C
30. B
31. B
32. B
33. A
34. C
35. B
36. A
37. C
38. B
39. D
40. C
41. B
42. B
43. C
44. D
45. D
46. B
47. B
48. C
49. C
50. A
51. C
52. C
53. D
54. B
55. B
56. B
57. C
58. B
59. B
60. B
61. C
62. C
63. A
64. D
65. C
66. B
67. B
68. A
69. A
70. C
71. C
72. D
73. B
74. A
75. A
76. C
77. B
78. A
79. C
80. B
81. B
82. A
83. B
84. A
85. B
86. A
87. B
88. A
89. B
90. B
91. B
92. B
93. A
94. A
95. A
96. B
97. C
98. B
99. A
100. D

****

SET-5

1. **Heart failure cells are seen in:-**
   a) **Left side heart failure**
   b) **Right side heart failure**
   c) **Both**
   d) **None of the above.**
2. **Cholecystitis involves inflammatory response in:-**
   a) **Bile duct only**
   b) **Bile duct and gall bladder**
   c) **Gall bladder only**
   d) **Bile duct, gall bladder and adjacent liver parenchyma.**
3. **Aujeszky's disease is caused by:-**

a) **Adeno virus**
b) **Retro virus**
c) **Herpes virus**
d) **Reo virus.**

4. **Epithelial pearls are seen in:-**
   a) **Squamous cell carcinoma**
   b) **Adenosarcoma**
   c) **Adenoma**
   d) **Cholangio-cellular carcinoma**
5. **Most common sites for metastatic spread of malignant tumors is:-**
   a) **Liver and brain**
   b) **Lungs and brain**
   c) **Liver and kidney**
   d) **Liver and lungs**
6. **Which nephritis is due to antigen antibody reaction:-**
   a) **Embolic nephritis**
   b) **Glomerulonephritis**
   c) **Interstitial nephritis**
   d) **Pyelonephritis**
7. **Twisting of the intestine on its mesenteric axis is called as:-**
   a) **Volvulus**
   b) **Torsion**
   c) **Intussuseption**
   d) **Paralytic ileus**
8. **Folliculitis is inflammation of:-**
   a) **Graffian follicle**
   b) **Hair follicle**
   c) **Fat**
   d) **Spinal cord**
9. **Pathogenesis of which of the following disease involves 'protagon' substance:-**
   a) **Black quarter**
   b) **Tetanus**
   c) **Braxy**
   d) **Enterotoxemia**
10. **Predominant cell in pus is:-**
    a) **Lymphocyte**
    b) **Monocyte**
    c) **Neutrophil**
    d) **Eosinophil**
11. **Main pathological alteration in pox disease is-**
    a) **Hydropic degeneration**
    b) **Hyaline degeneration**
    c) **Cellular swelling**
    d) **Amyloid degeneration**
12. **Crop mycosis is caused by-**
    a) **Fungus**
    b) **Bacteria**
    c) **Virus**
    d) **Prion**
13. **Haemmorage at tip of proventriculus is main lesion in-**
    a) **Avain influenza**
    b) **IBD**
    c) **IB**
    d) **Ranikhet disease**
14. **Marek's disease is characterized by-**
    a) **Enlagement of muscles**
    b) **Enlargement of joints**
    c) **Enlargement of nerves**
    d) **Deformality in bones**
15. **Equine sarcoid is caused by-**
    a) **Paramyxovirus**
    b) **Reovirus**
    c) **Poxvirus**
    d) **Papillomavirus**
16. **Coligranuloma is associated with-**
    a) ***Salmonella spp.***
    b) ***E. coli spp.***
    c) ***Klebsiella spp.***
    d) **Viral origin**
17. **Omarthritis is inflammation of-**
    a) **Stifle joint**
    b) **Tarsal joint**
    c) **Knee joint**
    d) **Shoulder joint**
18. **Which of the following is corrected matched-**
    a) **Anthracosis- liver**
    b) **Mad itch- Se deficiency**
    c) **Free radical- unpaired electron in inner orbit**
    d) **Hepatic coccidiosis- absent in poultry.**
19. **In Zn deficiency parakeratosis is seen in-**
    a) **Swine**
    b) **Birds**
    c) **Horse**
    d) **Caprine**

20. **Identify the incorrect match-**
    a) **Mn-perosis**
    b) **Se- alkali disease**
    c) **Elephant-FMD**
    d) **Rhinoceros-FMD**
21. **Blood in sputum is termed as-**
    a) **Haemoptysis**
    b) **Haematuria**
    c) **Epistaxis**
    d) **Haemetemesis**
22. **First line of defence in inflammation is-**
    a) **Lymphocyte**
    b) **Monocyte**
    c) **Neutrophil**
    d) **Basophil**
23. **Foul smelling diarrhea containing fat is called as-**
    a) **Ceratorrhea**
    b) **Steatorrhea**
    c) **Steatitis**
    d) **Keratitis**
24. **Necrotizing myositis is feature in-**
    a) **Black leg**
    b) **Black disease**
    c) **Black Quarter**
    d) **Both a and c**
25. **Sequel of FMD is-**
    a) **Ulcer**
    b) **Hair loss**
    c) **Panting**
    d) **Myositis**
26. **Which of the following is incorrect-**
    a) **Bloody exudate- ILT**
    b) **Soft pad-Canine distemper**
    c) **Hyaluronidase-rabies**
    d) **Erythritol-Brucellosis**
27. **Sequel of canine distemper is-**
    a) **Paralysis**
    b) **Shivering**
    c) **Chorea**
    d) **Paraphymosis**
28. **Haemoglobin is expressed in-**
    a) **%**
    b) **gm %**
    c) **Cubic mm**
    d) **millions/cumm**
29. **Haematocrit is also known as-**
    a) **ESR**
    b) **PCV**
    c) **DLC**
    d) **MCHC**
30. **Programmed cell death is called as-**
    a) **Necrosis**
    b) **Autolysis**
    c) **Gangrene**
    d) **Apoptosis**
31. **Nodules of tuberculosis is example of-**
    a) **Liquifactive necrosis**
    b) **Caeseative necrosis**
    c) **Coagulative necrosis**
    d) **Fat necrosis**
32. **Which of the following organism is detected by dark field microscopy of urine-**
    a) ***Leptospira spp.***
    b) ***Brucella spp.***
    c) ***Corynebacterium spp.***
    d) ***Bacillus spp.***
33. **Inflammation of crop is called as-**
    a) **Cropitis**
    b) **Ingluvitis**
    c) **Spondylitis**
    d) **Lampas**
34. **Lumpy skin disease is caused by-**
    a) **Poxvirus**
    b) **Paramyxovirus**
    c) **Picornavirus**
    d) **Reovirus**
35. **Blue tongue virus is transmitted by-**
    a) **Contact**
    b) **Fleas**
    c) **Culex**
    d) ***Culicoides spp.***
36. **Classical example of gas gangrene is-**
    a) **Tetanus**
    b) **Braxy**
    c) **Enterotoxaemia**
    d) **Black quarter**
37. **Intracytoplasmic and intranuclear inclusions are present in-**
    a) **Rabies**
    b) **Pox**
    c) **Canine distemper**
    d) **ICH**

38. **Brooders pueumonia is caused by-**
    a) ***Aspergillusnigar***
    b) ***Aspergillusfumigatus***
    c) ***Candida albicans***
    d) ***Brucellaabortus***
39. **Bollinger bodies are feature of-**
    a) **Rabies**
    b) **Pox**
    c) **IBD**
    d) **ICH**
40. **Which of the following is not of morbilivirus genus-**
    a) **Measles**
    b) **CD**
    c) **ICH**
    d) **Rinder pest**
41. **Sway back condition is due to deficiency of-**
    a) **Se**
    b) **Cu**
    c) **Mg**
    d) **Iodine**
42. **Omphalitis is caused by-**
    a) ***Salmonella spp.***
    b) ***E. coli spp.***
    c) ***Campylobacter spp.***
    d) **None.**
43. **Main feature of chronic inflammation is-**
    a) **Infiltration of gaint cells**
    b) **Infiltration of neutrophils**
    c) **Fibrosis**
    d) **Both a and c**
44. **Hypoxia causes-**
    a) **Dyspnoea**
    b) **Apnoea**
    c) **Polypnoea**
    d) **Hyperpnoea**
45. **Vitamin C is synthesized in-**
    a) **Gall bladder**
    b) **Intestine**
    c) **Kidney**
    d) **Skin**
46. **The lack of differentiation and reversion to embroyonic type of cells is known as-**
    a) **Hyperplasia**
    b) **Aplasia**
    c) **Metaplasia**
    d) **Anaplasia**
47. **Turkey egg kidney is found in-**
    a) **Pseudorabies**
    b) **Swine fever**
    c) **Enterotoxemia**
    d) **Pasteurellosis**
48. **The large cells containing lipid material and found in xanthomas are-**
    a) **Reed-stenberg cells**
    b) **Foreign body gaint cells**
    c) **Touton giant cells**
    d) **Tumour giant cells**
49. **Blueeye in cattle is also known as-**
    a) ***Morexellabovis***
    b) **ICH**
    c) **IBH**
    d) **CD**
50. **Blueeye in dog is also known as-**
    a) **ICH**
    b) **CD**
    c) **Rubarth's disease**
    d) **Both a and c**
51. **In which of the following thrombi partial blood flow is maintained-**
    a) **Lateral thrombi**
    b) **Saddle thrombi**
    c) **Canalized thrombi**
    d) **Propagating thrombi**
52. **Lines of zahn is related with-**
    a) **Infraction**
    b) **Embolism**
    c) **Thrombosis**
    d) **Edema**
53. **Hydrosalpinx is edema of-**
    a) **Oviduct**
    b) **Ovary**
    c) **Vagina**
    d) **Peritoneal cavity**
54. **Wool sorter's disease in man is due to-**
    a) **Black quarter**
    b) **Anthrax**
    c) **Avian influenza**
    d) **Schistosomiasis**
55. **Disease transmitted by vector is-**
    a) **Rabies**

b) **Blue tongue**
c) **FMD**
d) **Fowl typhoid**

56. **Stain for amyloid in tissue is-**
a) **Congo red**
b) **Best carmine**
c) **PAS**
d) **Alcian blue**

57. **Fragmentation of nucleus is called as-**
a) **Pyknosis**
b) **Karyolysis**
c) **Karyorrhexis**
d) **Chromatolysis**

58. **Necrosis in which architectural details are preserved is-**
a) **Coagulative**
b) **Caseative**
c) **Liquefactive**
d) **Fat necrosis**

59. **Cooling of body is called as-**
a) **Cryo mortis**
b) **Algor mortis**
c) **Rigor mortis**
d) **Somatic death**

60. **Post mortem white clot is termed as-**
a) **Chicken fat clot**
b) **Current jelly clot**
c) **Thrombus**
d) **None of the above**

61. **Macrophages of brain are-**
a) **Epitheloid cells**
b) **Microglial cells**
c) **Histiocytes**
d) **Schwann cells**

62. **Which is absent in exudate-**
a) **Irritant**
b) **WBC**
c) **RBC**
d) **Platlets**

63. **Diffuse spreading suppurative inflammation of connective tissue is called as-**
a) **Abscess**
b) **Furuncle**
c) **Phlegmon**
d) **Pustule**

64. **Mucopurulent exudates means-**
a) **More mucous than pus in exudate**
b) **More pus than mucous in exudate**
c) **Both are in equal quantity**
d) **Either a or b**

65. **Which Vitamin is required in wound healing-**
a) **K**
b) **C**
c) **E**
d) **A**

66. **Chronic irritation of a cell will lead to-**
a) **Metaplasia**
b) **Hyperplasia**
c) **Hypoplacia**
d) **Anaplasia**

67. **Hypostatic congestion is more common in-**
a) **Liver**
b) **Spleen**
c) **Lungs**
d) **Brain**

68. **Pin point haemorrhage are called as-**
a) **Extravasation**
b) **Ecchymoses**
c) **Petechiae**
d) **Apoplexy**

69. **Infraction is a area of-**
a) **Only ischemia**
b) **Ischemia with liquifactive necrosis**
c) **Ischemia with coagulative necrosis**
d) **Only liquifactive necrosis**

70. **In poultry Intadermal test in T.B. is performed at-**
a) **Skin**
b) **Comb**
c) **Wattle**
d) **All of the above**

71. **Most radioresistant organ is-**
a) **Spleen**
b) **Brain**
c) **Ovary**
d) **Skin**

72. **Most susceptible species for salt toxicity is-**
    a) **Horses and swine**
    b) **Fowls and cattle**
    c) **Fowls and swine**
    d) **Sheep and swine**
73. **Slipped tendon in fowl is due to deficiency of-**
    a) **Mn**
    b) **S**
    c) **Co**
    d) **Se**
74. **Curled toe paralysis in fowl is due to deficiency of-**
    a) **Vitamin B1**
    b) **Vitamin B2**
    c) **Vitamin A**
    d) **Vitamin B12**
75. **Which of the following is incorrect-**
    a) **Foul smelling diarrhea is absent in Johne's disease.**
    b) **Fat is stained by Sudan IV**
    c) **Deposition of iron dust in tissue is called as Siderosis**
    d) **In IB chick embryo inoculation lesions are absent.**
76. **Neural lymphomatosis is main lesion in-**
    a) **IBD**
    b) **Marek's disease**
    c) **ALC**
    d) **Ranikhet disease**
77. **Main target of virus is T cell in-**
    a) **IBD**
    b) **Marek's disease**
    c) **ALC**
    d) **Ranikhet disease**
78. **Rubber jaw syndrome is seen in-**
    a) **Tumors of parathyroid**
    b) **Tumors of adrenal**
    c) **Tumors of pancreas**
    d) **Tumors of thyroid**
79. **Localized dilatation of artery is called as-**
    a) **Arteritis**
    b) **Aneurysm**
    c) **Arthritis**
    d) **Lymphangitis**
80. **Abnormal notching of erythrocytes is called as-**
    a) **Basophilia**
    b) **Crenation**
    c) **Cabot rings**
    d) **Annulosytes**
81. **Increase in number of immature neutrophils is called as-**
    a) **Shift to left**
    b) **Shift to right**
    c) **Neutrophilia**
    d) **None of the above.**
82. **Inflammation of lymph node is called as-**
    a) **Lyphangitis**
    b) **Lymphadenitis**
    c) **Both of the above**
    d) **Lymphocytosis**
83. **Dilatation of bronchus is termed as-**
    a) **Bronchitis**
    b) **Bronchostenosis**
    c) **Bronchiectasis**
    d) **Bronchopneumonia**
84. **Erythritol sugar play important role in pathogenesis of-**
    a) **Pasteurellosis**
    b) **Salmonellosis**
    c) **Brucellosis**
    d) **Campylobacteriosis**
85. **Which is example of direct zoonoses-**
    a) **Histoplasmosis**
    b) **Japanese encephalitis**
    c) **Rabies**
    d) **Taeniasis**
86. **Most common strain of FMD is-**
    a) **A**
    b) **O**
    c) **C**
    d) **Asia-1**
87. **The most indicative symptom of Hemorrhagicsepticemia is-**
    a) **Hard edema of neck**
    b) **Stop feeding**
    c) **Difficult breathing**
    d) **High temperature**
88. **Amyelia means absence of-**
    a) **Legs**

b) **Lower jaw**
c) **Cranium**
d) **Spinal cord**

89. **Swollen face in poultry is seen in-**
a) **Infectious bronchitis**
b) **Infectious coryza**
c) **IBD**
d) **Ranikhet disease**

90. **Mycoplasmal disease of poultry is-**
a) **Chronic respiratory disease**
b) **Chicken infectious anemia**
c) **Infectious coryza**
d) **Avain encephalomyelitis**

91. **Avain encephalomyelitis is also known as-**
a) **Bird flu**
b) **Fowl pest**
c) **Fowl plague**
d) **Epidemic tremor**

92. **Hemorrhages at pectoral muscles are seen in-**
a) **Infectious bursal disease**
b) **Ranikhet disease**
c) **Infectious bronchitis**
d) **Pullorum disease**

93. **Which of the following statement is incorrect-**
a) **Horse is most susceptible to tetanus**
b) **Button ulcers in intestine are seen in swine fever**
c) **Pulpy kidney is found in swine fever**
d) **Overeating disease is enterotoxaemia**

94. **In which disease haemoglobinurea is not a feature-**
a) **Babesiosis**
b) **Leptospirosis**
c) **Theleriosis**
d) **None of the above**

95. **Vacuolation of neurons are seen in-**
a) **Listeriosis**
b) **Mad cow disease**
c) **Rabies**
d) **Avian encephalomyelitis**

96. **Microabscesses in brain is pathognomonic lesion in-**
a) **Gid**
b) **Listeriosis**
c) **Ranikhet disease**
d) **Bovine spongiform encephalopathy**

97. **Which of the following produces fibrinousperihepatitis in fowl-**
a) ***E. coli***
b) ***Salmonella pullorum***
c) ***Pasteurellamultocida***
d) **IBD virus**

98. **Vaccine given at the first day itself at hatchery is-**
a) **Marek's disease**
b) **Ranikhet disease**
c) **Fowl cholera**
d) **None of the above**

99. **Telescoping of intestine is called at**
a) **Volvulus**
b) **Torsion**
c) **Intusseption**
d) **Paralytic ileus**

100. PPR is also called as-
a) **Goat plague**
b) **Cattle plague**
c) **Swine plague**
d) **Sheep plague**

101. Zebra markings in intestine is seen in-
a) **Rinder Pest**
b) **PPR**
c) **Botulism**
d) **Meliodosis**

102. AvainSpirochetosis is transmitted by-
a) **Mite**
b) **Tick**
c) **Flies**
d) ***Culicoides spp.***

103. Lymphoid leucosis is also called as-
a) **Big liver disease**
b) **Big kidney disease**
c) **Big spleen disease**
d) **Splenic fever**

104. Oedema factor play important role in pathogenesis of-
a) **Botulism**

b) **Anthrax**
c) **Listeriosis**
d) **Streptococcosis**

105.Moraxella bovis causes infection in-

a) **Ears**
b) **Eyes**
c) **Foot**
d) **Skin**

106. Wooden tongue is caused by-

a) **Actinomycosis**
b) **Actinobacillosis**
c) **Spirochaetosis**
d) **Avian Tuberculosis**

107. Equine infectious anaemia is also known as-

a) **Damp fever**
b) **Malignant fever**
c) **Swamp fever**
d) **Avain nephritis**

108.In which disease virus causes destruction of neurons diffusely throughout grey matter-

a) **Equine viral arteritis**
b) **Japanese B encephalitis**
c) **Louping ill**
d) **Bovine viral diarrhea**

109. Recent outbreak of avian influenza is by which strain-

a) **H5N2**
b) **H7N1**
c) **H7N2**
d) **H5N1**

110. Biphasic fever is characteristic of-

a) **Rabies**
b) **Canine distemper**
c) **Infectious canine hepatitis**
d) **Bovine ephemeral fever**

111. Nasal granuloma in cattle is caused by-

a) ***Schistosomaspindalis***
b) ***Schistosomanasalis***
c) ***Sporothixschenckii***
d) ***Rhinosporadium spp.***

112. Psittacosis is mainly a disease of

a) **Elephant**
b) **Birds**
c) **Horse**
d) **Sheep**

113. Sequretra is Characteristic of

a) **CBPP**
b) **CCPP**
c) **Both**
d) **None of the above**

114. A disease in which cat acts as final host and intermediate host both-

a) **Trichomoniasis**
b) **Toxoplasmosis**
c) **Besnoitiosis**
d) **Sarcocytosis**

115. East coast fever is caused by-

a) ***Theileriaannulata***
b) ***Theileriaparva***
c) ***Eimeriaacervulina***
d) ***Isosporacanis***

116. Species of Eimeria causing coccidiosis in proximal part of small intestine-

a) ***Eimeriaacervulina***
b) ***Eimeriastaedie***
c) ***Eimeriacanis***
d) ***EimeriaZuernie***

117. Rhexis means-

a) **Escape of blood from a vessel by rupture of vessel**
b) **Escape of blood from a vessel through intact vessel**
c) **A type of emboli**
d) **Postmortem congestion**

118. Multiple linear mucosal haemorrhages in rectum is seen in-

a) **ALC**
b) **Ranikhet disease**
c) **Marek's disease**
d) **Infectious coryza**

119. Smallest RBC is found in-

a) **Goat**
b) **Elephant**
c) **Rat**
d) **Horse**.

120.In which outbreak at poultry farm maximum mortality of birds will be expected?

a) Ranikhet disease
b) Infectious Bronchitis
c) Infectious Lanyngiotracheitis
d) Avain Encephalomyelitis

121. Dohle's bodies are toxic granules of-

a) Macrophages
b) Eosinophils
c) Neutrophils
d) Lymphocytes

122. Tropical fever is caused by-

a) Theleriaparva
b) Theleriaannulata
c) *Babesiabovis*
d) Anaplasmacentrale

123. Edema consisting of gelatinous material in neck and brisket region seen in cattle in-

a) Black Quarter
b) Deganala disease
c) Botulism
d) Haemorrhagic Septicemia

124. Which is the main chemical mediator of inflammation-?

a) Serotonin
b) Bradykinin
c) Histamin
d) Interleukin-1

125. In Angara disease, the pathological finding is-

a) Haemopericardium
b) Hydropericardium
c) Myocarditis
d) Pneumopericardium

126. Most pathogenic species/disease affecting Snakes-

a) Pasteurellosis
b) Histomoniasis
c) Salmonellosis
d) Listeriosis.

127. Increase in number of immature lymphoid cells in blood is known as-

a) Shift to left
b) Shift to right
c) Leukemia
d) Leukocytosis

128. Spleen with diffuse Amyloidosis is known as-

a) Sago spleen
b) Bacon spleen
c) Ham spleen
d) Pulpy spleen

129. Which of the following statement is incorrect-

a) FMD doesn't occur in Elephant
b) Star grazing in chicken is due to vitamin B1 deficiency
c) Actinomycosis mostly affects hard tissues in animals
d) In Anthrax rigor mortis is absent.

130. Which of the following pair is incorrectly matched-?

a) Haemoptysis- Blood in Vomit
b) Pyelonephritis- Suppuration in kidney
c) White muscle disease- Vitamin E
d) Glanders- Mallein test

131. Which vitamin is act as anti-oxidant

a) Vit.B
b) Vit. D
c) Vit. E
d) Vit. A

132. Macrophage in spleen are known as

a) Septal cell
b) Kuffer cell
c) Alveolar cell
d) All of above

133. Macrophage laden with haemosiderin pigment

a) Kuffer cell
b) Foam cell
c) Heart failure cell
d) None of above

134. Toxic jaundice is also known as

a) Post haepatic jaundice
b) Haepatic jaundice
c) Pre haepatjc jaundice
d) Obstructive jaundice

135. Siderosis means

a) Deposition of calcium in lung
b) Deposition of iron dust in lung
c) Deposition of silicon in lung
d) Deposition of silver particle in lung

136. Van den Bergh test for obstructive jaundice

a) Direct
b) Indirect
c) Biphasic
d) Both (b) & (c)

137. In abscess which type of necrosis is seen?

a) Coagulative necrosis
b) Liquifective necrosis
c) Caseative necrosis
d) Fat necrosis

138. First change after death is
a) Algor mortis
b) Rigor mortis
c) Formation of bloat
d) Both (b) & (c)

139.Cart wheel appearance of nucleus found in
a) Plasma cell
b) Basophils
c) Eosinophils
d) Monocyte

140. Extreme elevation of leucocyte in peripheral blood is known as
a) Shift to left
b) Leukamoid reaction
c) Right shift
d) Both (a) & (c)

141.Blood in vomitus
a) Haematemesis
b) Haemoptysis
c) Epistaxis
d) Melena

142. Bleeding from the oviduct is designated as:
a) Epitaxis
b) Hemosalpinx
c) Hematocele
d) Hematemasis

143. Condition which is hereditary and sex linked in which clotting is delayed:
a) Apoplexy
b) Hemophilia
c) Brown induration
d) Epistaxis

144. Transformation of one type of cell into another is known as:
a) Dysplasia
b) Metaplasia
c) Hyperplasia
d) Aplasia

145. Capillary rupture and hemorrhage occurs due to deficiency of:
a) Vitamin B
b) Vitamin C
c) Thyroxine
d) Vitamin A

146.Healing by first intention occurs in:
a) Closed wound
b) Open wound
c) None of the above
d) All of above

147. The mass of proliferating connective tissue under scar is known as:
a) Keloid
b) Proud flesh
c) Cyst
d) Scar

148. Fibrin entraps the irritant and thus facilitates:
a) Diapedesis
b) Chemotaxis
c) Phagocytosis
d) Rhexis.

149. Black head disease is predominately a disease of-
a) Cattle caused by Parasite
b) Poultry caused by Parasite
c) Horse caused by Virus
d) Pig caused by Virus

150. Which of the following is correctly matched-?
a) Picorna virus-Ranikhet disease
b) Lumpy skin disease- Pox virus
c) Diamond skin disease-Herpes virus
d) Paramyxo virus-FMD

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ANSWERS

1. **a**
2. **c**
3. **c**
4. **a**
5. **d**
6. **b**
7. **a**

8. b
9. b
10. c
11. a
12. a
13. d
14. c
15. d
16. b
17. d
18. d
19. a
20. d
21. a
22. c
23. b
24. d
25. c
26. b
27. c
28. b
29. b
30. d
31. b
32. a
33. b
34. a
35. d
36. d
37. c
38. b
39. b
40. c
41. b
42. b
43. d
44. c
45. b
46. d
47. b
48. c
49. a
50. d
51. c
52. c
53. a
54. b
55. b
56. a
57. c
58. a
59. b
60. a
61. b
62. d
63. c
64. b
65. b
66. a
67. c
68. c
69. c
70. c
71. b
72. c
73. a
74. b
75. d
76. b
77. b
78. a
79. b
80. b
81. a
82. b
83. c
84. c
85. c
86. b
87. a
88. d
89. b
90. a
91. d
92. a
93. c
94. c
95. b
96. b
97. a
98. a
99. c
100. a
101. a

102. b
103. a
104. b
105. b
106. b
107. c
108. c
109. d
110. b
111. b
112. b
113. a
114. b
115. b
116. a
117. a
118. b
119. a
120. c
121. c
122. b
123. d
124. c
125. b
126. c
127. c
128. b
129. a
130. a
131. c
132. a
133. c
134. b
135. b
136. a
137. b
138. a
139. a
140. b
141. a
142. b
143. b
144. b
145. b
146. a
147. a
148. c
149. b
150. b

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SET-6

1. Genus salmonella is given by
   a) Robert Koch
   b) Daniel .E.salmon
   c) A.jenar
   d) R.vircho
2. Largest single reservoir of salmonella organisms
   a) Domestic poultry
   b) Cattel
   c) Camel
   d) Pig
3. Pullorum disease is also known as
   a) Bacillary white diarrhea
   b) Fowl cholera
   c) Fowl pox
   d) Avian influenza
4. Which form of pullorum disease is mainly seen in chicks
   a) Chronic
   b) Acute
   c) Sub acute
   d) Per acute
5. Which form of pullorum disease is mainly seen in adults
   a) Chronic
   b) Acute
   c) Sub acute
   d) Per acute
6. Pullorum disease is predominantly seen in
   a) Adults
   b) Chicks under 3 wk of age
   c) Chicks above 3 wk of age
   d) Grower
7. Post mortem lesion in adults in case of pullorum disease
   a) Misshapen, irregular, discoloured, cytic ova

b) Hydropericardium
c) Discoloured liver
d) All of above

8. Fowl typhoid is primarily disease of
a) chicken
b) Turkey
c) Both of above
d) Pigeon

9. Causative organisum of fowl typhoid
a) Sal. Pullorum
b) Sal.gallinarum
c) Sal.suis
d) Sal.bovis

10. Main Route of horizontal transmission of fowl typhoid
a) Orofaecal
b) Respiratory
c) Genital
d) None of above

11. Pathognomic lesion of fowl typhoid
a) Sciatic nerve become enlarge
b) Swollen wattles and combs
c) Haemorrhage in trachea
d) Liver show greenish bronze app

12. Feature of chronic fowl typhoid
a) Pericarditis
b) Turbid yellow fluid in the pericardial sac
c) Fibrin attached to the the surface of the heart
d) All of above

13. Which is intestinal carrier of paratyphoid organism
a) Rat
b) Mice
c) Both of above
d) Cattel

14. Rat and mice carry paratyphoid organism particularly
a) Sal.typhimurium
b) Sal. enteritidis
c) Both of above
d) Sal.suis

15. Sign common in paratyphoid
a) Blindness due to opacity of the cornea
b) Leg swollen
c) Conjunctivitis
d) Swollen wattles

16. Infectious coryza is caused by
a) Sal. typhimurium
b) Sal. gallinarum
c) Haemophilusparagallinarum
d) Sal. pullorum

17. Hemophilusparagallinarum also known as a:
a) Avibacteriumparagallinarum
b) Salmonella paragallinarum
c) Corynebacteriumparagallinarum
d) Bacillus paragallinarum

18. Infectious coryza mainly affect :
a) Gi tract
b) Urogenital tract
c) Respiratory tract
d) Liver

19. Factor required for growth of haemophilus
a) Haemin
b) NAD
c) X and V factor
d) All of above

20. Pathogenicity of H.paragallinarum is depends on
a) Capsule
b) Specific haemagglutination antigens
c) Both of above
d) None of them

21. Main source of infection of Haemophilusorganisum
a) Clinically affected carrier birds
b) Water
c) Feed
d) All of above

22. Sign of infectious coryza
a) Swollen heads
b) Swollen wattles
c) Seromucoid discharge from nasal and ocular orifices
d) All of above

23. Avian mycoplasmosis is caused by

a) Mycoplasma gallisepticum
b) Sal.gallinarum
c) Sal. typhimurium
d) Sal.pullorum

24. Mycoplasma sp. was probably first encountered in chicks by
a) Nelsen
b) Koch
c) Vircho
d) Jener

25. Mycoplasmosis is also known as
a) CRD
b) Air sac disease
c) Both of above
d) Aftosa

26. Which part of the poultry is affected in case of CRD
a) Upper respiratory tract
b) Lower respiratory tract
c) Beak
d) All of above

27. Characteristics feature of fowl mycoplasmosis is :
a) White fibrinous membrane on the surface of liver
b) Pericarditis
c) Perihepatitis
d) Air sacculitis

28. Avian pasturellosis is also known as
a) Fowl cholera
b) Fowl typhoid
c) CRD
d) Aftosa

29. Causative organisum of fowl cholera
a) Pasturellamultocida
b) Pasturellahaemorragica
c) Avibacteriumparagallinarum
d) None of them

30. Facial oedema and swollen wattles is a sign of _____disease
a) Fowl cholera
b) Fowl typhoid
c) CRD
d) Aftosa

31. In case of putryfication of birds in fowl cholera, Which sample is important for demonstration of organium.
a) Heart blood
b) Bonemarrow impression
c) Both of above
d) Liver

32. Which tick is transmit *Borreliaanserin*
a) Argus persicus
b) Ornithodorus
c) Otobius
d) None of above

33. Pathognomic lesion of spirochetosis
a) Carcass is emaciated
b) Spleen is enlarged upto 6 times more than normal
c) Liver is frible
d) Intestinal haemorrage

34. Which is the main sign of botulinum
a) Paralysis of wings , legs,neck
b) Swollen head
c) Enlarged spleen
d) All of above

35. Gangreneous dermatitis is mainly seen in
a) Broiler birds
b) Layer birds
c) Both of above
d) None of them

36. Characteristic sign of gangreneous dermatitis is
a) Discolouration and oedema of the skin and s/c tissues of the body including wings.
b) Wing rot
c) Both of above
d) None of them

37. Causative organisum of gangrenous dermatitis
a) Clostridium perfringens type A
b) Clostridium septicum
c) Staphylococcus aureus
d) All of above

38. Gangreneous dermatitis is also occurs due to nutritionl deficiency of
    a) Vit E
    b) Se
    c) Both a&b
    d) None of them
39. Predisposing disease of gangreneous dermatitis
    a) IBD
    b) Fowl cholera
    c) IlT
    d) All of above
40. Predisposing factor incase of necrotic enteritis
    a) Coccidial infection
    b) Dietary factor
    c) Both a and b
    d) None of the above
41. Which type of diarrhoeaseen in case of necrotic enteritis.
    a) Watery
    b) Disentry type
    c) Dark coloured
    d) Reddish coloured
42. Which part is mainly affected in case of necrotic enteritis
    a) Lower small intestine
    b) Upper small intestine
    c) Large intestine
    d) Gizzard
43. Test used for screening and identification of E.coli
    a) Eijkman's test
    b) Animal inoculation test
    c) Milk ring test
    d) Dermal test
44. Which Ag is not correlated with pathogenicity of E.coli
    a) O Ag
    b) K Ag
    c) H Ag
    d) All of above
45. Which Ag is associated with virulence of E.coli
    a) O Ag
    b) K Ag
    c) H Ag
    d) All of above
46. Which Ag is exotoxin and liberated by autolysis of somatic cells
    a) O Ag
    b) K Ag
    c) H Ag
    d) All of above
47. Fibrinious pericarditis with thick pericardial sac is characteristic feature of
    a) Colisepticemia
    b) Salmonellosis
    c) Pasturellosis
    d) Noneof them
48. Internal laying is common in case of_____
    a) Colisepticemia
    b) Egg peritonitis
    c) Fowl typhoid
    d) Fowl cholera
49. Synonym of yolk sac infection.
    a) Mushy chick disease
    b) Egg peritonitis
    c) Colisepticemia
    d) Colibacillosis
50. Which bacterial disease is most common cause of 1st wk after hatching
    a) Egg peritonitis
    b) Colisepticemia
    c) Fowl typhoid
    d) Yolk sac disease
51. Synonym of Hajarre's disease
    a) Egg peritonitis
    b) Coli granuloma
    c) Colisepticemia
    d) Unknown
52. Cause of coligranuloma
    a) E.coli
    b) Salmonella
    c) Pasturella
    d) Corynebacterium
53. Which age birds mainly affected by coligranuloma
    a) Adults
    b) Young

c) Dne day old
d) All age

54. Post mortem lesion of coligranuloma
a) Hard, yellow nodular granuloma in the mesentry
b) Hard, yellow nodular granuloma in the wall of caeca
c) Both a and b
d) None of them

55. Sign of panopthalmitis
a) Torticollis
b) Convulsion
c) Blindness
d) Not observable

56. Cause of panopthalmitis
a) E.coli
b) Salmonella
c) Pasturella
d) Corynebacterium

57. Complete destruction of retina seen in case of
a) Panopthalmitis
b) Egg peritonitis
c) Colisepticemia
d) Coligranuloma

58. Sequelae of colisepticemia
a) Synovitis
b) Panopthalmitis
c) Hepatitis
d) Myositis

59. Which orgen is affected in case of heat stock in poultry?
a) Liver
b) Kidney
c) Spleen
d) Brain

60. Which type of sign seen in brain incase of heat stock in poultry?
a) Congestion and haemorrage
b) Necrosis
c) Grangrene
d) All of above

61. Cause of prolapse of cloaca in poultry is
a) Fusariotoxins
b) Increased peristalsis in new layers.
c) Both of above
d) None of them

62. Vent Gleet is inflammation of:
a) Sub acute inflammatory condition of cloaca
b) Inflammation of crop
c) Inflammation of gizzard
d) Inflammation of proventriculous

63. Proventriculitis is :
a) Sub acute inflammatory condition of cloaca
b) Inflammation of crop
c) Inflammation of gizzard
d) Inflammation of proventriculous

64. Smothering often occurs during
a) Night
b) Day
c) Afternoon
d) All of above

65. Sign of carbone monoxide poisoning in poultry
a) Blood and lungs look like cheery red in colour
b) Necrosis in lung
c) Gangrene in ovary
d) None of them

66. Blood seen cherry red in colour in poultry in co poisoning due to
a) Formation of carbonedioxide
b) Formation of formic acid
c) Formation of carbone nitrite
d) Formation of carboxyhaemoglobin

67. Which homeopathic drug use incase of prolapse of cloaca:
a) Fusariotoxins
b) Utrogens
c) Titali
d) Podophyllum

68. Some birds stricks their head on roof causes death due to
a) Anorexia

b) Cerebral concussion
c) Asphyxia
d) Oedema

69. Infectious dermatitis also k/a
a) Red wing disease
b) Blue wing disease
c) Green wing disease
d) Yellow wing disease

70. Primary cause of infectious dermatitis may be immunosupression by:
a) IBD , Reovirus
b) Chicken anaemia agent
c) IBH
d) All of above

71. Primary cause of infectious dermatitis generally followed by:
a) Staph.aureus
b) Pox virus
c) Coccidiosis
d) All of above

72. Xanthomatosis are more commonly seen in :
a) Sexually mature birds
b) Young one
c) Growers
d) All of above

73. In xanthomatosis which substance accumulates in the skin
a) Cholesterol and fat
b) Carbohydrate
c) Protein
d) All of above

74. Which is responsible for haemorrhagic disease
a) Sulpha drugs as anticoccidialangents
b) Aflatoxin
c) Both
d) None of above

75. Which vitamine deficiency may cause Gizzard erosions occurs ?
a) Vit B_2
b) Vit C
c) Vit A
d) Vit B_{12}

76. Pendulous crop or sour crops is cause by:
a) Inherited condition
b) Hot weather
c) Moniliasis infections
d) All of above

77. Which type of lesion seen in case of visceral gout
a) Presence of whitish uric acid deposits or urates on surface of kidney, pericardium
b) Ureters are impacted and dilated with urates
c) Both of above
d) None of above

78. Which vitamins deficiency may cause visceral gout
a) Vit A
b) Vit B
c) Vit C
d) Vit D

79. Other name of Fatty liver kidney syndrome is:
a) Grey eye disease
b) Pink disease
c) Pink eye disease
d) Grey disease

80. Lesion of fatty liver kidney syndrome:
a) Pale liver and kidney due to excess amount of fat.
b) Haemorrhage in liver
c) Necrotic foci on liver
d) Enlarged bursa

81. Other name of Keratoconjunctivitis in poultry
a) Pink eye
b) Ammonia blindness of broiler
c) Nitrite blindness
d) Formaline blindness

82. Cause of keratoconjunctivitis in poultry
a) Nitric acid fumes
b) Ammonia fumes
c) Formaline fumes

d) Fungal disease

83. Howmuch concentration of ammonia in shed cause keratoconjunctivitis
    a) 10-20ppm
    b) 20-30ppm
    c) 30-40 ppm
    d) Above 50 ppm
84. Which type of toxicity is seen in case of Ochrotixin A in poultry
    a) Nephrotoxic
    b) Hepatotoxic
    c) Both
    d) Cardiotoxic
85. Ochrotoxin A is produce by which organisum
    a) Species of Aspergillus
    b) Species of penicillium
    c) Both
    d) None of above
86. Which type of toxicity is seen in case of Citrinin in poultry
    a) Nephrotoxic
    b) Hepatotoxic
    c) Both
    d) Cardiotoxic
87. Which type of lesion is seen incase of Tricothecenes
    a) Necrosis in thymus, spleen and bursa
    b) Lymphoid depletion in thymus, spleen and bursa
    c) Decreased cell- mediated immune response
    d) All of above
88. Which toxins produce by fusarium spp. affect poultry
    a) T_1
    b) T_2
    c) T_3
    d) T_4
89. Which type of embryonic sign seen incase of Vit A deficiency
    a) Early mortality of embryos
    b) Late mortality of embryos
    c) Stunting of embryos and soft bones
    d) Dwarfing of embryos
90. Which type of embryonic sign seen incase of Vit D deficiency
    a) Early mortality of embryos
    b) Late mortality of embryos
    c) Stunting of embryos and soft bones
    d) Dwarfing of embryos
91. Which type of embryonic sign seen incase of Vit B_2 deficiency
    a) Early mortality of embryos
    b) Late mortality of embryos
    c) Stunting of embryos and soft bones
    d) Dwarfing of embryos
92. Which type of embryonic sign seen incase of Vit E deficiency
    a) Early mortality of embryos
    b) Late mortality of embryos
    c) Stunting of embryos and soft bones
    d) Dwarfing of embryos
93. Coccidiosis is characterized by
    a) Necrosis of intestitis
    b) Emphysema of lung
    c) Cirrhosis of liver
    d) Haemarragic enteritis
94. One of the most parasitic disease of poultry
    a) Coccidiosis
    b) Salmonellosis
    c) Ascariosis
    d) Histoplasmosis
95. Coccidial infections is spread by
    a) Oocysts
    b) Larvae
    c) Pupae
    d) Biting flies
96. Essenteial condition s for the survivl of oocyst
    a) Moisture
    b) Oxygen
    c) Suitable temperature
    d) All of above
97. Most coccidial infections are
    a) Subclinical
    b) Clinical
    c) Both of them
    d) None of above

98. Infact most of the birds survive to the coccidiosis due to
   a) Preimmunity
   b) Postimmunity
   c) Both of them
   d) None of above

99. Species of eimeria affect the epithelium of duodenal loop-
   a) E.nacatix
   b) E.maxima
   c) E. acevulina
   d) E.brunetti

100. Species of Eimeria affects the lower small intestine , rectum , and proximal area of caeca-
   a) E. brunette
   b) E.necatrix
   c) E.acevulina
   d) E.maxima

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ANSWERS

1. b
2. a
3. a
4. b
5. a
6. b
7. d
8. c
9. b
10. a
11. d
12. d
13. c
14. c
15. a
16. c
17. a
18. c
19. d
20. c
21. a
22. d
23. a
24. a
25. c
26. b
27. a
28. a
29. a
30. a
31. c
32. a
33. b
34. a
35. a
36. c
37. d
38. c
39. a
40. c
41. c
42. a
43. a
44. c
45. b
46. a
47. a
48. b
49. a
50. d
51. b
52. a
53. a
54. c
55. c
56. a
57. a
58. a
59. d
60. a
61. c
62. a
63. d
64. a
65. a
66. d

67. d
68. b
69. b
70. d
71. a
72. a
73. a
74. c
75. d
76. d
77. c
78. a
79. b
80. a
81. b
82. b
83. d
84. c
85. c
86. a
87. d
88. b
89. a
90. c
91. d
92. b
93. d
94. a
95. a
96. d
97. a
98. a
99. c
100. a

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SET-7

1. Inflammation of lymph node is called as-
   (A) Lymphangitis
   (B) Lymphadenitis
   (C) Typhilitis
   (D) Both (A) and (B).
2. Disease of poultry which is not caused by virus is-
   (A) Chronic respiratory Disease
   (B) Infectious Bronchitis
   (C) Fowl Pox
   (D) Ranikhet Disease.
3. Bronze discolouration of Liver in poultry is caused by-
   (A) Pasteurellosis
   (B) IBD Virus
   (C) Leptospirosis
   (D) Salmonellosis
4. Fragmentation of nucleus in a cell is termed as-
   (A) Pyknosis
   (B) Karyorrhexis
   (C) Karyolysis
   (D) Chromatolysis
5. Infectious Necrotic Hepatitis in sheep is caused by-
   (A) *Leptospira sp.*
   (B) *Fasciola hepatica*
   (C) *Clostridium sp.*
   (D) *Heterakis gallinarum*
6. The animal resistant to Atherosclerosis is-
   (A) Cattle
   (B) Swine
   (C) Rabbit
   (D) Poultry.
7. Tumour which Metastasize in different organ is-
   (A) Lipoma
   (B) Angioma
   (C) Seminoma
   (D) Sqamous cell carcinoma.
8. Haemoglobinuria is seen in-
   (A) Theileriosis
   (B) Leptospirosis
   (C) Salmonellosis
   (D) Pasturellosis.
9. Who is the father of Cellular Pathology?
   (A) John Hunter
   (B) Robert Koch
   (C) Rudolph Virchow
   (D) K.Cohnhiem.
10. Pseudo Rabies is caused by-
   (A) Lyssa virus
   (B) Picorna virus
   (C) Paramyxo virus
   (D) Herpes virus.
11. Pulpy Kidney Disease is caused by-
   (A) *Clostridium perfringens*
   (B) Clostridium septicum
   (C) Clostridium novyi
   (D) *Clostridium tetani*

12. Turkey Egg Kidney is seen in-
(A) Swine Pox
(B) Swine Influenza
(C) Swine Fever
(D) Swine Erysipelas.

13. Poll evil in Horse is caused by-
(A) *Clostridium tetani*
(B) Actinomyces bovis
(C) Brucella abortus
(D) Both (B) and (C).

14. Nutritional roup in Poultry is caused due to deficiency of-
(A) Vitamin B
(B) Vitamin C
(C) Vitamin E
(D) Vitamin A.

15. Epithelial Pearls are seen in-
(A) Sebaceous cell Adenoma
(B) Squamous cell carcinoma
(C) Melanoma
(D) Venereal granuloma.

16. Blue Tongue in sheep is caused by-
(A) Herpes virus
(B) Birna virus
(C) Picorna virus
(D) Orbi virus.

17. Most common Serotype of FMD virus in India is-
(A) A
(B) C
(C) Asia-1
(D) O.

18. In which disease post mortem of carcass is prohibited?
(A) Haemorragic septicemia
(B) Rinder pest
(C) Anthrax
(D) Brucellosis.

19. Mad itch is mostly a disease of-
(A) Caprine
(B) Bovine
(C) Swine
(D) Ovine

20. Tigroid Heart is seen in cattle affected with-
(A) Bovine malignant catarrhal
(B) Botulism
(C) Bovine viral diarrhea
(D) Foot and mouth disease.

21. Wooden Tongue in cattle is seen in-
(A) Actinomycosis
(B) Botriomycosis
(C) Haemorrhagic Septicemia
(D) Actinobacillosis.

22. Mode of transmission of IBR virus is-
(A) Venereal
(B) Inhalation
(C) Both
(D) None of the above.

23. Maedi is primarily a disease of-
(A) Sheep affecting respiratory system
(B) Cattle affecting reproductive system
(C) Sheep affecting nervous system
(D) Cattle affecting nervous system.

24. Equine Plague is also called as-
(A) Equine viral arteritis
(B) Glanders
(C) Strangles
(D) African Horse sickness.

25. Sore mouth in cattle is seen in-
(A) Blue tongue
(B) Bovine malignant catarrh
(C) Rinder pest
(D) Vesicular Stomatitis

26. Disease caused by *Clostridium septicum* is-
(A) Black Quarter
(B) Enterotoxaemia
(C) Braxy
(D) Tetanus

27. Sulphur granules in yellowish pus is seen in-
(A) Glanders
(B) Strangles
(C) Staphylococcosis
(D) Actinomycosis

28. Toxins of organism causes peripheral nerve paralysis in cattle-
(A) Botulism
(B) Tetanus
(C) Both
(D) None of the above

29. Diamond skin disease is primarily a disease of-
(A) Horse
(B) Lion
(C) Sow
(D) Turkey

30. In Johne's disease, corrugation is not the feature in-
(A) Cattle
(B) Sheep
(C) Horse
(D) Both (B) and (C)

31. Most susceptible species for Haemorrhagic septicemia-
(A) Sheep
(B) Buffalo
(C) Cattle
(D) Pig

32. Erythritol sugar plays important role in pathogenesis of-
(A) *Clostridium spp.*
(B) Brucella spp.
(C) Bacillus spp.
(D) Corynebacterium spp.

33. Substance responsible for increase penetration of Lyssa virus-
(A) Hyaluronidase
(B) Erythriol
(C) Protagen
(D) Amylase

34. Crop mycosis in poultry is caused by-
(A) Bacteria
(B) Mycoplasma
(C) Fungi
(D) Virus

35. Brooder's pneumonia in poultry is caused by-
(A) *Candida albicans*
(B) Aspergillus fumigatus
(C) Haemophilus paragallinarum
(D) Pasturella multocida

36. Circling disease in cattle is caused by-
(A) *Listeria monocytogenes*
(B) Erysipelothrix rhusiopathiae
(C) Streptococcus equi
(D) Chlamydia psittacii

37. Intranuclear inclusion bodies are seen in-
(A) Pox diseases
(B) Herpes virus infection
(C) Adeno virus infection
(D) Lyssa virus infection

38. Negri bodies are seen in Rabies which are-
(A) Intranuclear
(B) Intracytoplasmic
(C) Both
(D) May be intranuclear or intracytoplasmic

39. Enlargement of Bursa of fabricius in poultry is seen in-
(A) CRD
(B) IB
(C) RD
(D) IBD

40. Zebra marking is predominant feature of-
(A) Johne's disease
(B) Tuberculosis
(C) Rinder pest
(D) Both (A) and (C)

41. CBPP differs from CCPP in-
(A) Both occur in same species
(B) Sequestra formation
(C) Mode of transmission
(D) Pathogenesis

42. Which bacterium is predisposed by *Fasiola hepatica* infestation-
(A) *Bacillus spp.*
(B) Clostridium spp.
(C) Leptospira spp.
(D) Pasturella spp.

43. Which is the most potent aflatoxin-
(A) M1
(B) M2
(C) B1
(D) B2

44. Curled toe paralysis in chicken is due to deficiency of-
(A) Vitamin B12
(B) Vitamin B1
(C) Niacin
(D) Vitamin B2

45. Mn deficiency is chicken will lead to-
(A) Pica
(B) Star grazing condition
(C) Crazy chick disease
(D) Slipped Tendon

46. Phosphorous deficiency in soil will predispose the cattle to-
(A) Haemorrhagic septicemia
(B) Botulism
(C) Anthrax
(D) Mucosal disease

47. Black head disease is predominately a disease of-
(A) Cattle caused by Parasite
(B) Poultry caused by Parasite
(C) Horse caused by Virus
(D) Pig caused by Virus

48. Which of the following is correctly matched-
(A) Tubercular lesions are calcified-Buffalo
(B) Johne's disease-Foul smelling diarrhea
(C) Avian spp.- Dry pus
(D) Lamb dysentery- Clostridium perfringens type D

49. Post mortem of chick shows foul smelling yellow-brown watery Yolk, fibrinous perihepatitis and pericarditis, suspect the disease
(A)Infectious Coryza
(B) Fowl Typhoid
(C) Coli Bacillosis
(D) Infectious Bronchitis

50. Haemorrhages at the tip of the proventricular gland is the pathognomic lesion seen in-
(A)Ranikhet disease
(B) Chronic respiratory disease
(C) Infectious bursal disease
(D) Avian influenza

51. Which of the following is not correctly matched-?
(A) Zn deficiency-Pig
(B) Epidemic tremor-Virus
(C) Siderosis-silica dust
(D) Alkali disease-Se

52. Pachymeningitis is inflammation of-
(A) Piamater
(B) Brain
(C) Duramater
(D) Spinal cord

53. Liquifactive necrosis is most commonly seen in-
(A) Kidney
(B) Liver
(C) Heart
(D) Brain

54. Which of the following is correctly matched-?
(A) Picorna virus-Ranikhet disease
(B) Lumpy skin disease- Pox virus
(C) Diamond skin disease-Herpes virus
(D) Paramyxo virus-FMD

55. Enlargement of Sciatic nerve is seen in-
(A) Ranikhet disease
(B) Marek's disease
(C) Chronic respiratory disease
(D) Infectious Coryza

56. Apennosis is-
(A) Intracellular edema of epidermis
(B) Congenital lack of feathers in fowl
(C) Absence of pineal gland
(D) Lack of cell differentiation during embryogenesis

57. Which is incorrect about avain tuberculosis-?
(A) Calcification absent
(B) Liver and bones are most commonly affected
(C) Lungs are most commonly affected
(D) Intradermal test is performed on wattle.

58. Post mortem of cattle reveals too much emaciated carcass,mucosa of intestine thrown into corrugated folds, most probable cause will be-
(A) Rinder pest
(B) Johne's disease
(C) Tuberculosis
(D) Pasterellosis.

59. Spondylitis is inflammation of-
(A) Prepuce
(B) Vertebrae
(C) Bone
(D) Spermatic cord

60. Which of the following is correct regarding poultry diseases-?
(A) In pullorum disease, green constant diarrhea is seen
(B) Face is swollen and edematous in Haemophilus infection
(C) Bloody mucous expelled from trachea in Infectious Bronchitis
(D) In pullorum disease, nervous signs are seen along with diarrhoea

61. In which outbreak at poultry farm maximum mortality of birds will be expected?
(A) Ranikhet disease
(B) Infectious Bronchitis
(C) Infectious Lanyngiotracheitis
(D) Avain Encephalomyelitis

62. Dohle's bodies are toxic granules of-
(A) Macrophages
(B) Eosinophils
(C) Neutrophils
(D) Lymphocytes

63. East coast fever is caused by-
(A) *Theleria parva*
(B) Theleria annulata
(C) Babesia bovis
(D) *Anaplasma centrale*

64. Edema consisting of gelatinous material in neck and brisket region seen in cattle in-
(A) Black Quarter
(B) Deganala disease
(C) Botulism
(D) Haemorrhagic Septicemia

65. Which is the main chemical mediator of inflammation-?
(A) Serotonin
(B) Bradykinin
(C) Histamin

(D) Interleukin-1

66. Big liver disease is also known as-
(A) IBD
(B) CRD
(C) Fowl cholera
(D) Fowl typhoid

67. In Angara disease, the pathological finding is-
(A) Haemopericardium
(B) Hydropericardium
(C) Myocarditis
(D) Pneumopericardium

68. In Left side heart failure, the heart failure cells are seen in-
(A) Lungs
(B) Heart
(C) Kidney
(D) Spleen

69. Sway back condition is seen due to deficiency of-
(A) Cu
(B) Co
(C) Mn
(D) Se

70. Most pathogenic species/disease affecting Snakes-
(A) Pasteurellosis
(B) Histomoniasis
(C) Salmonellosis
(D) Listeriosis.

71. Increase in number of immature lymphoid cells in blood is known as-
(A)Shift to left
(B) Shift to right
(C) Leukemia
(D) Leukocytosis

72. Oval and nucleated RBC's are present in-
(A) Parrot
(B) Cobra
(C) Camel
(D) Both (A) and (B)

73. Spleen with diffuse Amyloidosis is known as-
(A) Sago spleen
(B) Bacon spleen
(C) Ham spleen
(D) Pulpy spleen

74. Which of the following statement is incorrect-
(A) FMD doesn't occur in Elephant
(B) Star grazing in chicken is due to vitamin B1 deficiency
(C) Actinomycosis mostly affects hard tissues in animals
(D) In Anthrax rigor mortis is absent.

75. Which of the following pair is incorrectly matched-?
(A) Haemoptysis- Blood in Vomit
(B) Pyelonephritis- Suppuration in kidney
(C) White muscle disease- Vitamin E
(D) Glanders- Mallein test

76. Which vitamin is act as anti-oxidant
(A) Vit.B
(B) Vit. D
(C) Vit. E
(D) Vit. A

77. Localized loss of melanin
(A) Vitiligo
(B) Leucoderma
(C) Acanthosis nigricans
(D) All of above

78. Macrophage in spleen are known as
(A) Septal cell
(B) Kuffer cell
(C) Alveolar cell
(D) All of above

79. Macrophage laden with haemosiderin pigment
(A) Kuffer cell
(B) Foam cell
(C) Heart failure cell
(D) None of above

80. Toxic jaundice is also known as
(A) Post haepatic jaundis
(B) Haepatic jaundis
(C) Pre haepatjc jaundis
(D) Obstructive jaundis

81. Siderosis means
(A) Deposition of calcium in lung
(B) Deposition of iron in lung
(C) Deposition of silicon in lung
(D Deposition of silver particle in lung

82. Van den Bergh test for obstructive jaundice
(A) Direct
(B) Indirect
(C) Biphasic
(D) Both (B) & (C)

83. In abscess which type of necrosis is seen?
(A) Coagulative necrosis
(B) Liquifective necrosis
(C) Caseative necrosis
(D) Fat necrosis

84..First change after death is
(A) Alger mortis
(B) Rigor mortis

(C) Formation of bloat
(D) Both (B) & (C)

85..Inflammation of crop
(A) Blephritis
(B) Ingluvitis
(C) Typhlitis
(D) Gonitis

86.Cart wheel appearance of nuclease found in
(A) Plasma cell
(B) Basophils
(C) Eosinophils
(D) Monocyte

87..Extreme elevation of leucocyte in peripheral blood is known as
(A) Shift to left
(B) Leukamoid reaction
(C) Right shift
(D) Both (A) & (C)

88.Blood in vomitus
(A) Haematamiasis
(B) Haemoptysis
(C) Epistaxis
(D) Melena

89. Bleeding from the oviduct is designated as:
A) Epitaxis
B) Hemosalpinx
C) Hematocele
D) Hematemasis

90. Condition which is hereditary and sex linked in which clotting is delayed:
A) Apoplexy
B) Hemophilia
C) Brown induration
D) Epistaxis

91. Transformation of one type of cell into another is known as:
A) Dysplasia
B) Metaplasia
C) Hyperplasia
D) Aplasia

92. Capillary rupture and hemorrhage occurs due to deficiency of:
A) Vitamin B
B) Vitamin C
C) Thyroxine
D) Vitamin A

93. Healing by first intention occurs in:
A) Closed wound
B) Open wound
C) None of the above
D) All of above

94. The mass of proliferating connective tissue under scar is known as:
A) Keloid
B) Proud flesh
C) Cyst
D) Scar

95. Fibrin entraps the irritant and thus facilitates:
A) Diapedesis
B) Chemotaxis
C) Phagocytosis
D) Rhexis

96. Biliary cirrhosis is also known as:
A) Multi nodular cirrhosis
B) Nodular cirrhosis
C) Monolobular cirrhosis
D) All of above

97. Pulmonary adenomatosis is characterized by:
A) Hyperplasia of epithelium
B) Hypertrophy of epithelium
C) Both of the above
D) None of above

98. Nucleus becoming smaller and condensed is called
A) Necrosis
B) Pyknosis
C) Chromatolysis
D) Keratolysis

99. Closure of lumen of hollow organ is called:
A) Fissure
B) Hypoplasia
C) Atresia
D) Sinus

100. Serum gives Direct Van Den Bergh test in
A) Diabetes
B) Obstructive jaundice
C) Hemorrhage
D) Toxic jaundice

ANSWER KEY: VETRINARY PATHOLOGY

1. B **2. A** **3. D** **4. B** **5. C** **6. A** **7. D** **8. B** **9. C**

10. D **11. A** **12. C**

13. D **14. D** **15. B**

16. D **17. D** **18. C**

19. C **20. D** **21. D**

22. C **23. A** **24. D**

25. D **26. C** **27. D**

28. A **29. C** **30. D**

31. B **32. B** **33. A**

34. C **35. B** **36. A**

37. C **38. B** **39. D**

40. C **41. B** **42. B**

43. C **44. D** **45. D**

46. B **47. B** **48. C**

49. C **50. A** **51. C**

52. C **53. D** **54. B**

55. B **56. B** **57. C**

58. B **59. B** **60. B**

61. C **62. C** **63. A**

64. D **65. C** **66. A**

67. B **68. A** **69. A**

70. C **71. C** **72. D**

73. B **74. A** **75. A**

76. C **77. B** **78. A**

79. C **80. B** **81. B**

82. A **83. B** **84. A**

85. B **86. A** **87. B**

88. A **89. B** **90. B**

91. B **92. B** **93. A**

94. A **95. C** **96. C**

97. C **98. B** **99. C**

100. B

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SET-8

1. Other name of aspergillosis in poultry
   a) Brooder pneumonia
   b) Interstitial pneumonia
   c) Suppurative pneumonia
   d) None of above
2. Multiple yellow white pin head sized nodules scattered throughout the lung tissue is seen in:
   a) Flavus

b) Aspergillosis
c) Moniliasis
d) Histoplasmosis

3. Moniliasis is caused by
   a) Moniliaalbicans
   b) Candida albicans
   c) Both
   d) None of above
4. Turkish towel appearance in crop is seen in case of:
   a) Flavus
   b) Aspergillosis
   c) Moniliasis
   d) Histoplasmosis
5. Cause of flavus
   a) Trichophytongallinae
   b) Tichomonasgallinae
   c) Moniliaalbicans
   d) Candida albicans
6. White powder like spots on the unfeathered parts of the head
   a) Flavus
   b) Aspergillosis
   c) Moniliasis
   d) Histoplasmosis
7. which parts of intestine is affected by E.necatrix
   a) Mid gut near the yolk sac diverticulum
   b) Duodenum
   c) Rectum
   d) Whole intestine
8. which parts of intestine is affected by E.preacox
   a) Mid gut near the yolk sac diverticulume
   b) Upper third of the digestive tract
   c) Rectum
   d) Whole intestine
9. Smallest oocyst liberating coccidian is
   a) E.mivati
   b) E.maxima
   c) E.burnetti
   d) E.tenella
10. Largest oocyst liberating coccidian is
    a) E.mivati
    b) E. maxima
    c) E.burnetti
    d) E.tenella
11. Which Eimeria sp. cause heavy mortality
    a) E.tenella
    b) E.praecox
    c) E.mitis
    d) All of above
12. Diptheretic enteritis is common in poultry after recovery in case of occidiosis due to:
    a) E.necatrix
    b) E. burnetti
    c) E. tenella
    d) E. maxima
13. Sequalae of coccidiosis is:
    a) Fever
    b) Cough
    c) Devastating
    d) Diarrhoea
14. Which chemical use for stored and sporulation of oocyst in coccidiosis ?
    a) Potassium dichromate at 10^0c
    b) Liquid N_2 at 196^0c
    c) Glycerin at 10^0c
    d) Fomaline at 10^0c
15. Which nematode parasite are important to poultry?
    a) Ascaridia
    b) Capillaria
    c) Hetarkis
    d) All of above
16. Which part of body affected by genus tetrameriasis
    a) Gut
    b) Respiratory tract
    c) Gi tract
    d) Liver
17. Largest round worm of poultry that stay in the intestinal tract
    a) Ascardiagalli
    b) Hetrakisgallinae
    c) Caillariaannulata
    d) Capillariacontorta
18. Caecal worm of chicken :

a) Ascardiagalli
b) Hetrakisgallinae
c) Capillariaannulata
d) Capillariacontorta

19. Which organisms spread the infection in the poultry
a) Fly
b) Snail
c) Earthworm
d) Ticks

20. Capillaria species are stay in the which part of body of birds:
a) Oesophagus
b) Crop
c) Both
d) None of the above

21. Hair like worms of poultry:
a) Ascardia sp.
b) Hetarkis sp.
c) Strongylus sp.
d) Capillaria sp.

22. Which sp. Of capillaria is common in pigeons:
a) Capillariaannulata
b) Capillariacontorta
c) Capillariaobsignata
d) All of above

23. Bright red worms seen are seen in glandular stomach of poultry is
a) Capillaria sp.
b) Ascardia sp.
c) Hetarkis sp.
d) Tetrameriasis

24. Intermediate hosts of tetramere Americana are:
a) Grasshopper
b) Cockroaches
c) None of them
d) All of above

25. How Fowl is infected with Tetramere Americana?
a) By ingestion of snail
b) By ingestion of food
c) By ingestion of grass hopper and cockroaches
d) All of above

26. Orgen of poultry in which Acuariidae species inhabited
a) Gizzard
b) Proventriculus
c) Duodenum
d) Crop

27. Birds infected with Acuariidae sp. Often seen
a) Ulcer in the proventriculus
b) Ulcer in the lung
c) Ulcer in the kidney
d) None of them

28. Parasites causes the condition of gapes in birds
a) Syngamus tracheae
b) Strongylus vulgaris
c) Schistosomanasale
d) Ascardiagalli

29. Tracheal worm of poultry is
a) Strongylusvalgaris
b) Schistosomanasale
c) Syngamus tracheae
d) Ascardiagalli

30. Who is acts as a transport hosts of Syngymus tracheae
a) Earth worm
b) Grosshoppers
c) Cockroaches
d) Snail

31. Red nematode worm of trachea of poultry is
a) Schistosomanasale
b) Strongylusvalgaris
c) Syngamus trachea
d) Hetrakisgallinae

32. Trematodes of skin of poultry
a) Collyriclumfaba
b) Echinostomarevolutum
c) Prosthogonimusmacrorchis
d) Philopthalmusgalli

33. Trematode of intestine of poultry

a) Collyriclumfaba
b) Echinostomarevolutum
c) Prosthogonimusmacrorchis
d) Philopthalmsgalli

34. Inter mediate hosts of Echinostomarevolutum is
a) Snails
b) Fishes
c) Tad poles
d) All of above

35. Prosthogonimus sp. is found in which orgen of fowl
a) Bursa, Oviduct
b) Liver, Bursa
c) Kidney, Liver
d) Brain, Heart

36. Intermediate host of Prosthogoimus sp.
a) 1^{st} water snail and 2^{nd} dragon fly
b) 1^{st} dragon fly and 2^{nd} water snail
c) 1^{st}coccaroch and 2^{nd} snail
d) 1^{st} snail and 2^{nd}coccaroch

37. Trematode of kidney of poultry
a) Collyriclumfaba
b) Echinostomarevolutum
c) Eucotylenephritica
d) Philopthalmsgalli

38. Trematode of Blood vessels of poultry
a) Collyriclumfaba
b) Echinostomarevolutum
c) Eucotylenephritica
d) Billharziellapolonica

39. Which vein of poultry affected by Billharziellapolonica
a) Abdominal veins
b) Portal veins
c) Both
d) Messenteric vein

40. Trematode of eye of poultry
a) Collyriclumfaba
b) Echinostomarevolutum
c) Philopthalmusgalli
d) Billharziellapolonica

41. Trematodes of Respiratory System of poultry:
a) Collyriclumfaba
b) Typhlocoelumcucumarinum
c) Philopthalmusgalli
d) Billharziellapolonica

42. Nodular taeniasis is caused by
a) Railliteniaechinobothridia
b) Davaineaproglottina
c) Philopthalmusgalli
d) Billharziellapolonica

43. Which type of intestinal lesion seen in case of Railliteniaechinobothridia infestation?
a) Fibrosis and nodular appearance to the intestine
b) Haemorragic enteritis
c) Haemorrage in ilium
d) Rectal prolepse

44. Which type of embryonic sign seen incase of Vit B_2 deficiency
a) Dwarfing of embryos
b) Embryos show oedema
c) Clubbing down
d) All of above

45. Which type of embryonic sign seen incase of Pantothenic acid deficiency
a) Early mortality of embryos
b) Late mortality of embryos
c) Abnormal feathering development
d) Dwarfing of embryos

46. Which type of embryonic sign seen incase of Biotin acid deficiency
a) Skeletal deformities
b) Oedema of embryo
c) Perosis and haemorrhage
d) Development of faulty spine and limb

47. Which type of embryonic sign seen incase of Vit B_{12} deficiency
a) Skeletal deformities
b) Oedema of embryo
c) Perosis and haemorrhage
d) Development of faulty spine and limb

48. Which type of embryonic sign seen incase of Manganese deficiency
a) Skeletal deformities
b) Oedema of embryo
c) Perosis and haemorrhage
d) Development of faulty spine and limb

49. Which type of embryonic sign seen incase of Zinc deficiency
    a) Skeletal deformities
    b) Oedema of embryo
    c) Perosis and haemorrhage
    d) Development of faulty spine and limb

50. Which type of embryonic sign seen incase of Iodine deficiency
    a) Skeletal deformities
    b) Oedema of embryo
    c) Perosis and haemorrhage
    d) Enlarged thyroid glands

51. Which condition seen incase of nicotinic acid deficiency
    a) Black tongue
    b) Star gazing
    c) Curled toe paralysis
    d) Twisted legs

52. Which condition seen incase of Thiamine deficiency
    a) Black tongue
    b) Star gazing
    c) Curled toe paralysis
    d) Twisted legs

53. Which condition is seen incase of Riboflavin deficiency
    a) Black tongue
    b) Star gazing
    c) Curled toe paralysis
    d) Twisted legs

54. Which condition is seen incase of Pyridoxine deficiency
    a) Black tongue
    b) Star gazing
    c) Curled toe paralysis
    d) Twisted legs

55. Which condition is seen incase of Biotin deficiency
    a) Black tongue
    b) Star gazing
    c) Curled toe paralysis
    d) Fattyliver kidney syndrome

56. Which condition is seen incase of Folic acid deficiency syndrome
    a) Anaemic syndrome
    b) Gizzard erosions
    c) Nutritional croup
    d) Rickets or rachitic syndrome

57. Which condition is seen incase of Vit B_{12} deficiency syndromes
    a) Anaemic syndrome
    b) Gizzard erosions
    c) Nutritional roup
    d) Rickets or rachitic syndrome

58. Which condition is seen incase of Vit A deficiency syndrome
    a) Anaemic syndrome
    b) Gizzard erosions
    c) Nutritional roup
    d) Rickets or rachitic syndrome

59. Which condition is seen incase of Vit D deficiency syndrome
    a) Anaemic syndrome
    b) Gizzard erosions
    c) Nutritional croup
    d) Rickets or rachitic syndrome

60. Which condition is seen incase of Vit D deficiency syndromes
    a) Encephalomalacia
    b) Exudative diathesis
    c) Muscular dystrophy
    d) All of above

61. Which condition is seen incase of Manganese deficiency syndromes
    a) Chodrodystrophy
    b) Femoral head necrosis
    c) Round heart disease
    d) Oil bird syndrome

62. Which condition is seen incase of Molybdenum deficiency syndromes
    a) Chodrodystrophy
    b) Femoral head necrosis
    c) Round heart disease
    d) Oil bird syndrome

63. Which condition is seen incase of Selenium deficiency syndromes
    a) Chodrodystrophy
    b) Femoral head necrosis

c) Round heart disease
d) Oil bird syndrome

64. Family of infectious laryngotrachitis
a) Herpesviridae
b) Poxviaridae
c) Picornaviridae
d) Rota virus

65. Outbreak of ILT mainly seen which age group of birds
a) 5 to 9 months
b) 21 days
c) 3 to 4 months
d) All age group

66. Predisposing factor which cause severe ILT disease.
a) Defi. of Vit A
b) Excess ammonia in atmosphere
c) Both a and b
d) Defi of B complex

67. ILT virus mainly spread by which type
a) Horizontal
b) Vertical
c) Lateral
d) All of above

68. Incubation period of ILT
a) 6 to 12d
b) 3 to 4d
c) 20 to 24d
d) Not proper

69. Characteristic feature of acute ILT
a) Torticollis
b) Dyspnoea
c) Convulsion
d) Paralysis

70. Sign of ILT
a) Moist rales
b) Birds with wide open mouths and gasping
c) Blood stain sputum
d) All of above

71. Incase of ILT lesions are mainly seen in
a) Upper respiratory tract
b) Lower respiratory tract
c) Digestive system
d) Genital system

72. Post mortem sign incase of peracute ILT
a) Haemorragictracheitis
b) Blood stain mucous in trachea
c) Both a and b
d) Caseousdiptheretic exudate

73. Post mortem sign incase of acute ILT
a) Haemorragictracheitis
b) Blood stain mucous in trachea
c) Both a and b
d) Caseousdiptheretic exudates

74. Synonym of Infectious avian encephalomyelitis
a) Aftosa
b) Epidemic tremor
c) Pink eye
d) Wattles disease

75. Which system of our body primarily affected in case of epidemic tremor
a) Peripheral nervous system of young chick
b) Central nervous system of young chick
c) Musculoskeletal system of young chick
d) Respiratory system of young chick

76. Signs seen in case of Epidemic tremor
a) Ataxia
b) Paralysis
c) Stunted growth
d) All of above

77. Causal organisum of epidemic tremor
a) Picorna virus
b) Pox virus
c) Adeno virus
d) Para maxovirus

78. Which age group birds infected will show nervous sign
a) Upto 6 week
b) Upto 3 week
c) Upto 10 week
d) All age group

79. Transmission of epidemic tremor occurs though
a) Eggs
b) Fomites
c) Mechanical carrier

d) All of above

80. Synonym of Ranikhet disease is
    a) New castle disease
    b) Doyle's disease
    c) Both a and b
    d) None of above
81. Ranikhet disease belong which group of virus
    a) Paramaxo virus
    b) Orthomaxovirus
    c) Pox virus
    d) Picorna virus
82. Activity of longest projection
    a) Haemagglutination
    b) Nuraminidase
    c) Both a and b
    d) Ability of virus enveloped to fuse with cell membrane.
83. Activity of smaller spikes
    a) Haemagglutination
    b) Nuraminidase
    c) Both a and b
    d) Ability of virus enveloped to fuse with cell membrane.
84. How many form of RD is seen in poultry flock
    a) 4
    b) 5
    c) 3
    d) 6
85. On base of virulence how many form of RD seen in poultry flock
    a) 4
    b) 5
    c) 3
    d) 6
86. Which is a form of RD on base of virulence
    a) Doyle's
    b) Lentogenic
    c) Beach's form
    d) Asymptomatic
87. Other name of Doyle's form
    a) Asiatic New Castle disease
    b) Typical Ranikhet disease
    c) Viscerotropicvelogenic
    d) All of above
88. Highly virulent form of RD
    a) Doyle's
    b) Beach 's
    c) Hitchner's
    d) Asymptomatic form
89. Which type of lesion seen incase of RD
    a) Haemorrage seen on tip of proventricular gland
    b) Haemorrage seen on caecal tonsil
    c) Haemorrage on the tracheal mucosa
    d) All of above
90. Doyle's form mainly affect
    a) Digestive tract
    b) Respiratory tract
    c) Cardiovascular tract
    d) Genital tract
91. Beach's form of ranikhet disease mainly affect
    a) Respiratory system
    b) Nervous system
    c) Both of a and b
    d) Digestive system
92. Which form of RD is neurotropic velogenic
    a) Doyle's form
    b) Beach form
    c) Hitchnner's
    d) Asymptomatic form
93. Which form of RD is pneumoencephalitic form
    a) Doyle's form
    b) Beach form
    c) Hitchnner's
    d) Asymptomatic form
94. Which form of RD is a less virulent mesogenic form
    a) Doyle's form
    b) Beach form
    c) Beaudett's
    d) Asymptomatic form
95. Which form of RD is affect pigeon.
    a) Doyle's form
    b) Beach form

c) Beaudett's
d) Asymptomatic form

96. Which stain of RD associated with Hitchner's form
a) Lentogenic strain
b) Mesognic strain
c) Velognic strain
d) None of above

97. Asymptomatic form is also known as
a) Enteric form
b) Beach's form
c) Doyle's form
d) Hitchner's form

98. Which type of sign seen in man in case of Ranikhet disease
a) Orchitis
b) Intermittent fever
c) Conjunctivitis
d) Dermatitis

99. Through which route virus enters the body
a) Respiratory
b) Intestinal
c) Both route
d) None of above

100. Characteristic lesions in case of RD
a) Haemorrage in proventriculus
b) Haemorrage in caecal tonsils
c) Ulcerarion of the caecal tonsils
d) All of the above

101. Nervous sign of Ranikhet disease
a) Paralysis of wing and legs
b) Torticollis
c) Ataxia or circular movement
d) All of above

102. Which factor able to aggravate post vaccinal reaction
a) E.coli
b) Mycoplasma gallispticum
c) Low relative humidity
d) All of above

103. Synoname of infectious bursal disease
a) Gumboro disease
b) IBD
c) Both a and b
d) IB

104. Genus of the Gumboro disease virus
a) Birnavirus
b) Paramaxovirus
c) Orthomaxovirus
d) Orbivirus

105. Which serotype of IBD affect chicken and cause pathogenicity
a) Serotype 1
b) Serotype 2
c) Serotype 3
d) Serotype 4

106. IBD exhibites in which form
a) Acute
b) Chronic
c) Both
d) None of above

107. Which age group birds usually affected with IBD
a) More than 6 wk of age
b) 6 wk of age
c) Adults
d) One day old bird

108. Which tissue is mainly affected with IBD virus
a) Lymphoid tissues
b) Nervous tissues
c) Cardiac tissues
d) All tissue

109. Which organ is mainly affected with IBD virus
a) Spleen
b) Caecal tonsil
c) Bursa
d) All of above

110. Which cells is mainly affected in case of IBD infection
a) B-lymphocyte
b) T-lymphocyte
c) Both B and T lymphocytes
d) Nerve cell

111. Most important route of IBD infection
a) Respiratory
b) Oral

c) Conjuctival
d) Genital

112. Vent pecking is commonly seen in-
a) Pox
b) IBD
c) IB
d) RD

113. Post mortem lesion in Gumboro disease
a) Haemorrage in thigh and leg
b) Haemorrage between proventiculus and gizzard
c) Both a and b
d) Haemorrage in proventriculus

114. Which type of lesion seen on bursa in Gumboro disease
a) Enlarged, inflamed ,oedematous,creamcoloured
b) Atrophies ,3 to8 after symptoms started
c) Both a and b
d) None of above

115. Which type of necrosis seen in lymphoid follicle in case of IBD
a) Coagulative necrosis
b) Caseous necrosis
c) Fat necrosis
d) Suppurative necrosis

116. Infectious bronchitis is belong to the family-
a) Coronaviridae
b) Birnaviridae
c) Picornaviridae
d) Poxviridae

117. Which organ is affected in case of infectious bronchitis
a) Respiratory tract
b) Oviducts
c) Kidney
d) All of above

118. Main site of IB virus multiplication is
a) Digestive tract
b) Respiratory tract
c) Genital tract
d) Skin

119. Which system of body mainly affected in case of IB
a) Respiratory and Digestive
b) Respiratory and urogenital
c) Respiratory and cardiovascular
d) Urogenital and cardiovascular

120. Which is most important natural host of IB
a) Turkey
b) Chickens
c) Pheasants
d) Quail

121. Reproductive signs of IB in layer
a) Shell less, misshaped eggs with watery contents
b) Gasping
c) Paralysis of wing and neck
d) Torticolis

122. 1st avian adenovirus isolated from:
a) Respiratory disease in quail (quail bronchitis)
b) Egg drop syndrome
c) Turkey haemorragic enteritis
d) Haemorragic enteritis

123. Inclusion Body Hepatitis usually which group of birds
a) Broiler
b) Layer
c) Both
d) Dual purpose

124. Which condition is mainly associated with adenovirus in avian:
a) IBH
b) EDS
c) Angara disease
d) All of above

125. Combine infection of which virus cause produce IBH infection
a) IBD +IB
b) IBD + RD
c) IBD + adenovirus
d) Adenovirus +RD +IB

126. Egg drop syndrome recognized in:
a) Netherland in 1976
b) Netherland in 1972
c) India 1976
d) India 1972

127. EDSvirus agglutinates the RBCs of
   a) Chicken
   b) Duck
   c) Turkey
   d) All of above
128. EDS virus is naturally occuring in which birds
   a) Ducks
   b) Geese
   c) Both a and b
   d) Fowl
129. 1st sign of manifestation of classsical EDS is :
   a) Sudden fall in production that is occur around peak egg production
   b) Thin shell eggs
   c) Misshaped eggs
   d) All of above
130. Ascitic syndrome consist:
   a) Right ventricle failure
   b) Pulmonary hypertension
   c) Portal hypertension
   d) All of above
131. Some time outbreak of Ascities may follow which disease
   a) IB
   b) IBD
   c) Respiratory Aspergillosis
   d) RD
132. Angara disease also called as
   a) Hydropericardium syndrome
   b) Hydroperitonitis syndrome
   c) Encephalitic disease
   d) Muscular disease
133. Angora disease 1st reported in:
   a) India 1987
   b) Pakistan 1987
   c) Sri Lanka 1987
   d) Bangladesh 1987
134. Which lesion is seen in Chicken infectious anemia
   a) Anemic lesion
   b) Hypertrophy of kidney
   c) Mucous in trachea
   d) Decolouration of kidney
135. Which lesion is not a seen in CIA
   a) Haemorrhage in skin, proventriculus, on heart
   b) Atrophy of Thymus, Spleen, Bursa
   c) Lymphoid depletion
   d) Hydropericardium
136. Principle sites of CIA virus appears is:
   a) B cells
   b) Epithelial cells
   c) T cells
   d) All of above
137. Which is not a immunosuppressive disease
   a) CIA
   b) MD
   c) IBD
   d) Avian pox disease
138. Aplastic pale bonemarrow is seen in which disease of poultry.
   a) MD
   b) CIA
   c) Pox virus
   d) RD
139. In which age group birds not seen any clinical sign in CIA
   a) Chick
   b) Adults broiler
   c) Adults layer
   d) None of above
140. Other name of Infectious stunting syndrome
   a) Pale birds syndrome
   b) Mal absorption syndrome
   c) Infectious runting
   d) All of above
141. From these which is not a syndrome of Infectious stunting syndrome
   a) Runting and stunting syndrome
   b) Helicopter feathering
   c) Osteoporosis
   d) None of above
142. Broken and displaced primary feathers on the head and neck (Helicopter feather) is feature of :

a) Infectious stunting syndrome
b) Inclusion body hepatitis
c) Marek's disease
d) Avian influenza

143. Which is significant feature in stunted syndrome
a) Enlarged liver
b) Atrophied bursa
c) Pale shanks
d) Swollen head

144. Osteodystropathies is common in broiler chicken of more than 2 week of age.
a) Infectious stunting syndrome
b) Inclusion body hepatitis
c) Marek's disease
d) Avian influenza

145. Characteristic feature of lymphoid leucosis:
a) Enlargement of liver by diffuse or nodular infiltration of lymphoblasts.
b) Swollen liver
c) Swollen head
d) Haemorragic enteritis

146. Large number of immature red cells are presents in the blood
a) Lymphoid leucosis
b) Myeloblastosis
c) Myelocytomatosis
d) Erythroid leucosis

147. In which condition seen Morocco leather appearance in liver.
a) Lymphoid leucosis
b) Myeloblastosis
c) Myelocytomatosis
d) Erythroid leucosis

148. Lymphopoliferative disease of domestic chicken
a) IBH
b) New castale disease
c) MD
d) IB

149. Characteristic feature of ofmarek's disease
a) Mononuclear cell infiltration of peripheral nerves and also in various viscera
b) Helicopter feather
c) Swollen liver
d) Haemorragic enteritis

150. Which serotype strain of MD is vary markedly in pathogenicity
a) Sero type 1
b) Sero type 2
c) Sero type 3
d) Sero type 4

151. Which age group chicks most commonly affected with Marek's disease
a) 12 to 24 week
b) 2 week
c) Upto 6 week
d) One day old

152. MATSA is
a) Marek's disease associated tumor specific antigen
b) Marek's disease associated tumor specific antibody
c) Marek's disease associated thymus specific antigen
d) Mucosal disease associated tumor specific antigen

153. Bilateral paralysis of legs is character of which form:
a) Visceral form
b) Classical form
c) Ocular form
d) Cutaneous form

154. Cauliflower like ovary is character of which form:
a) Visceral form
b) Classical form
c) Ocular form
d) Cutaneous form

155. Pearly eyes is a characteristic of which form:
a) Visceral form
b) Classical form
c) Ocular form
d) Cutaneous form

156. Leukotic lesions in the skin are common.
a) Visceral form
b) Classical form

c) Ocular form
d) Cutaneous form

157. Enlarged sciatic nerve is characteristic of which disease
a) Mucosal disease
b) Encephalitis
c) Lymphoid leucosis
d) Marek's disease

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ANSWERS

1. a
2. b
3. c
4. c
5. a
6. a
7. a
8. b
9. a
10. b
11. a
12. a
13. c
14. a
15. d
16. b
17. a
18. b
19. c
20. c
21. d
22. c
23. d
24. d
25. c
26. b
27. a
28. a
29. c
30. a
31. c
32. a
33. b
34. d
35. a
36. a
37. c
38. d
39. c
40. c
41. b
42. a
43. a
44. d
45. c
46. a
47. b
48. c
49. d
50. d
51. a
52. b
53. c
54. d
55. d
56. a
57. b
58. c
59. d
60. d
61. a
62. b
63. c
64. a
65. a
66. c
67. c
68. a
69. b
70. d
71. a
72. c

73. d
74. b
75. b
76. d
77. a
78. a
79. d
80. c
81. a
82. c
83. d
84. b
85. c
86. b
87. d
88. a
89. d
90. a
91. c
92. b
93. b
94. c
95. c
96. a
97. a
98. c
99. c
100. d
101. d
102. d
103. c
104. a
105. b
106. a
107. b
108. a
109. d
110. a
111. b
112. b
113. c
114. c
115. a
116. a
117. d
118. b
119. b
120. b
121. a
122. a
123. a
124. d
125. c
126. a
127. d
128. c
129. a
130. d
131. c
132. a
133. b
134. a
135. d
136. c
137. b
138. b
139. b
140. d
141. d
142. a
143. c
144. a
145. a
146. d
147. b
148. c
149. a
150. a
151. a
152. a
153. b
154. a
155. c
156. d
157. d

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<u>SET-9</u>

1. Inflammation of seminal vesicles is called as-
   a) Funiculitis
   b) Orchitis
   c) Seminal vesiculitis
   d) Scirrhous cord
2. Inflammation of glans penis is called as-
   a) Balanitis
   b) Posthitis
   c) Balanoposthitis
   d) Phimosis
3. Twisting of neck with an unnatural position of the head is called as-
   a) Torticollis
   b) Scoliosis
   c) Kyphosis
   d) Lordosis
4. Bow legs condition seen in-
   a) Rickets
   b) Osteoporosis
   c) Osteomalacia
   d) None of the above
5. Test for detection of alkaline phosphatase in serum in osteoporosis is called as-
   a) Rothra's test
   b) Fouchet's test
   c) Izuka's test
   d) Any of the above
6. Inflammation of bone marrow is called as-
   a) Osteitis
   b) Periostitis
   c) Spondylitis
   d) Osteomyelitis
7. Which of the following disorder of musculoskeletal system **doesn't** causes lameness-
   a) Ring bone
   b) Spavin
   c) Splint
   d) Laminitis
8. Inflammation of hip joint is called as-
   a) Om arthritis
   b) Coxitis
   c) Gonotis
   d) Arthritis
9. Inflammation of shoulder joint is called as-
   a) Om arthritis
   b) Coxitis
   c) Gonotis
   d) Arthritis
10. Inflammation of stifle joint is called as-
   a) Om arthritis
   b) Coxitis
   c) Gonotis
   d) Arthritis
11. Chronic arthritis may be seen in fowl in-
   a) Fowl typhoid
   b) Fowl cholera
   c) Fowl pox
   d) IBD
12. Inflammation of bursa (joint) between ligamentumnuchae and atlas/axis is called as-
   a) Poll evil
   b) Fistulous withers
   c) Navicular disease
   d) Infectious synovitis
13. Inflammation of bursa (joint) between ligamentumnuchae and thorasic spine is called as-
   a) Poll evil
   b) Fistulous withers
   c) Navicular disease
   d) Infectious synovitis
14. Bursitis of carpal joint is called as-
   a) Poll evil
   b) Bog spavin
   c) Hygroma
   d) Synovitis
15. Bursitis of hock joint is called as-
   a) Poll evil
   b) Bog spavin
   c) Hygroma
   d) Synovitis
16. Example of acute non-suppurative myositis is-
   a) Black quarter
   b) Strangles
   c) Glanders
   d) All of the above
17. Death in myoglobinuria is due to-
   a) Asphyxia
   b) Renal insufficieny leading to uremia
   c) Toxemia

d) Jaundice

18. Hassel's corpuscles are present in-
    a) Thymus
    b) Thyroid
    c) Parathyroid
    d) Pineal
19. Thickening of the epidermis due to hyperplasia of the cells of malpighian layer is known as-
    a) Bulla
    b) Hyperkeratosis
    c) Dyskeratosis
    d) Acanthosis
20. Abnormal thickening of stratum granulosum layer is called as-
    a) Bulla
    b) Hyperkeratosis
    c) Dyskeratosis
    d) Acanthosis
21. Thickening of skin in which all layers of skin is affected is called as-
    a) Pachyderma
    b) Acanthosis
    c) Lichenification
    d) Erosion
22. Intracellular edema of epidermis is called as-
    a) Scales
    b) Papule
    c) Wheal
    d) Spongiosis
23. Pustular dermatitis caused by *Staphylococcus* sp. is known as-
    a) Seborrhea
    b) Impetigo
    c) Urticaria
    d) Eczema
24. Inflammation of sebaceous gland is called as-
    a) Acne
    b) Boil
    c) Carbuncle
    d) Urticaria
25. Inflammation of hair follicle is called as-
    a) Acne
    b) Boil
    c) Carbuncle
    d) Folliculitis
26. Abscess of hair follicle is called as-
    a) Acne
    b) Boil
    c) Carbuncle
    d) Folliculitis
27. Cluster of boils situated close to each other, opening on to the skin through several pores is known as-
    a) Acne
    b) Boil
    c) Carbuncle
    d) Furuncle
28. Allergic condition which is characterized by appearance of wheals on the skin is-
    a) Acne
    b) Boil
    c) Carbuncle
    d) Urticaria
29. Which is also called as 'wattle disease' in fowl-
    a) Fowl coryza
    b) Fowl plague
    c) Fowl cholera
    d) Fowl typhoid
30. Which of the following statement is correct-
    a) Demoid cyst contain skin appendages
    b) Epidermoid cyst contain skin appendages
    c) Equine sarcoid is caused by herpes virus
    d) Ranikhet disease is caused by DNA virus.
31. Constriction of pupil is known as-
    a) Mydriasis
    b) Myiosis
    c) Choroid
    d) None of the above
32. The condition in which lens of eye become opaque is called as-
    a) Cataract
    b) Coloboma
    c) Entropion
    d) Strabismus
33. Inflammation of eye lids is known as-
    a) Trichiasis

b) Blepharitis
c) Keratitis
d) Hordeolum

34. Abscess formation in meibomian glands is called as-
a) Chalazion
b) Hordeolum
c) Pannus
d) Stye

35. Infectious keratoconjuctivitis in cattle is caused by-
a) Staphylococcus aureus
b) Pseudomonas aeruginosa
c) Morexellabovis
d) *Pasteurellatularensis*

36. Inflammation of orbit is called as-
a) Cellulitis
b) Orbitis
c) Dacryoadenitis
d) Orbital cellulitis

37. Abscess formation of the follicles of an eyelid is known as-
a) Chalazion
b) Hordeolum
c) Pannus
d) Trichiasis

38. Infectious keratoconjuctivitis in sheep is caused by-
a) *Rickettsia conjuctiva*
b) *Pseudomonas aeruginosa*
c) *Morexellabovis*
d) *Pasteurellatularensis*

39. Infectious keratoconjuctivitis in fowl is caused by-
a) Rickettsia conjuctiva
b) Ricloasiaconjuctivae
c) Morexellabovis
d) IBR virus

40. Inflammation of iris and ciliary body called as-
a) Anterior uveitis
b) Iridocyclitis
c) Both of the above
d) None of the above

41. Periodic ophthalmia or equine recurrent iridocyclitis is caused by-
a) Leptospira sp.
b) Listeria sp.
c) Salmonella sp.
d) Bacillus sp.

42. The condition in which there is increase in intraocular pressure is known as-
a) Cataract
b) Anterior synechia
c) Luxation
d) Glaucoma

43. Iridocyclitis in fowl is seen in-
a) ALC
b) IBD
c) MD
d) RD

44. Appearance of giant cell is pathognomonic of-
a) Anthrax
b) Tuberculosis
c) Listeriosis
d) Pasteurellosis

45. Animal most susceptible for tuberculous meningitis is-
a) Swine
b) Cattle
c) Equine
d) Fowl

46. Animal most susceptible for tuberculous osteomyelitis is-
a) Swine
b) Cattle
c) Equine
d) Fowl

47. Lesions caused by avian strain of tuberculosis in the intestines of horse resembles-
a) Lesions of intestines in hog cholera
b) Lesions of intestines in Johne's disease
c) Lesions of intestines in salmonellosis
d) Lesions of intestine in pullorum disease

48. Epitheloid cells may fuse to form syncytial mass termed as 'symplasma stage' is seen in-
a) Paratuberculosis
b) Tuberculosis
c) Actinomycosis
d) Actinobacillosis

49. Oily nasal discharge is feature of-
    a) Strangles
    b) Glanders
    c) IBR virus
    d) All of the above
50. Punched out ulcers in lungs are seen in-
    a) Strangles
    b) Glanders
    c) Tuberculosis
    d) Pasteurellosis

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ANSWERS

1. **c**
2. **a**
3. **a**
4. **a**
5. **c**
6. **d**
7. **c**
8. **b**
9. **a**
10. **c**
11. **b**
12. **a**
13. **b**
14. **c**
15. **b**
16. **a**
17. **b**
18. **a**
19. **d**
20. **b**
21. **a**
22. **d**
23. **b**
24. **a**
25. **d**
26. **b**
27. **c**
28. **d**
29. **c**
30. **a**
31. **b**
32. **a**
33. **b**
34. **a**
35. **c**
36. **d**
37. **b**
38. **a**
39. **b**
40. **c**
41. **a**
42. **d**
43. **c**
44. **b**
45. **b**
46. **c**
47. **b**
48. **a**
49. **b**
50. **b**

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<u>SET-10</u>

1. Fluke causing diseases of veins is-
    a) Schistosomaspindalis
    b) Fasciola hepatica
    c) Paraamphistomumcervi
    d) Oesophagostomum spp.

2. Which vitamin deficiency causes metaplasia of conjunctiva and cornea-
    a) Vitamin C
    b) Vitamin B
    c) Vitamin A
    d) Vitamin K

3. Gout mostly occur in-
    a) Cattle
    b) Horses
    c) Dogs
    d) Fowl

4. Pale infract is not seen in-
    a) Lung
    b) Liver
    c) Spleen
    d) Heart

5. Commonest site of metastasis is-
- **a) Lung**
- **b) Brain**
- **c) Liver**
- **d) Kidney**

6. Epitheloid cell is modified-
- **a) Lymphocyte**
- **b) Macrophage**
- **c) Monocyte**
- **d) Eosinophil**

7. Line of Zahn seen in-
- **a) Postmortem clot**
- **b) Infarct**
- **c) Embolus**
- **d) Thrombus**

8. Anthrax in camel characteristically shows-
- **a) Hemorrhagic enteritis**
- **b) Extremely enlarged liver**
- **c) Lymphadenitis**
- **d) S/c edema along with ventral part of body**

9. Rinderpest produces following type of enteritis-
- **a) Fibrinous**
- **b) Hemorrhagic**
- **c) Serous**
- **d) Suppurative**

10. Kidney worm found in cysts in perirenal tissue-
- **a) Single worm**
- **b) Always in pair**
- **c) Always in two pair**
- **d) Not present in peri-renal tissue, present in kidney**

11. Which of the following is incorrectlymatched-

a) Glycogen- Best Carmine

b) Amyloid- Best Carmine
- **c) Fat- Sudan IV**
- **d) Amyloid- Congo Red**

12. Mycoplasma in poultry causes-
- **a) Fowl typhoid**
- **b) Fowl cholera**
- **c) Fowl plague**
- **d) CRD**

13. Chronic inflammation of Spermatic cord is called as-
- **a) Scirrhous cord**
- **b) Funiculitis**
- **c) Spermatitis**
- **d) Corditis**

14. For histopathology of tissues they are fixed in-
- **a) 10% formalin**
- **b) 10% nitric acid**
- **c) 5% formalin**
- **d) Distilled water**

15. For histopathology of Bone or calcified tissue they are decalcified in-
- **a) 5% sodium nitrate**
- **b) 5% nitric acid**
- **c) 10% formalin**
- **d) 5% sulphuric acid**

16. Tubercular nodules doesn't calcified in-
- **a) Pig**
- **b) Cattle**
- **c) Dog**
- **d) Fowl**

17. Tumor of enamel tissue of tooth is called as-
- **a) Admentinoma**
- **b) Odontoma**
- **c) Teratoma**
- **d) None of the above.**

18. Which of the following is not a tumor-
- **a) Teratoma**
- **b) Mastocytoma**
- **c) Granuloma**
- **d) Lipoma**

19. Lesions seen in Liver in Fowl cholera are-
- **a) Severe ecchymotic hemorrhage**
- **b) Multiple pin point necrotic foci**
- **c) Severe large infracts on liver**
- **d) None of the above.**

20. Typical Lesion of Black Quarter-
- **a) Crepitating sound of thigh muscle**
- **b) Wooden tongue**
- **c) Cysts in muscles**
- **d) Muscular dystrophy**

21. Telangiectasis is a

a) Haematoma
b) Cavernous angioma or tumour of newly formed blood vessel
c) Mass of dilated previously existing blood vessels
d) Cancer metastasis

22. Proctitis is inflammation of-
a) Anus
b) Prostate gland
c) Perineal gland
d) Caecum

23. The accumulation of purulent exudates in the body cavity is known as-
a) Hydrothorax
b) Pneumothorax
c) Chylithorax
d) Empyema

24. The primary pathological lesion produced by Brucellaovis infection in rams is:
a) Seminal vesiculitis
b) Epididymitis
c) Orchitis
d) Balanoposthitis

25. In the central nervous system, oligodendroglia are primarily concerned with:
a) Initiation of nervous impulses
b) Regulation of fluid and electrolyte balance
c) Formation and maintenance of myelin
d) Phagocytic activity

26. The characteristic muscle lesion of blackleg (Clostridium chauvoei) is:
a) Necrotizing myositis
b) Degenerative myopathy
c) Muscular hypertrophy
d) Intestinal oedema with no muscle lesion

27. Fatty change mainly affects the:
a) Nucleus
b) Cytoplasm
c) Nucleolus
d) Mitochondria

28. Themostimportant method of spread of Brucellaabortus among cattle is:
a) Ingestion
b) By coitus
c) Both
d) Respiratory

29. Which one of these findings would be of greatest assistance in establishing a diagnosis of enterotoxaemia in a sheep found dead?
a) A fibrin clot in the pericardial sac and autolysed kidneys
b) Many large gram negative rods arranged singly in smears of the mucosa of the small intestine
c) Severs acute pulmonary oedema
d) *Cl. perfringens* type D toxin in the small intestine as determined by ELISA tests

30.Which one of the following organisms is frequently isolated from lesions resembling tuberculosis in the submaxilliary lymph nodes of pigs?
a) *Streptococci* Group E
b) *Staphylococcus aureus*
c) *Pasteurellamultocida*
d) Rhodococcus (*Corynebacterium*) *equi*

31. Sleepy foal disease is an acute highly fatal septicaemia of new born foals characterize by kidney micro abscesses. The causative organism is:
a) Actinobacillusequuli
b) Rhodococcus (Corynebacterium) equi
c) Streptococcus equi
d) Salmonella typhimurium

32. Infectious avian encephalomyelitis virus causes disease with nervous signs in domestic fowl:
a) 1-4 weeks of age
b) 12-18 weeks of age
c) older than 25 weeks
d) of any age provided that they are not immune

33. In dogs with hepatocellular necrosis, which is most likely to be increased in serum?
a) Albumin
b) Bilirubin
c) Alkaline phosphatase (ALP)
d) Alanine aminotransferase (ALT)

34. Which causes secondary absolute appropriate erythrocytosis?
a) Dehydration
b) Polycythemia vera
c) Splenic contraction
d) Right-to-left cardiac shunt

35. A morphologic feature of autophagy is:
a) Organelle swelling
b) Nuclear fragmentation
c) Pericellular neutrophils
d) Cytoplasmic intravacuolar whorls

36. In a 12-week-old rat with multifocal lymphohistocytic interstitial pneumonia and perivascular lymphoid cuffing, the most appropriate diagnosis is:
a) Sendai viral infection
b) Rat coronaviral infection
c) Rat respiratory viral infection
d) *Mycoplasma pulmonis*infection

37. In lambs, which one is most affected in Type O Foot and Mouth Disease?
a) Feet
b) Teats
c) Heart
d) Mouth

38. An effector caspase is:
a) Caspase 1
b) Caspase 2
c) Caspase 3
d) Caspase 4

39. *Chlamydophilacaviae*in guinea pigs causes:
a) Fibrinous polyarthritis
b) Necrotizing placentitis
c) Granulomatous enteritis
d) Seropurulent conjunctivitis

40. In cattle, *Cryptosporidiaandersoni*causes:
a) Ulcerative colitis
b) Necrotizing enteritis
c) Proliferative enteritis
d) Proliferative abomasitis

41. In dogs with chronic kidney disease and renal secondary hyperparathyroidism, all are increased EXCEPT:
a) Serum calcitriol
b) Serum phosphorus
c) Urine protein:creatinine
d) Serum parathyroid hormone levels

42. In BAL fluid from sheep infected with Maedi-Visna virus, which increases with disease severity?
a) Percentage of eosinophils
b) Percentage of neutrophils
c) Percentage of lymphocytes
d) Percentage of macrophages

43. Disease of poultry which is not caused by virus is-
a) Chronic respiratory Disease
b) Infectious Bronchitis
c) Fowl Pox
d) Ranikhet Disease.

44. Canine have more _____ than lymphocytes-
a) Monocytes
b) Eosinophils
c) Neutrophils
d) Basophils

45. In rotavirus infection sample collected in sterile vial for confirmation is-
a) Fecal sample
b) Serum
c) Lung
d) None.

46. Hydropic degeneration leads to _____ formation.
a) Papule
b) Vesicle
c) Pustule
d) Scab.

47. Watery yolk with caseous material in bronchi is seen in-
a) IB
b) ILT
c) EDS-76

d) Hydropercardium syndrome.

48. Turkish Towel appearance of crop with ulcers are seen in-
a) Candidiasis
b) Aspergillosis
c) Histoplasmosis
d) Mycoplasmosis.

49. White mouldy growth with accumulations of cheesy material in air sac are characteristic lesion of-
a) Candidiasis
b) Aspergillosis
c) Histoplasmosis
d) Mycoplasmosis.

50. Microabscess in brain seen in-
a) Salmonellosis
b) Fowl cholera
c) Rabies
d) Listeriosis.

****

ANSWERS

1. a
2. c
3. d
4. a
5. a
6. b
7. d
8. d
9. a
10. b
11. b
12. d
13. a
14. a
15. b
16. d
17. a
18. c
19. b
20. a
21. c
22. a
23. d
24. b
25. c
26. a
27. a
28. c
29. d
30. a
31. a
32. a
33. d
34. d
35. d
36. c
37. c
38. c
39. d
40. d
41. a
42. c
43. a
44. c
45. a
46. b
47. a
48. a
49. b
50. d

****

1. Punched ulcers in abomasums of cattle are characteristic of :

a. *Theilaria annulata*
b. *Babesia bigemina*
c. *Haemonchus contortus*
d. *Ostertagia ostertagi*

2. Typical sign of ripened abscess is

a. Swelling

b. Pain

c. Fluctuation

d. Pointing

3. Operation flood I was launched during

(a) 1960

(b) 1970

(c) 1980

(b) 1982.

4. When world environmental day celebrated…..

a) 15th June
b) 5th July
c) 15th July
d) 5th June

5. Right side displacement of abomasums is usually caused after

a) Immediately postpartum

b) 2-4 weeks postpartum

c) During gestation
d) 9-12 months postpartum

6. The term that refers to the percentage of packed erythrocytes per unit volume of blood is the:

a. Differential Count
b. Hemoglobin
c. Hematocrit
d. Hemopoiesis

7. Which of the following enzymes are present in the acrosome of the bovine sperm?

a. Trypsin
b. Adenylate cyclase
c. Phospholipase C (PLC)
d. Acrosin

8. Which of the following is the smallest compartment of the ruminant stomach?

a. Rumen

b. Reticulum

c. Omasum

d. Abomasum

9. Blood is added in blood medium agar at following concentration:

a) 5-10 %
b) 15 %
c) 20 %
d) 2 %

10. The 5 carbon sugar compound present in DNA molecule is:

a. Erythrose
b. Deoxyribose
c. Ribose
d. Ribulose

11. Study of birds which are not classed as poultry is known as

a. Poultry Science
b. Ornithology
c. Bird Science
d. Poultry Production

12. Inhibition of aggregation of platelets

a) Aspirine

b) Urokinase

c) Thromboxane A2

d) Streptokinase

13. Gajrai grass is the fodder grass belong to group

a. Seasonal
b. Annual
c. Perennial
d. None

14. Which of the following will be the number of chromosomes in the sperm of a Sahiwal bull?

a) 30

b) 60

c) 50

d) 25

15. Skim milk powder is a byproduct of

a) Industrial

b) Grain

c) Cereal

d) Roughage

16. East coast fever in cattle is caused by :

(a) Theileria
(b) Trypanosoma
(c) Babesia
(d) None

17. Wound does not heal is known as

a. Maggot wound

b. Ulcer

c. Infected wound

d. Contaminated wound

18. 73rd amendment act 1992 was introduced to strengthen

a Dairy development

b Community development

c Panchayat development

d Co-operative development

19. CFC's are responsible for depletion of…..

a) Ozone
b) Oxygen
c) Carbon
d) Nitrogen

20. Serum calcium and phosphorus concentration in nutritional dystrophies may

a) Increase above normal level

b) decrease above normal level

c) Decrease appreciably

d) remain with-in normal range

21. Which of the following is a circulating blood cell that is capable of differentiating into a plasma cell?

a. Neutrophil
b. Basophil
c. B lymphocyte
d. T lymphocyte

22. After ovulation, which of the following is most important for the rapid movement of the oocyte to the ampular-isthmic junction of the oviduct?

a. Fluid production by the isthmus
b. Cillilary beating in the ampulla
c. Muscle contractions in the ampulla
d. The presence of cumulus cells surrounding the oocyte at ovulation.

23. Which is the hardest substance in the animal body?

a. Bone

b. Cartilage

c. Enamel

d. Dentine

24. Nucleic acid present in virus

a) DNA

b) RNA

c) Either DNA or RNA

d) Both DNA and RNA

25. The synthesis of new DNA strand on template strand takes place in the direction of:

a. 3'-5'
b. 5'-3'
c. In both the directions

d. In 3'-5' on leading strand and in 5'-3' direction on lagging strand

26. Study of birds which are classed as poultry is known as

a. Poultry Science
b. Ornithology
c. Bird Science
d. Poultry Production

27. Verapamil blocks transport of

a) Sodium ion

b) Chloride ion

c) Calcium ion

d) Potassium ion

28. Subabul is the grass originated in the country

a. Maxico
b. U. S. A.
c. Brazil
d. India

29. Genotype of purebred Rose comb hen should be

a) RrPp

b) RRPp

c) RRpp

d) rrpp

30. Example of protein is

a) Peptide

b) Amine

c) Amino acid

d) Glutamine

31. Caecal coccidiosis in fowl is due to which of the following :

(a) Eimeria precox
(b) *Eimeria mutis*
(c) *Eimeria tenella*
(d) *Eimeria brunetti*

32. The main cause of death in case of burn during latter stage is

a. Hypovolemia

b. Blood loss

c. Asphyxia

d. Secondary infection

33. Ranching is common practice in

(A) India

(B) Australia

(C) Japan

(D) USA

34. Humidity is measured by…..

a) Luxmeter
b) Dry bulb thermometer
c) Wet bulb thermometer
d) Chlorinometer

35. Increase survival rate of S. pullorum infected chick embryo is achieved by drug

a) Chloramphenicol

b) Furazolidon

c) Oxytetracycline

d) Colistin

36. The component of plasma responsible for maintaining the osmotic pressure of blood is:

a. Plasmin
b. Albumin
c. Fibrinogen
d. Gamma globulin

37. Following artificial insemination in the cow, increased retrograde flow will occur if semen is placed in which of the following locations?

a. Cervix
b. Uterine body
c. Uterine horn, at the greater curvature (half way up the uterine horn)
d. At the distal tip of the uterine horn

38. Which is the largest foramen in the skull?

a. Foramen magnum

b. Supraorbital foramen

c. Infra orbital foramen

d. Mantel foramen

39. Short hair like projections for attachment and genetic transfer in bacteria are:

a) Flagella

b) Fimbria

c) Plasmid

d) All

40. The autonomously replicating extra-chromosomal double stranded DNA molecule present in bacteria is called:

a. Plasmid
b. Episome
c. Phage
d. Transposon

41. Modern chicken are descendents of the which following wild species

a. *Gallus soneratti*
b. *Gallus lafeyetti*
c. *Gallus varius*
d. *Gallus gallus*

42. The most appropriate anticoagulant used for collection of blood for blood glucose estimation

a) Sodium EDTA

b) Sodium fluoride

c) Heparin

d) Sodium oxalate

43. Swath curing is the method apply to

a. Cutting the crop
b. Hay making
c. Silage making
d. Straw making

44. The strength of selection is expressed as

(a) Coefficient of selection
(b) Response to selection
(c) Selection differential
(d) None

45. Inflammation of lymph node is called as-

(A) Lymphangitis

(B) Lymphadenitis

(C) Typhilitis

(D) Both (A) and (B).

46. Example of NPN is

a) Albumin

b) Amino acid

c) Prolamine

d) Lignin

47. Example of anaerobic protozoa is :

(a) Leishmania
(b) Trichomonas
(c) Trypanosoma
(d) None of the above

48. Last stage of wound healing is

a. Wound contraction

b. Epithelization

c. Fibroplasia

d. Vasodilatation

49. The approach in which people have their say in programmed planning is

(A) Democratic

(B) Authoritative

(C) Directive

(D) Laissez-faire

50. The metal should not be used for storage of rain water is…..
    a) Iron
    b) Galvanized iron
    c) Lead
    d) Copper

51. Virion of avian infectious bronchitis has a shape of

    a) Globules with cilia

    b) crown like projection

    c) Oval shaped body

    d) elliptical round body

52. Plasma is:

    a. Blood that has no red blood cells
    b. The liquid portion of blood including the clotting factors
    c. The liquid portion of blood minus the clotting factors
    d. The proteins of blood

53. The concentration of sperm in the ejaculate would be highest among which of the following farm animal species?
    a. Bull
    b. Ram
    c. Boar
    d Stallion

54. Which of the bone is the hardest bone in the animal body?

    a. Femur

    b. Tibia

    c. Petrous temporal

    d. Humerus

55. The term antibiotic was first used by:

    a) Domagk

    b) Fleming

    c) Waksman

    d) Robert Koch

56. The scientists associated with discovery of "restriction endonucleases":
    a. Lederberg
    b. Kelly & Smith
    c. Dulbecco
    d. Korenberg

57. National Institutes of Nutrition (NIN) to Government of India has recommended eggs and poultry meat consumption per capita per annum are
    a. 18 eggs and 9 kg of poultry meat
    b. 180 eggs and 0.90 kg of poultry meat
    c. 180 eggs and 9.0 kg of poultry meat
    d. 180 eggs and 11.0 kg of poultry meat

58. Receptors of CTZ stimulated by centrally acting emetics are

    a) α_1

    b) α_2

    c) β_1

    d) Dopamine

59. For ensiling the fodder crop should contain moisture percent
    a. 40 to 50
    b. 50 to 60
    c. 65 to 70
    d. 70 to 75

60. What will be the phenotypic ratio in progenies from a cross between creeper and normal fowl

    a) 1:1

    b) 3:1

    c) 9:7

    d) 2:1

61. DCP content of Guinea grass

    a) 50%

    b) 5%

    c) 15%

d) 1%

62. Disease of poultry which is not caused by virus is-

(A) Chronic respiratory Disease

(B) Infectious Bronchitis

(C) Fowl Pox

(D) Ranikhet Disease.

63. Wild game is reservoir host for which parasite :

(a) Trypanosoma evansi
(b) Taenia
(c) Entamoeba histolytica
(d) Coccidia

64. The best treatment of fistula is

a. Antibiotics

b. Antibiotics and corticosteroids

c. Surgical removal

d. Counter irritants

65. In IRDP, SC/ST and physical handicapped beneficiaries are provided subsidy @

Percent

(A) 10

(B) 25

(C) 33

(D) 50

66. Among following is the safest source of drinking water…..

a) Shallow well
b) Surface water
c) River
d) Deep well

67. If vomition due to metabolic acidosis suggested fluid therapy is

a) Ringers lactate

b) Normal saline

c) Dextrose saline

d) Dextrose saline 20%

68. Excessive destruction of erythrocytes is characteristic of:

a. Thalassemia
b. Aplastic anemia
c. Pernicious anemia
d. Hemolytic anemia

69. Which of the following are examples of the maturation function in the epididymis?

a. Removal of protoplasmic droplets
b. Concentration of sperm
c. Secretion of glycoproteins by principle cells
d. Contractions of smooth muscle

70. Which of the following is tendineous linear sheet present at the abdominal floor?

a. Linea alba

b. Rectus abdominis

c. Fascia

d. Tendoachillis

71. Agar is a source of carbohydrate to:

a) Most of the bacteria

b) Only a few bacteria

c) None of the bacteria
d) All the bacteria

72. The acquisition of DNA molecule by bacterial cells from environment is called:

a. Transformation
b. Transduction
c. Conjugation
d. None

73. First poultry show was held at Boston in the year

a. 1838
b. 1870

c. 1861
d. 1849

74. Agar acts as a

a) Cathartics

b) Emollient purgative

c) Bulk purgative

d) Osmotic purgative

75. Mango seed kernel is the byproduct of industry

a. Canning industry
b. Oil industry
c. Gluten industry
d. None

76. Proportion of Roan polled progenies from a cross between Red polled (Pp) and white polled (Pp) cow will be

a) 0.25

b) 0.50

c) 0.75

d) 0.60

77. Bronze discolouration of Liver in poultry is caused by-

(A) Pasteurellosis

(B) IBD Virus

(C) Leptospirosis

(D) Salmonellosis

78. Rich source of carbohydrates

a) Barley
b) Bone meal
c) Cotton seed
d) Dub grass

79. Tape worm increases in which of the following :

(a) Liver
(b) Caecum
(c) Small intestine
(d) None

80. Typical sign of moist gangrene of tail is

a. Erected hairs

b. Immobility of tail

c. Swelling

d. Cold to touch

81. In First five year plan ---------- programmed was started for development of animal Husbandry common alone

(A) Operation flood I

(B) Key village scheme

(C) ICDP

(D) Gosadan

82. Causative agent of undulant fever is…..

a) Br. abortus
b) Br. melitensis
c) Br. suis
d) *Br. Equi*

83. Coughing up of blood is termed as

a) Haematemesis

b) Epistaxsis

c) Metrorrhagia

d) Haemoptysis

84. A hematocrit of 80 would be considered:

a. Polycythemia
b. Anemia
c. Thrombocytopenia
d. Leukemia

85. The ATP produced by sperm goes towards which of the following?

a. Motility
b. Maturation of sperm
c. Lysis of corona radiate
d. Transcription and translation

86. Which of the following is the longest ligament in the animal body?

a. Broad ligament

b. Umbilical ligament

c. Supraspinatous ligament

d. Caudate ligament

87. Bacteria that grow at 50-55^0 C are known as:

a) Psychrophiles
b) Mesophiles
c) Thermophiles
d) Halophiles

88. The ability of the cell to acquire DNA from environment is called:

a. Competence
b. Compatibility
c. Interference
d. None of the above

89. Per capita availability of poultry eggs and meat are respectively

a. 44 nos. and 17.6 kg.
b. 176 nos. and 44 kg.
c. 44 nos. and 1.76 kg.
d. 176 nos. and 4.4 kg

90. Acid rebound effect is observed with

a) Sodium bicarbonate

b) Sodium citrate

c) Sodium chloride

d) Potassium iodide

91. Rotational stocking is the method of

a. Storage of feed
b. Feeding of animal
c. Grazing of animal
d. Management of pasture

92. The cross over percentage ranges between

a) 80 -100 %

b) 50 -100 %

c) 0- 50 %

d) 50 – 80 %

93. Fragmentation of nucleus in a cell is termed as-

(A) Pyknosis

(B) Karyorrhexis

(C) Karyolysis

(D) Chromatolysis

94. Concentrate is a feed containing more than % TDN

a) 20

b) 10

c) 60

d) 30

95. Triangular and pyriform apparatus like cooked rice grain present in egg of :

(a) Moniezia sp.
(b) Hymenolepsis nana
(c) Dipylidium sp
(d) Taenia sp.

96. Common site of occurrence of haematoma in dog is

a. Ear

b. Eyelid

c. Tail tip

d. Digit

97. Prime goal of state department of animal husbandry and dairying is to provide ------- - To the farmers

(A) Subsidy

(B) Input

(C) Service

(D) Semen

98. The causative agent of hydatidious is…..
a) Echinococcus granulosa
b) Diphylobothrium spp.
c) Taenia solium
d) *Taenia saginata*

99. Ptyakusn is

a) Excessive secretion from brunners gland

b) Excessive salivation

c) Decrease secretion from salivary gland

d) Decrease secretion of succus entericus

100. During hemoglobin recycling in the spleen, heme is initially converted into:

a. Bilirubin
b. Stercobilin
c. Urobilin
d. Urobilinogen

101. Failure of the blood testis barrier would directly prevent
a. Stem cell renewal.
b. Spermatocytogenesis.
c. Meiosis.
d. Spermiogenesis.

102. Which of the following is unpaired skeletal muscle present in the animal body?

a. Diaphragm

b. Bicepbrachii

c. Popliteus

d. Quadriceps femoris

103. Nucleic acid not found in plasmids is:

a) DNA

b) RNA

c) either DNA or RNA

d) Both DNA and RNA

104. First Genome sequenced was of
a. Bacteriophage λ
b. Bacteriophage φ X 174
c. Haemophilus influenza
d. Homo sapiens

105. Total contribution of poultry production to the National GDP of India is nearly
a. 1.0 %
b. 0.1 %
c. 10 %
d. 8 %

106. Which one of the following is a rate limiting step in adrenaline synthesis?

a) Tyrosine to DOPA

b) DOPA to Dopamine

c) Dopamine to Nor-adrenaline

d) None of the above

107. The synonym of Anjan grass is
a. Dhaman
b. Shevari
c. Ghamar
d. Jinjavo

108. Slow and fast feathering trait in poultry is

a) Sex linked
b) sex limited trait
c) sex influenced
d) autosomal

109. Infectious Necrotic Hepatitis in sheep is caused by-

(A) *Leptospira sp.*

(B*) Fasciola hepatica*

(C) *Clostridium sp.*

(D) *Heterakis gallinarum*

110. Green fodder to be ensiled should have DM between

a) 50 to 60%

b) 30 to 35%

c) 20 to 25%

d) 15 to 20%

111. All domestic animal is definitive host for which of the following :

(a) Moniezia sp. .
(b) Hymenolepsis nana
(c) Dipylidium sp
(d) Taenia sp.

112. The best suture material for peritoneum in dog is

a. Catgut # 1

b. Catgut # 1/0

c. Catgut # 2

d. Catgut # 3

113. Programmed is the statement of situation ---- problem and solution

(A) Physical resources

(B) Objectives

(C) Planning

(D) Goal

114. Sellar's staining technique is used for diagnosis of…..

a) Rabies
b) Brucellosis
c) Listeriosis
d) Tuberculosis

115. Tympany of diaphragmatic hernia is

a) Recurrent

b) Persistent

c) Both 1and 2

d) None of the above

116. All of the following conditions impair coagulation except:

a. Vascular spasm
b. Vitamin K deficiency
c. Severe hypocalcaemia
d. Liver disease

117. Spherical bodies, weighing 0.45 – 0.9 kg, attached to the placenta of a normal calf comprising of an outer skin enclosing a mass of adipose connective tissue is known as

a) Perosomus elumbis
b) Amorphus globosus
c) Otter calf
d) Schistosomus reflexus

118. Which one of the following is the longest nerve in the animal body?

a. Vagus

b. Sciatic

c. Femoral

d. Median

119. Disposable articles are best sterilized by:

a) Hot air oven

b) Autoclave

c) Gamma radiation

d) Alcohol

120. First bacterial genome sequenced was of

a. Salmonella typimurium
b. Bacillus anthracis
c. Pseudomonas aeruginosa
e. Haemophilus influenza

121. Female Hen has a following set of chromosomes

a. Xx
b. Xw
c. Zz
d. Zy

122. Which of the following drugs is used in treating digitalis arrhythmia?

a) Lignocaine

b) Quinidine

c) Procainamide

d) None of the above

123. *Medicago sativa* is the botanical name of

a. Alfalfa
b. Berseem
c. Guar
d. Cowpea

124. Stage of cell division in which chiasmata formation takes place is

a) Metaphase I

b) Pachytene

c) Diakinesis

d) Anaphase

125. The animal resistant to Atherosclerosis is-

(A) Cattle

(B) Swine

(C) Rabbit

(D) Poultry.

126. Lucerne hay contains % TDN

a) 10

b) 30

c) 20

d) 50

127. In which tape worm, uterus is long transverse and dumble shape :

(a) Stilesia hepatica
(b) Thysanosoma actinoides
(c) Thysaneizia giardia
(d) Anaplocephala magna

128. Which of the following is unpaired skeletal muscle present in the animal body?

a. Diaphragm

b. Bicepbrachii

c. Popliteus

d. Quadriceps femoris

129. Which one of the following is the longest nerve in the animal body?

a. Vagus

b. Sciatic

c. Femoral

d. Median

130. Which of the following is the largest nerve in the animal body?

a. Radial

b. Sciatic

c. Femoral

d. Median

131 Which one of the following nerve supplying to blood vessel?

a. Vasomotar

b. Sensory

c. Mixed

d. Motar

132. Which of the following is a spindle shaped glandular stomach of the bird?

a. proventriculus

b. fundic part

c. Gizzard

d. pyloric part

133. In modern smoke house, we can control

a) Temperature

b) Moisture

c) Flavour

d) None of the above

134. Which of the following is a opening of abomasum into the duodenum?

a. Pylorus

b. cardia

c. rima oris

d. Isthmus faucium

135. Stage of cell division in which chiasmata formation takes place is

a) Metaphase I

b) Pachytene

c) Diakinesis

d) Anaphase

136. The Frequency for any class that is obtained by dividing the frequency for that class by the total number of observations is known as

(a) Class frequency

(b) Relative frequency

(c) Cumulative frequency

(d) Grouped frequency

137. The dose of a drug that kills 50 % of the population is known as

(a) ED_{50}

(b) LD_{50}

(c) KD_{50}

(d) Half life dose

138. Exchange of non homologous chromosome material is known as

a) Translocation

b) Crossingover

c) Duplication

d) Synapsis

139. The terms gene and genotype were coined by

(a) Wilson

(b) Johannsen

(c) Mendel

(d) Weisman

140. Spherical bodies, weighing 0.45 – 0.9 kg, attached to the placenta of a normal calf comprising of an outer skin enclosing a mass of adipose connective tissue is known as

a) Perosomus elumbis

b) Amorphus globosus

c) Otter calf

d) Schistosomus reflexus

141. Obturator paralysis is more common in

a) Mare

b) Cow

c) Bitch

d) ewe

142. Early insemination during estrous leads to fertilization failure due to

a) Ageing of sperms

b) Ageing of zygote

c) Ageing of ovum

d) none of above

143. The relations of the dorsum of the fetus to the quandrants of the maternal pelvis is

a) Presentation

b) Position

c) Posture

d) None of the above

144. Sterno abdominal presentation is a

a) Posterior longitudinal presentation

b) Transverse ventral presentation

c) Anterior longitudinal presentation

d) Transverse dorsal presentation

145. Balwant Ray Mehta committee was appointed by

(A) Govt. of India

(B) planning commission

(C) State govt.

(D) NGO

146. Post is example of --------aid.

(A) Visual

(B) Audio

(C) A.V.

(D) Projected

147. Who is the architect of Indian modern dairy industry?

(A) Dr. V.Kurian

(B) Dr. Amrita Patel

(C) Shree Parthi Bhatol

(D) MansiBhai

148. Operation Flood III Was Launched during

(A) 1986

(B) 1990

(C) 1992

(D) 1998

149. The synonym of Anjan grass is

a. Dhaman
b. Shevari
c. Ghamar
d. Jinjavo

150. *Medicago sativa* is the botanical name of

a. Alfalfa
b. Berseem
c. Guar
d. Cowpea

151. The nitrogen content (%) of urea fertilizer is

a. 38
b. 42
c. 46
d. 50

152. Licking of wall is the vices observed in animal due to

a. Mineral deficiencies
b. Internal parasites
c. Depraved appetite
d. All of the above

153. Wind sucking is the vice observed in the species

a. Pig
b. Cattle
c. Horse
d. None of above

154. Mediterranean chicken breeds egg shell colour is

a. Brown
b. White
c. Brown and white
d. All of above

155. American chicken breeds skin colour is

a. Brown
b. Yellow
c. White
d. Black

156. Medusa head colonies are characteristic feature of…..

a) Rickettsia spp.
b) Bacillus anthracis
c) Clostridium botulinm
d) Listeria spp.

157. Ring worm infection is caused by…..

a) Nocardia spp.
b) Trichophyton spp.
c) Candida spp.
d) Dermatophillus spp.

158. Curdling without pronounced acid production associated with milk and milk products…..

a) Sweet curdling
b) Acid curdling
c) Curdling
d) Alkaline curdling

159. Type of microbial association in which in which food chain i.e. the metabolic products of one are utilized by the other…..

a) Metabolism
b) Symbiosis
c) Fermentation

160. Which of the following breeds of class is known for egg production

a. American breed
b. Asiatic breeds
c. English breeds
d. Mediterranean breeds

161 Which of the following breeds of class has feathered shank

a. American breed
b. Asiatic breeds
c. English breeds
d. Mediterranean breeds

162. Which of the following is smallest tape worm of poultry :

(a) Ralleitina tetragona
(b) *Ralleitina echinobothridia*
(c) *Davainea proglotina*
(d) *Hymenolepis nana*

163. Indian liver fluke is which of the following :

(a) Prosthogonimum sp.
(b) *Paramphistomes sp.*
(c) *Fasciola hepatica*
(d) *Fasciola gigantica*

164. Ovary much lobulated in which of the following :

(a) Prosthogonimus sp.
(b) Paramphistomes sp.
(c) *Fasciola hepatica*
(d) *Fasciola gigantica*

165. Haemoglobinuria is seen in-

(A) Theileriosis

(B) Leptospirosis

(C) Salmonellosis

(D) Pasturellosis.

166. Who is the father of Cellular Pathology?

(A) John Hunter

(B) Robert Koch

(C) Rudolph Virchow

(D) K.Cohnhiem.

167. Pseudo Rabies is caused by-

(A) Lyssa virus

(B) Picorna virus

(C) Paramyxo virus

(D) Herpes virus.

168. Pulpy Kidney Disease is caused by-

(A) *Clostridium perfringens*

(B) Clostridium septicum

(C) Clostridium novyi

(D) *Clostridium tetani*

169. Turkey Egg Kidney is seen in-

(A) Swine Pox

(B) Swine Influenza

(C) Swine Fever

(D) Swine Erysipelas.

170. Antiseptics used for cleaning of eye is

a. Dettol

b. Boric acid

c. Tr. iodine

d. Zinc oxide

171. More than two fracture fragments with interconnecting fracture line in complete fracture is known as

a. Multiple fracture

b. Comminuted fracture

c. Depressed fracture

d. Fissure fracture

172. Pathognomic signs of fracture is

a. Crepitation

b. Pain

c. Swelling

d. Loss of function

173. Which of the following is a unicellular gland that is typically found in mucosal epithelium?

a. Neuroepithelial cell
b. Myoepithelial cell
c. Goblet cell
d. Friar cell

174. Which of the following cells is primarily responsible for the production of collagen and the amorphous ground substance in loose connective tissue?

a. Adipocyte
b. Fibroblast
c. Mast cell
d. Plasma cell

175. Which of the following describes a secretory process in which no cell membrane components or cytosolic contents are lost?

a. Merocrine
b. Apocrine
c. Holocrine
d. Endocrine

176. The matrix of connective tissue is composed of:

a. Cells, fibers, and ground substance
b. Cells and fibers
c. Fibers and ground substance
d. Cells and ground substance

177. Following is not an effect of the Ganglionic blockade

a) Dry mouth
b) Anhydrosis
c) Tachycardia
d) Vasoconstriction

178. Magnesium sulphate has following effects except

a) CNS depressant
b) Purgative
c) Muscle relaxant
d) Diuretic

179. Which one of the following is an osmotic diuretic?

a) Magnesium sulphate
b) Ethacrynic acid
c) Spironolactone
d) None of the above

180. What is the site of action of carbonic anhydrase inhibitors?

a) Throughout the length of the tubule
b) Loop of Henle
c) PCT
d) DCT

181. Viruses having Reverse transcriptase enzyme:

a) Retro virus

b) Reo virus

c) Rabies virus

d) Rota virus

182. Holoenzyme is a combination of:

a) enzyme and substrate

b) Apoenzyme and substrate

c) Apoenzyme and coenzyme

d) None of the above

183. Following statements are correct except.

a. Viruses multiply only in living cells.

b. Viral nucleic acid directs cell metabolism to synthesize viral components

c. Viruses are not able to perform their own metabolic activities.

d. Viral genetic information resides only in DNA not in RNA

184. First Genome sequenced was of
a. Bacteriophage λ
b. Bacteriophage φ X 174
c. Haemophilus influenza
d. Homo sapiens

185. First bacterial genome sequenced was of
a. Salmonella typimurium
b. Bacillus anthracis
c. Pseudomonas aeruginosa
e. Haemophilus influenza

186. First human protein produced in micro-organism was:
a. Somatostatin
b. Insulin
c. Protopin
d. None of the above

187. The intercalating dye used to visualize double stranded DNA is
a. Ethidium bromide
b. Methylene blue
c. Carbol fuchsin
d. None of the above

189. The concentration of double stranded DNA molecule which gives absorbance value of 1.0 at 260 nm is:
a. 33 µg/ ml
b. 40 µg/ ml
c. 50 µg/ ml
d. Cannot be determined on the basis of absorbance value

190. The concentration of single stranded DNA molecule which gives absorbance value of 1.0 at 260 nm is:
a. 33 µg/ ml
b. 40 µg/ ml
c. 50 µg/ ml
d. Cannot be determined on the basis of absorbance value

191. Which of the following cells lines the ventricle of the brain?

a. Ependymal cell

b. Simple squamous cell

c.simple cuboidal cell

d. Simple columner cell

192. The bony demarcation between abdominal and pelvic cavities is:

a. Pelvic outlet

b. Pelvic diaphragm

c. Plevic brim

d. Pelvic symphysis

193 In which part of the cloaca in birds, bursa of fabricus opens?

a. Urodeum

b. Proctodeum

c. Coprodeum

d. Vent

194 Which is the space between right and left pleural sac in thoracic cavity?

a. Omentum

b. Mediastinum

c. Serous sac

d. pleural sac

195 Which of the following is the largest vein in the animal body?

a. Saphenous vein

b. Posterior venacava

c. Anterior venacava

d. Mammary vein

196 Which of the following is the longest bone in birds?

a. Femur

b. Humerus

c. Tarsometatarsus

d. Tibiotarsus

197. Mendel's work was rediscovered in the year

(a) 1895

b) 1900

(c) 1905

(d) 1913

198. Holandric inheritance is characterized by

(a) Color blindness

(b) Muscular atrophy

(c) Hair in ear pinna

(d) Baldness

199. Hemophilia is a condition which is inherited as

(a) Sex linked

(b) Sex influenced

(c) Sex limited

(d) None

200. The method of sex determination in birds is

(a) XO

(b) XY

(c) ZW

(d) XA

201. Linkage between either dominant or recessive alleles is called

(a) Coupling linkage

(b) Repulsion linkage

(c) Complete linkage

(d) Incomplete linkage

202. The diploid chromosome number in chicken is

(a) 38

(b) 74

(c) 78

(d) 60

203. Wry neck is mostly seen in

a) Bovine

b) Caprine

c) Equine

d) Canine

204. Recommended fetotomy procedure in perosomus elumbis is

a) Amputation of fetal limbs

b) Bisection of pelvis

c) Transverse division of fetal trunk

d) Amputation of head and neck

205. Generally stallion attains the puberty at the age of

a) 4 to 7 months

b) 9 to 12 months

c) 12 to 24 months

d) 36 to 42 months

206. Sertoli cell tumor of the testes in dog secretes

a) Testosterone

b) Estrogen

c) Androgen

d) Prolactin

207. Dystrophia adiposogenitalis is observed in the

a) Dog

b) Stallion

c) Boar

d) Ram

208. Large number of primary sperm abnormalities are indicative of

a) Ectopic testes

b) Testicular degeneration

c) Testicular neoplasm

d) Testicular fibrosis

209. When arable farming is mixed with livestock raising it is known as

(A) Mixed farming

(B) Sole farming

(C) Co-operative farming

(D) Slate farming

210. Villagesurpanch is elected through

(A) Secret ballot paper

(B) Member

(C) Co-operative

(D) Nominated

211. AMUL system of milk marketing follows the principle of

(A) Co-operative

(B) Mutual work

(C) Subsidy purpose

(D) Service

212. GCMMF has made turnover of Rs.

(A) 5500 crore

(B) 6700 crore

(C) 5000 crore

(D) 8000 crore

213. Who is the chairman of GCMMF?

(A) Amrita patel

(B) Vipul chaudhary

(C) Parthi Bhatol

(D) Dr. Kurian

214. Rural dairy extension programmed was the part and parcel of

(A) ICDP

(B) DPAP

(C) IRDP

(D) JRY

215. Electronic identity is made in animal by

a. Electron microscope
b. Computer
c. Radium number
d. Electronic chip

216.This measurement of body has close relation with body weight in animal

a. Body length
b. Paunch girth
c. Height at wither
d. Heart girth

217.Blanketing is the practice utilize for

a. Brighter look to body coat
b. To keep hide in good condition
c. Refard hair growth
d. All of above

218.Wedge shaped body denotes

a. Beef character
b. Draught character
c. Dairy character
d. None of above

219.Colostrum feeding in the calf should be done at

a. Within two hours after calving
b. Within three days of calving
c. Within twelve hours after calving
d. None of above

220.Age at first kidding in mehsani goat breed is

a. 18 to 24 months
b. 24 to 30 months
c. 12 to 18 months
d. 30 to 36 months

221. Which state rank first in duck population

a. West Bangal
b. Assam
c. Orissa
d. Karala

222. Project Directorate on Poultry (PDP) is located at

a. Izzatnagar
b. Banglore
c. Hyderabad
d. Anand

223. Central Avian Research Institute (CARI) is located at

a. Izzatnagar
b. Banglore
c. Hyderabad
d. Anand

224. Normally which ovary & oviduct is functional in chicken

a. Right ovary and Right oviduct
b. Left ovary and Left oviduct
c. Right ovary and Left oviduct
d. Left ovary and right oviduct

225. Complete Parts of Oviduct in chronological order are

a. Infundibulum-Isthumus-Magnum-Uterus-Vagina
b. Infundibulum-Magnum-Isthumus-Uterus-Vagina
c. Infundibulum-Magnum-Isthumus-Uterus
d. Infundibulum-Magnum-Isthumus-Vagina-Uterus

226. Fertilization is take place in which part of reproductive tract

a. Ovary
b. Isthumus
c. Infundibulum
d. Uterus

227. . Chloramphenicol residues and milk products causes in consumers…..

a) Arthritis
b) Aplastic anemia
c) Blindness
d) Anorexia

228. Well established protozoan disease transmitted through milk…..

a) Cysticercosis
b) Toxoplasmosis
c) Giardiasis
d) *Salmonellosis*

229. Insecticides of group that constitute the principal health hazard to consumers of milk and milk products…..

a) Organic sulphates
b) Organic phosphates

c) Chlorinated hydrocarbons
d) Activated chlorinate

230. The following acid producing bacteria convert lactose into lactic acid in milk…..

a) Streptococcus cremoris
b) Staphylococcus aureus
c) Bacillus cereus
d) Clostridium botulinm

231. The most common bacterium causing joint pain…..

a) *Brucella*
b) *Shigella*
c) *Salmonella*
d) *Clostridia*

232. Galacto toxins in milk are produced by…..

a) Streptococci spp.
b) Contact of milk with steel vessels
c) Contact of milk with copper vessel
d) Serratia spp.

233. . Praziquental and tartar emetic is drug of choice for :

(a) Schistosoma sp.
(b) *Eurytrema sp.*
(c) *Notocotylus sp.*
(d) All of the above

234. In schistosoma which of the following statement is true :

(a) Male is longer than female
(b) Female is longer than male
(c) Female & Male are of same size
(d) None of the above

235. Flame cell is excretory system of which of the following :

(a) Trematodes
(b) Cestodes
(c) Nematodes
(d) Acanthocephala

236. Normally eggs are operculated in which of the following :

(a) Round worm
(b) Trematode
(c) Both of the above
(d) None of the above

237. Out of which of the following are unsegmented :

(a)Round worm

(b) Trematode

(c) Both of the above

(d) None of the above

238. 'Gape worm' of poultry is :

(a) Ascaridia galli
(b) Heterakis gallinarum
(c) Syngamus trachea
(d) Subulura brumpti

239. Poll evil in Horse is caused by-

(A) *Clostridium tetani*

(B) Actinomyces bovis

(C) Brucella abortus

(D) Both (B) and (C).

240. Nutritional roup in Poultry is caused due to deficiency of-

(A) Vitamin B

(B) Vitamin C

(C) Vitamin E

(D) Vitamin A.

241. Epithelial Pearls are seen in-

(A) Sebaceous cell Adenoma

(B) Squamous cell carcinoma

(C) Melanoma

(D) Venereal granuloma.

242. Blue Tongue in sheep is caused by-

(A) Herpes virus

(B) Birna virus

(C) Picorna virus

(D) Orbi virus.

243. Most common Serotype of FMD virus in India is-

(A) A

(B) C

(C) Asia-1

(D) O.

244. In which disease post mortem of carcass is prohibited?

(A) Haemorragic septicemia

(B) Rinder pest

(C) Anthrax

(D) Brucellosis.

245. The water used for moistening of POP cast should range between

a. 30-35℃

b.10-20 ℃

c. 20-25 ℃

d. 40-45 ℃

246. The best procedure for complete diaphyseal fracture of tibia in bullock is

a. POP

b. Hanging pin cast

c. Walking cast

d. Thomas splint

247. If fracture is stabilized with rigid fixation the clinical union occur at

a. 15-20 days

b.20-30 days

c.40-50 days

d.80-100 days

248. Typical radiographic sign of osteo-arthritis is

a. Increased joint space

b. Decreased joint space

c. Irregular joint space

d. Irregular joint space with new bony growth

249. The radiographic signs of non union is

a. Radiolucency between fragments

b. Increased radio density of either fragments

c. Placement of fragments side by side

d. Rounding of both fragments

250. The radiographic diagnosis of intestinal obstruction is done by using

a. Barium sulphate

b. Conray -420

c. Urographin

d. Ipamidol

251. . Holocrine secretion:

a. Occurs in sebaceous glands
b. Occurs in endocrine glands
c. Involves little or no loss of cytoplasm
d. All of the above

252. The site of production of cholecystokinin and secretin is the:

a. Stomach
b. Pancreas
c. Small Intestine
d. Large Intestine

253. Alkaline mucous glands are found in the submucosa of the:

a. Ileum
b. Jejunum
c. Duodenum
d. Cardiac region of the stomach

254. The gallbladder:

a. Produces bile
b. Is attached to the pancreas
c. Stores and concentrates bile
d. Produces cholecystokinin

255. Which of the following sphincters is under voluntary control?

a. Pyloric
b. Hepatopancreatic
c. Internal anal
d. External anal

256. At the junction between the esophagus and the stomach, the epithelial lining changes abruptly from _____ to _____.

a. Nonkeratinized stratified squamous; simple columnar
b. Simple columnar; nonkeratinized stratified squamous
c. Nonkeratinized simple squamous; stratified columnar
d. Stratified columnar; nonkeratinized simple squamous

257. Which one of the following has maximum natriuretic effect?

a) Spironolactone
b) Frusemide
c) Mannitol
d) Acetazolamide

258. The following is not an indication of PGF2 alpha

a) Synchronization of oestrus
b) Cystic ovaries
c) Persistent corpus luteum
d) Induction of abortion

259. In which of the following animals emetics are not used?

a) Rats
b) Cattle
c) Horse
d) All of the above

260. Which of the following drugs produces only laxative effect even with increase in dose?

a) Magnesium sulphate
b) Anthraquinone
c) Castor oil
d) Liquid paraffin

261. One of the following is not a salt of bunamidine used against cestodial infestation in animals.

a) Bunamidine P-toluene sulphonate

b) Bunamidine hydrochloride

c) Bunamide sodium

d) Bunamidine hydroxynaphthoate

262. Source of bacitracin is

a) *Streptomycin rimosus*

b) *Bacillus subtilis*

c) *Streptomyces aureqfaciens*

d) *Bacillus polymyxa*

263. The most effective chemical disinfectant to kill FMD virus is:

a. 2 % formalin

b. 70 % alcohol

c. 2 % Sodium hydroxide

d. 0.5 % phenol

264. Hendra and Nipah viruses belong to the family:

a. Paramyxoviridae

b. Orthromyxoviridae

c. Picornaviridae

d. Parvoviridae

265. Clinical manifestation of canine parvovirus infection is/are:

a. Mycocarditis in pups

b. Haemorrhagic diarrhea
c. Leukopenia

d. All of above

266. Bluetongue virus has:

a. 20 serotypes

b. 24 serotypes

c. 7 serotypes

d. 9 serotypes

267. Find the wrong match:

a. Borrel bodies- Fowl pox
b. Guarneri bodies- small pox
c. Negribodies- Rabies
d. All are correct

268. Bovine diarrhea virus belongs to the family

a. Flaviviridae

b. Reoviridae

c.Togaviridae

d.Rhabdoviridae

269. Viral triad include

a. Rinder pest virus, Measles virus and Canine distemper virus

b. Rinder pest virus, Mumps virus, Measles virus

c. Measles, mumps and Rubella viruses

d. Rinder pest virus, Reo virus and Rhabdo virus

270. The concentration of single stranded RNA molecule which gives absorbance value of 1.0 at 260 nm is:

a. 33 µg/ ml
b. 40 µg/ ml
c. 50 µg/ ml
d. Cannot be determined on the basis of absorbance value

271. The 260/280 nm ratio of pure DNA sample should be:

a. Less than 1.8
b. 1.8
c. More than 1.8
d. 3.0

272. The 260/280 nm ratio less than 1.8 for a DNA sample reflects:

a. Protein contamination
b. RNA contamination
c. Both
d. None

273. Oligo dT attached to resin is used for the column based isolation of

a. Prokaryotic DNA
b. Eukaryotic DNA
c. Prokaryotic m-RNA
d. Eukaryotic m-RNA

274. The chemical that can be used for precipitation of DNA is:

a. Ethyl alcohol
b. Isoamyl alcohol
c. Phenol
d. None

275. The chemical method of DNA sequencing is:

a. Maxam Gilbert method
b. Sanger method
c. Both
d. None

276. Which of the following is a oval articular projection?

a. Condyle

b. Trochlea

c. Head

d. Facet

277. Which of the following is a ventricle of hind brain?

a. Third ventricle

b. Fourth ventricle

c. Lateral ventricle

d. None of above

278. Which of the following is a spherical shallow articular depression?

a. Glenoid cavity

b. Cotyloid cavity

c. Articular groove

d. Semilunar notch

279. The cell membranes is mainly composed of

a. a single layer of protein molecules

b. a protein bilayer

c. a phospholipids bilayer

d. a polysaccharide bilayer

280. Which organelles is the site for ATP production?

a. nucleoli

b. mitochondria

c. gogli complex

d. ribosomes

281. During which stage mitosis do the chromosomes line up in the middle of cell

a. prophase

b. anaphase

c. metaphase

d. telophase

282. Which of the following is not a connective tissue?

a. bone

b. cartilage

c. muscle

d. blood

283. The point of crossover is known as

(a) Tetrad

(b) Chiasma

(c) Synapsis

(d) Recombination

284. The The maximum probability of making Type-I error is known as

(a) Confidence interval

(b) Test of significance

(c) Level of significance

(d) Rejection region

285. Which of the following traits will show higher rate of genetic improvement under mass selection programme

a) Service period in cattle
b) Body weight at 8 week in poultry
c) Litter size in pig
d) Twinning rate in goat

286. Diallele crossing is usually practiced in

(a) Cattle
(b) Sheep
(c) Race horse
(d) Poultry

287. Marker assisted selection is more effective for traits of

(a) High heritability
(b) Low heritability
(c) Medium heritability
(d) Both b) and c)

288 'Operation Flood' scheme was operated by

(a) NDDB, Anand
(b) NDRI, Karnal
(c) IVRI, Izatnagar
(d) NDRI, Bangalore

289. Inbreeding would more severely affect

(a) Pre weaning gain in sheep
(b) Litter size in pig
(c) Fat % in cow
(d) Mature body weight in doe

290. Smooth muscle around spermatic cord to help in thermoregulation of testes is

a) Tunica dartos

b) Cremester muscle

c) Pampiniform plexus

d) Gubernaculum

291. Mitochondria concentrates close to the axoneme and forms the

a) End piece of the tail

b) Neck of the sperm

c) Mid piece of the tail

d) Annulus

292. Unnatural tactile stimulation and ejaculation is known as

a) Onanism

b) Coolidge effect

c) Pederasty

d) Balling up

293. A complete series of cellular associations along a seminiferous tubule

a) Spermatogenic wave

b) Spermiostasis

c) Spermiogenesis

d) Cycle of seminiferous epithelium

294. Terminology used for the high per cent of abnormal sperms

a) Teratozoospermia

b) Aspermia

c) Asthenozoospermia

d) Necrozoospermia

295. Inability to withdraw the penis back in to the prepuce

a) Paraphimosis

b) Posthitis

c) Phimosis

d) Preputial prolapse

296. Effect of novelty of stimulus females reduces refractory period in males is known as

a) Balling up effect

b) Coolidge effect

c) Bruce effect

d) Pederasty

297. Sabarmati Ashram gosala founded in

(A) 1815

(B) 1925

(C) 1915

(D) 1945

297. Central council of Gosamverdhan was started

(A) 1952

(B) 1955

(C) 1958

(D) 1960

298. State farming is managed by

(A) NGO

(B) Govt.

(C) People

(D) Middlemen

299. NDRI is located at

(A) Jaipur

(B) Kernel

(C) Jabalpur

(D) Cochin

300. CSWRI is located at

(A) Avikanagar

(B) Izzatnagar

(C) Modinagar

(D) Mathura

301. In mixed farming income from main enterprise is

(A) 49%

(B) 50%

(C) 60%

(D) 70%

302. NDDB was established in the year

(A) 1965

(B) 1955

(C) 1975

(D) 1985

303. Crone is the synonym of the

a. Young sow
b. Broken mouth sow
c. Old aged ewe
d. Ewe with loss of teat

304.The average life span of horse is (Years)

a. 2.5 to 18 Years
b. 3 to 16 Years
c. 3 to 15 Years
d. 3 to 12 Years

305.Sunandini is the cross bred developed from

a. Local cattle Kerala
b. Local cattle Karnataka
c. Sahiwal
d. Tharparkar

306.Simmental is the breed of cow belong to breed

a. Exotic dairy cow
b. Exotic beef cow
c. Indigenous dairy cow
d. Indigenous beef cow

307.This breed not belong to mysore type cattle group

a. Burgur
b. Alambadi
c. Khillari
d. Nimari

308.Buffalo in philipines is known as

a. Kerban
b. Shin nive
c. Arana
d. Carabao

309. This buffalo breed is come under endangered categories

a. Bhadawari
b. Jafarabadi
c. Banni
d. Jerangi

310. The inner surface of which section of oviduct is lined with goblet cell that secrete albumen

a. Isthumus
b. Magnum
c. Uterus
d. Infundibulum

311. Doubled yolked egg is more common in

a. Older birds
b. Pullet
c. Both a and b
d. None of above

312 Hens usually moult in the which following

order

a. Head-Neck-Body-Wing-Tail
b. Head- Neck-Wing-Body-Tail
c. Tail-Wing-Neck-Head-Body
d. Tail-Wing-Body-Neck-Head

313 The order of disappearance of pigment (bleaching) from body in

a. Vent-Eye ring-Ear lobes-Beak-Shanks
b. Vent- Beak- Eye ring-Ear lobes-Shanks
c. Shanks-Beak-Ear lobes-Eye ring-Vent
d. Vent-Shanks-Beak-Ear lobes-Eye ring

314 The pigment fist leaves those structures having

a. Poor blood circulation
b. Best blood circulation
c. No correlation with blood circulation
d. Both a and b

315 The urophygial gland is located on dorsal area of

a. Tail
b. Back
c. Head
d. Neck

316 Most chicken breeds have how many number of toes on each foot

a. Four
b. Three
c. Five
d. Two

317. Immediate test to judge the quality of milk…..

a) Electro impedance method
b) Alcohol test
c) Organoleptic tests
d) Sediment test

318. *Psychrophils* of significance in milk hygiene is/are…..

a) Pseudomonas
b) Listeria monocytogenes
c) Both a and b
d) None of the above

319. Cold sterilization means…..

a) Sterilization at low temperature
b) Sterilization by radiations
c) Flash pasteurization
d) None of the above

320. Anthrax is also called as…..

a) Splenic fever
b) Desert fever
c) Undulant fever
d) All of the above

321. *Trichinella* cyst can be destroyed by…..

a) Salting
b) Smoking
c) Both of the above
d) None of the above

322. Scrapie is a…..

a) Progressive fatal disease of CNS
b) Disease of young animals
c) The causal agent is antigenic
d) All of the above

323. Knott's technique is a concentration method for detection of following parasite in blood

(a) Trichomonas spp.

(b) Trypanosoma evansi
(c) Microfilariae
(d) All above

324. Which parasite cause destruction of host tissue by breakage of lymph vessels :

(a) Chiggers
(b) Filarids
(c) Strongylus
(d) Ascarids

325. *Oxyuris equi* in horse found in which of the following :

(a) Small intestine
(b) Caecum, colon
(c) Oesphagus
(d) Caecum, colon, rectum

326. Presence of eggs of the *Oxyuris equi* can be diagnosed by which of the following :

(a) Faeces
(b) Perianal swab
(c) Both of the above
(d) None of the above

327. Alimentary canal present in which of the following :

(a) Trematodes
(b) Cestodes
(c) Nematodes
(d) Acanthocephala

328. Which of the following is the kidney worm of dog :

(a) Trichuris sp.
(b) Capillaria sp.
(c) Seteria digitata
(d) Dioctophyma renale

329. In which egg are lemon shaped and with plug on both side of egg :

(a) Trichuris sp.
(b) Capillaria sp.
(c) *Seteria digitata*
(d) *Dioctophyma renale*

330. Mad itch is mostly a disease of-

(A) Caprine

(B) Bovine

(C) Swine

(D) Ovine

331. Tigroid Heart is seen in cattle affected with-

(A) Bovine malignant catarrhal

(B) Botulism

(C) Bovine viral diarrhea

(D) Foot and mouth disease.

332. Wooden Tongue in cattle is seen in-

(A) Actinomycosis

(B) Botriomycosis

(C) Haemorrhagic Septicemia

(D) Actinobacillosis.

333. Mode of transmission of IBR virus is-

(A) Venereal

(B) Inhalation

(C) Both

(D) None of the above.

334. Maedi is primarily a disease of-

(A) Sheep affecting respiratory system

(B) Cattle affecting reproductive system

(C) Sheep affecting nervous system

(D) Cattle affecting nervous system.

335. Equine Plague is also called as-

(A) Equine viral arteritis

(B) Glanders

(C) Strangles

(D) African Horse sickness.

336. Sore mouth in cattle is seen in-

(A) Blue tongue

(B) Bovine malignant catarrh

(C) Rinder pest

(D) Vesicular Stomatitis

337. Protective wears for radiography are made up of

a. Lead

b. Iron

c. Zinc

d. Tungste

338. The best treatment of long bone fracture is

a. POP bandages

b. Intramadulary pinning

c. Intramadulary nailing

d. Bone plating

339. Suturing of lacerated nostril is performed under nerve block

a. Infra-orbital

b. Retro bulbar

c. Mandibular

d. Supra-orbital

340. Extirpation of incisor tooth in cattle is performed under nerve block

a. Infra-orbital

b. Mandibular

c. Retro bulbar

d. Cornual

341. The best anaesthetic technique for laparotomy in cattle is

a. Local infiltration

b. Paravertebral

c. Field block

d. Anterior caudal epidural

342. Docking in adult dog is performed under

a. Epidural

b. Local infiltration

c. Ring block

d. General anaesthesia

343. General anesthesia of equine is performed now a days by using

a. Chloral hydrate

b. Xylazine

c. Xylazine + Ketamine

d. Chlormag

344. Histologically, the stomach wall is unique because it contains:

a. No lamina propria
b. 1 extra layer in its muscularis mucosae
c. 1 extra layer in its muscularis externa
d. An adventitia in addition to a double-membraned serosa

345. The gastric gland cell whose absence could lead to pernicious anemia is the:

a. Chief cell
b. Goblet cell
c. Mucous neck cell
d. Parietal cell

346. The layer of the digestive tube wall which contains blood vessels, lymphatic nodules, and a rich supply of elastic fibers is the:

a. Mucosa
b. Submucosa
c. Muscularis Externa
d. Serosa

347. Mechanical digestion occurs in the:

a. Stomach
b. Cecum
c. Pharynx
d. Esophagus

348. The entry of bile into the duodenum is controlled by the:

a. Liver sinusoids
b. Common pancreatic duct
c. Pyloric sphincter
d. None of the above

349. A major function of the large intestine is to:

a. Secrete digestive enzymes
b. Remove waste materials
c. Regulate the release of bile
d. Secrete water in order to regulate blood volume

350. Which of the following is not produced by an enteroendocrine cell?

a. Pepsin
b. Cholecystokinin
c. Gastrin
d. Secretin

351. An anti-estrogen used in advanced breast cancer is

a) Tamoxifen

b) Precarbazine

c) Mitotane

d) Cisplatin

352. A semi synthetic derivative of diterpene is

a) Clindamycin

b) Ticarbiciliin

c) Tiamulin

d) Lincomycin

353. Drug used as anthelmentic by producing its effect by GABA mediated hyper polarization is

a) Albendazole

b) Mebendazole

c) Fenbendazole

d) Ivermectin

354. Kanamycin derivate is

a) Amikacin

b) Spectinomycin

c) Atramycin

d) Spiramycin

355. Polymixin E is also called as

a) Novobiocin

b) Bacitracin

c) Colistin

d) Kanamycin.

356. An agent used against anaerobic bacteria as well as protozoa is

a) Mebendazole

b) Metronidazole

c) Methicillin

d) Marbofloxacin

357. Neomycin B is also called as

a)Kanamycin

b) Amikacin

c) Tobramycin

d) Gentamicin

358. Flaviviridae is

a. dsDNA

b.ds RNA

c.ss DNA

d. ssRNA

359. Following are the morbilli viruses except

a. Mumps virus

b. Measles virus

c.PPRV

d.Rinderpest virus

360. Following is/are the character(s) of *Streptococcus*
   a. Gram positive cocci
   b. Catalase –Ve
   c. Arranged in chain
   d. All of these

361. Cold enrichment is required for the isolation of
   a. *Listeria monocytogenes*
   b. *Erysipelothrix*
   c. *Staph.aureus*
   d. *Clostridium tetani*

362. Bacteria responsible for food poisoning
   a. *Staph.aureus*
   b. *Clostridium botulinum*
   c. *Bacillus cereus*
   d. *All of these*

363. Dysgonic species of Mycobacterium is
   a. *M.bovis*
   b. *M*.avium
   c. *M.tuberculosis*
   d. *M.phlei*

364. Satellite growth on blood agar plate in presence of *Staph. aureus* is characteristic of
   a. Pasteurella
   b. Haemophillus
   c. Actinobacillus
   d. Mycoplasma

365. The di-deoxy chain termination method of DNA sequencing is:
   a. Maxam gilbert method
   b. Sanger's method
   c. Pyrosequencing method
   d. Nanopore sequencing method

366. The pH of Tris saturated phenol used for the purpose of DNA isolation should be:
   a. 5.0
   b. 6.0
   c. 7.0
   d. 8.0

367. DNA molecule as big as 10 MB can be separated by:
   a. Polyacrylamide gel electrophoresis
   b. Agrose gel electrophoresis
   c. Pulse Field electrophoresis
   d. None

368. The blotting technique used for the detection of DNA molecule is called:
   a. Southern blot
   b. Northern blot
   c. Western blot
   d. Eastern blot

369. The blotting technique used for the detection of RNA molecule is called:
   a. Southern blot
   b. Northern blot
   c. Western blot
   d. Eastern blot

370. The blotting technique used for the detection of protein is called:
   a. Southern blot
   b. Northern blot
   c. Western blot
   d. Eastern blot

371. In southern blot, the labeled nucleic acid used to detect complementary sequence is called:
   a. Template
   b. Primer
   c. Probe
   d. None of the above

372. Which type of tissue covers the external and internal surfaces of the body?

   a. connective

   b. skin

   c. areolar

   d. epithelial

373. What is found within the peritoneal cavity?

   a. pleural fluid

   b. the pericardium

   c. peritoneal fluid

   d. liquor pericardi

374. Which of the following is a splanchnic bone?

a. sternum

b. patella

c. os cardis

d. calcaneus

375. Which of the following joints is an example of an amphiarthrosis?

a. the temporomandibular joint

b. Sutures of the skull

c. between the bodies of the vertebrae

d. ischiopubic symphysis

376. What is the unit of contraction in a muscle?

a. motor unit

b. sarcomere

c. origin

d. insertion

377. Which of the following muscle is not a component of the Achilles tendon?

a. semimembranosus

b. biceps femoris

c. semiitendinosus

d. superficial digital flexor

378. Which of the following structures is not part of the peripheral nervous system?

a. cranial nerve V

b. spinal nerves supplying the intercostal muscles c. hypothalamus

d. a neuromuscular junction

379. The pons, medulla and cerebellum together form the

a. forebrain

b. midbrain

c. hindbrain

d. cerebral hemispheres

380. Testosterone is secreted by which cell?

a. islets cells

b. sertoli cells

c. Brunner's glands

d. cells of Leydig

381. In the foetal circulation, the shunt that connects the pulmonary artery and aorta is called as

a. ductus venosus

b. foremen ovale

c. ductus arteriosus

d. falciform ligament

382. Genetic drift in small population is an example of

(a) Systematic process

(b) Dispersive process

(c) Both

(d) None

383. The maximum frequency of recombinant progeny is

(a) 50 %
(b) 25 %

(c) 42 %
(d) 63 %

384. The diploid number of chromosomes are equal in
(a) Sheep and goat
(b) Cattle and goat
(c) Buffalo and sheep

(d) Man and rhesus monkey

385. A negative correlation coefficient between the two variables X and Y indicates that
(a) Large values of X are associated with small values of Y

(b) Large values of X are associated with large values of Y

(c) Small values of X are associated with small values of Y

(d) None of the above answers are correct

386. Which of the following chemical is used as a mutagen?

(a) Mustard gas

(b) Colchisine

(c) FCS

(d) All of these

387. Which of the following is sex linked trait in poultry?

(a) Colour pattern of plumage

(b) Brring pattern of plumage

(c) Comb pattern

(d) Abumin height

388. The difference between mean phenotypic values of the progeny of
selected parents and whole of the population before selection is known as

(a) Intensity of selection

(b) Standardized selection

(c) Selection differential

(d) None of the above

389. Scent glands, source of pheromones located dorsally and medially at the horns of

a) Ram

b) Buck

c) Bull

d) Stallion

390. Sertoli cell produces the protein hormone which suppresses the production of FSH

a) Androgen binding protein

b) Inhibin

c) Luteinizing hormone

d) Estrogen

391. Spreading of adherent acrosomal granule over the surface of spermatid nucleus

a) Golgi phase

b) Cap phase

c) Acrosomal phase

d) Maturation phase

392. Infertility in a bull due to Inability to fertilize

a) Penile deviation

b) Penile franulum

c) Testicular Hypoplasia

d) Penile Neoplasm

393. The penile protrusion is followed by

a) Erection

b) Mounting

c) Intromission

d) Pelvic thrust

394. The required number of progressive motile sperms at A.I. in cattle is

a) 50 millions

b) 30 millions

c) 10 millions

d) 3 millions

395. Presence of musculo membranous attachment on ventral aspect of glans penis to the preputial mucosa

a) Balanoposthitis

b) corkscrew penis

c) Penile tumor

d) Penile frenulum

396. Accentrically placed thickening of the acrosome is known as

a) Diadem defect

b) Acrosomal cap

c) Sterilizing tail stump

d) Knobbed spermatozoa

397. Flehman's reaction is not observed in

a) Bull

b) Boar

c) Stallion

d) Ram

398. Bicornual transverse presentation is more common in

a) Cows

b) Buffalo

c) Mare

d) Ewes

399. The first veterinary college was started in the year 1886 at

(A) Kolkata

(B) Mumbai

(C) Madras

(D) Ludhiyana

400. The first dairy co-operative was started in the year 1913 at

(A) Anand

(B) Allahabad

(C) Jaipur

(D) Pune

401. Toxic jaundis is also known as

(A).Post haepatic jaundis

(B).Haepatic jaundis

(C).Pre haepatjc jaundis

(D). Obstructive jaundis

402. Siderosis means

(A).Deposition of calcium in lung

(B). Deposition of iron in lung

(C). Deposition of silicon in lung

(D). Deposition of silver particle in lung

403. Van den Bergh test for obstructive jaundis

(A). Direct

(B).Indirect

(C).Biphasic

(D). Both (B) & (C)

404. In abscess which type of necrosis is seen?

(A). Coagulative necrosis

(B).Liquifective necrosis

(C).Caseative necrosis

(D).Fat necrosis

405..First change after death is

(A). Alger mortis

(B).Rigor mortis

(C).Formation of bloat

(D).Both (B) & (C)

406. Inflammation of crop

(A). Blephritis

(B).Ingluvitis

(C). Typhlitis

(D). Gonitis

407.Cart wheel appearance of nuclease found in

(A).Plasma cell

(B). Basophils

(C). Eosinophils

(D). Monocyte

408..Extreme elevation of leucocyte in peripheral blood is known as

(A).Shift to left

(B). Leukamoid reaction

(C). Right shift

(D). Both (A) & (C)

409.Blood in vomitus

(A). Haematamiasis

(B). Haemoptysis

(C).Epistaxis

(D).Melena

410. Bleeding from the oviduct is designated as:

a) Epitaxis

b) Hemosalpinx

c) Hematocele

d) Hematemasis

411. Condition which is hereditary and sex linked in which clotting is delayed:

a) Apoplexy

b) Hemophilia

c) Brown induration

d) Epistaxis

412. On the basis of rainfall, temperature, and soil the country can be divided into ---

Animal husbandry region

(A) 5

(B) 6

(C) 7

(D) 8

413. Small scale farming also known as

(A) Faimly farming

(B) Sole farming

(C) Individual farming

(D) Co-operative farming

414. Secretary of Panchayat samity

(A) DDO

(B) TDO

(C) Collector

(D) Mamlatdar

415. National Institute of Rural Development is located at

(A) Hyderabad

(B) Chennai

(C) Bangalore

(D) Jaipur

416. Specialized farm income from main enterprise is

(A) <50%

(B) >50%

(C) 50%

(D) 60%

417. The first Veterinary University was established in the year 1986 at

(A) Hyderabad

(B) Trichur

(C) Bangalore

(D) Chennai

418. Contribution of sight in learning is

(A) 80%

(B) 87%

(C) 90%

(D) 95%

419. Two forms of social stratification

(A) Cast class

(B) Color race

(C) Custom value

(D) Norm belief

420. Tegur in Karnataka is the breeding farm for
a. Gir
b. Tharparkar
c. Khillar
d. None of these

421. Malas are the professional breeder for
a. Sahiwal
b. Red sindhi
c. Rathi
d. Ongole

422. This breed produce the "Primium market milk" due to yellow color of milk
a. Jersey
b. Brown swiss
c. Guernsey
d. Ayreshire

423. Ration calculation for individual animal does not require this thing
a. Weight of animal
b. Lactation yield
c. Pregnanacy
d. Parity of animal

424. Maize fodder (green) is comes under the grade in quality
a. Excellent
b. Good
c. Medium
d. Poor

425. This practice is not comes under milking method
a. Intermittent milking
b. Knuckling
c. Full hand
d. Stripping

426. This practice does not required for sexual stimulation in bull
a. False mount
b. Changing teaser
c. Changing semen collector

d. Restraining mount

427. The score points for cow graded "very good" are
a. 80 to 85
b. 85 to 90
c. 90 to 95
d. 70 to 80

428. The key village scheme was launched in India during the year
a. First five year plan
b. Second five year plan
c. Fifth five year plan
d. Sixth five year plan

429. Operation flood project received donation of butter oil and scheme milk from
a. European union
b. U. S. A.
c. European dairies
d. European economic community

430 In poultry true stomach is

a. Gizzard
b. Proventriculus
c. Crop
d. Abomasums

431 The end product of protein metabolism in poultry is mainly

a. Urea
b. Uric acid
c. Ammonia
d. Urates

432 Which type of egg producer molt late in the season and rapidly

a. Good egg producer
b. Poor egg producer
c. Average egg producer
d. None of above

433 Which type of egg producer molt early in the season and slowly

a. Good egg producer
b. Poor egg producer
c. Average egg producer
d. None of above

434 Forced molting is done by

a. Withdrawal of Feed and Water
b. Withdrawal of Light
c. Increase level of dietary Zinc
d. All of above

435 Cold room temperature for hatching egg storage is

a. 48-52 ºF
b. 58-62 ºF
c. 68-72 ºF
d. 78-82 ºF

436 Setter temperature for hatching egg is

a. 92.5-93 ºF
b. 99.5-100 ºF
c. 102.5-103 ºF
d. 97.5-98 ºF

437 Hatcher temperature for hatching egg is

a. 94-95 ºF
b. 99-100 ºF
c. 98-99 ºF
d. 96-97 ºF

438 Physiological zero (0) temperature bellow which embryo growth is arrested in eggs

a. 75 ºF
b. 65 ºF
c. 85 ºF
d. 95 ºF

439 Position of hatching egg in setter is

a. Narrow end up
b. Broad end up
c. Horizontal
d. Vertical

440. Ematiation in meat is caused by…..
a) Inadequate intake of nutrients
b) Pathological conditions
c) Advanced age of animal
d) Over eating

441. *Clostridium botulinum* secretes toxin under…..
a) Aseptic condition
b) Aerobic condition
c) Anaerobic condition
d) Aerobic as well as anaerobic condition

442. In sheep the normal arterial blood pressure is…..

a) 100-110 mm of mercury
b) 120-145 mm of mercury
c) 146-165 mm of mercury
d) 166-175 mm of mercury

443. Unconventional meat…..
a) Beef
b) Mutton
c) Crocodile meat

444. Booling test on meat detect…..
a) $_{P}H$
b) Colour
c) Odour

445. Electrical stunning is widely used in…..
a) Cattle and poultry
b) Pigs and poultry
c) Buffaloes and poultry

446. Study of organism in relation to their environment is Known as…

a)Ecology

b)Ecosystem

c)Epornitic

d)Oncology

447. Which disease is Ectoparasitic zoonosis

a) Scabies

b) Taeniasis

c) Both a) & b)

d) None of above

448. How to control reservoir of infection

a) Treatment

b) Health education

c) Both a) & b)

d) None of above

449. Rabies also knokwn as….

a)Lyssa

b)Rage

c)Tallwut

d)All of above

450. Spinose ear tick mainly pathogenic in which of the following stage :

(a) Larval stage
(b) Nymphal stage
(c) Adult stage
(d) All of the above

451. The chief cause of 'strike in the sheep' is which of the following :

(a) Larvae of *Musca sp.*
(b) Larvae of *Sarcopaga sp*.
(c) Larvae of *Lucilia sp.*
(d) All the above

452. Second intermediate host of oviduct fluke are :

(a) Dragon flies
(b) Water snail
(c) Grasshopper
(d) None

453. Insects which possess sponging mouth parts and do not bite are :

(a) Fleas
(b) House flies
(c) Mosquitoes
(d) Deer flies

454. Scientific name of horse fly is ……

(a) Tabanus equinum
(b) *Oestrus ovis*
(c) *Simulium sp*
(d) None of the above

455. Which of the following is a non granular WBC?

a. Lymphocytes

b. Neutrophil

c. Basophil

d. Eosinophil

456. In Classification of helminthes the higher taxa platyhelminthes containing

helminthes of veterinary importance are :

(a) Flat worm

(b) Round worm
(c) Thornyheaded worms
(d) None

457. In Filarial nematode, the life cycle is……

(a) Direct
(b) Direct and Indirect
(c) Indirect
(d) None

458. Morocco leather condition is caused by :

(a) Hemonchus contortus
(b) Ostertagia ostertagia
(c) *Cooperia curtesi*
(d) None

459. *Strongylus vulgaris* is responsible for :

(a) Colic in ruminants
(b) Paralysis in horse
(c) Colic in horse
(d) None

460 *Bunostomum trigonocephalum* is hook worms of :

(a) Sheep and Goat
(b) Cattle
(c) Dog
(d) None

461. Disease caused by *Clostridium septicum* is-

(A) Black Quarter

(B) Enterotoxaemia

(C) Braxy

(D) Tetanus

462. Sulphur granules in yellowish pus is seen in-

(A) Glanders

(B) Strangles

(C) Staphylococcosis

(D) Actinomycosis

463. Toxins of organism causes peripheral nerve paralysis in cattle-

(A) Botulism

(B) Tetanus

(C) Both

(D) None of the above

464. Diamond skin disease is primarily a disease of-

(A) Horse

(B) Lion

(C) Sow

(D) Turkey

465. In Johne's disease, corrugation is not the feature in-

(A) Cattle

(B) Sheep

(C) Horse

(D) Both (B) and (C)

466. Most susceptible species for Haemorrhagic septicemia-

(A) Sheep

(B) Buffalo

(C) Cattle

(D) Pig

467. Erythritol sugar plays important role in pathogenesis of-

(A) *Clostridium spp.*

(B) Brucella spp.

(C) Bacillus spp.

(D) Corynebacterium spp.

468. Substance responsible for increase penetration of Lyssa virus-

(A) Hyaluronidase

(B) Erythriol

(C) Protagen

(D) Amylase

469. Crop mycosis in poultry is caused by-

(A) Bacteria

(B) Mycoplasma

(C) Fungi

(D) Virus

470. Brooder's pneumonia in poultry is caused by-

(A) *Candida albicans*

(B) Aspergillus fumigatus

(C) Haemophilus paragallinarum

(D) Pasturella multocida

471. The best general anesthetic for canine is

a. Xylazine

b. Thiopental

c. Acepromazine

d. Ketamine

472. To deliver live pups, cesarean section is performed under

a. Thiopentone

b. Pentobarbitone

c. Acepromazine

d. Diazepam + Local anesthesia

473. To capture wild elephant the anesthetic used is

a. Xylazine

b. Etorphine

c. Medazolam

d. Morphin

474. The sedation in camel is performed by using xylazine intravenously

a. 2-3 ml

b. 8-10 ml

c. 25 -30 ml.

d. 30-40 ml

475. The best inhalation anesthetic for closed circuit is

a. Cyclopropane

b. Ether

c. Nitrous oxide

d. Chloroform

476. Deep chested dog is prone to following surgical condition

a. Intestinal obstruction

b. Diaphragmatic hernia

c. Gastric dilatation and torsion

d. Gastric ulcer

477. Pathognomic sign of sharp molar is

a. Quidding

b. Halitosis

c. Salivation

d. All of above

478. The development of pouch in lower neck just after feeding in case of buffalo is noticed in

a. Pyloric stenosis

b. Oesophageal ulcer

c. Choke

d. Oesophageal diverticulum

479. Continuous lacrimation in canine is characteristic sign of

a. Obstruction of lacrimal duct

b. Entropion

c. Conjunctivitis

d. Ectropion

480. Myringotomy in canine is performed for the correction of

a. Otitis interna

b. Otitis media

c. Otitis externa

d. Othaematoma

481. Each of the following is an amino acid derivative EXCEPT:

a. Epinephrine
b. Melatonin
c. Thyroxine
d. TSH

482. Which of the following hormones does not act via a second messenger system?

a. Glucagon
b. Epinephrine
c. GH
d. Testosterone

483. What hypophyseal structure receives signals from the hypothalamus via the hypophyseal portal system?

a. Follicular medulla
b. Adenohypophysis
c. Neurohypophysis
d. Pars intermedia

484. Low blood glucose typically results in the secretion of all of the following EXCEPT:

a. Glucagon
b. Thyroxine
c. hGH
d. PTH

485. What hormone increases intestinal calcium absorption?

a. Calcitriol
b. Calcitonin
c. Parathormone
d. Pancreatic polypeptide

486. The _____ cells of the pancreas secrete insulin.

a. Chief
b. Principal
c. Alpha
d. Beta

487. Oxytocin is secreted by the:

a. Adenohypophysis
b. Neurohypophysis
c. Zona glomerulosa
d. Pars intermedia

488. Hyposecretion of cortisol can cause:

a. Cretinism
b. Diabetes mellitus
c. Diabetes insipidus
d. Addison's disease

489. The space in the middle of the thoracic cavity where the heart resides is the:

a. Pericardial cavity
b. Pericardium
c. Pleural Cavity
d. Mediastinum

490. The foramen ovale in the fetal heart is located in the:

a. Right atrium
b. Left atrium
c. Interventricular septum
d. Interatrial septum

491. In body netobimin is converted into

a) Albendazole

b) Mebendazole

c) Fenbendazole

d) Lobendazole

492. Which one of the followings not an anaesthetic?

a) Phencyclidine

b) Xylazine

c) Ketamine

d) Cyclopropane

493. Diazepam does not possess the following action

a) Sedative

b) Anticonvulsant

c) Analgesic

d) Anxiolytic

494. The full life of drug is usually approximately

a) Twice its half-life

b) Ten times its half- life

c) Five times its half- life

d) None of the above

495. The following is not a phenothiazine derivative

a) Triflupromazine

b) Chlorpromazine

c) Promazine

d) Reserpine

496. Xylazine does not have the following effect

a) Analgesic

b) Muscle relaxant

c) Sedative

d) Antipyretic

497. Which one of the following has high water to lipi partition coefficient?

a) Chlorpromazine
b) Ether
c) Halothane
d) None of the above

498. With which of the following anaesthetic is eructation reflex not affected.

a) Ketamine

b) Xylazine

c) Phenobarbitone

d) Equithesin

499. Which of the following statements is false?

a) Thiopentone is ultra short acting barbiturate
b) Thiopentone is administered by intramuscular route
c) Thiopentone administered typically shows barbiturate apnoea.
d) Thiopentone is yellowish powder used as a sodium salt.

500. Which one of the following is an example of physical antagonism?

a) Administration of activated charcoal in poisoning

b) Relief of acidity using antacids

c) Administration of Atropine in organophosphate poisoning

d) None of the above

501. The body region of the sheep in which best quality wool is found
   a. Breech
   b. Shoulder
   c. Head
   d. Tail

502. A growing female sheep between sixth month to maturity.
   a. Doeling
   b. Wedder
   c. Hogget
   d. Lamb

503. Native place of sannem is
   a. England
   b. Switzerland
   c. U. S. A.
   d. China

504. Major breeding season of Indian sheep is
   a. June to august
   b. December to January
   c. March to april
   d. Year round

505. The term used for meat of rabbit is
   a. Mutton
   b. Pork
   c. Chevon
   d. Venison

506. Location of rabbit breeding farm in Gujarat
   a. Bhuj
   b. Ankleshwar
   c. Morbid
   d. Mandvi

507. India has total number of sheep breed
   a. 40
   b. 15
   c. 20
   d. 28

508. Gurej sheep breed found in
   a. J & K
   b. Himachal Pradesh
   c. Hariyana
   d. Punjab

509. Spiti is the horse breed found at
   a. J & K
   b. Himachal Pradesh
   c. Hariyana
   d. Punjab

510. The disease found in sheep during monsoon
   a. Foot rot
   b. F. M. D.
   c. Enterotoxaemia
   d. Rinderpest

511. Bacteria which require living medium for their growth is
   a. Mycoplasma and Leptospira
   b. Chlamydia and Rickettsia
   c. Rickettsia and Mycoplasma
   d. None of these

512. Pallisade arrangement is characteristic of
   a. Corynebacterium
   b. *E.coli*
   c. Campylobacter
   d. Listeria

513. Mycoplasma organisms are pleomorphic in nature due to
   a. Absence of cell wall
   b. Absence of rigid cell wall
   c. Small in size
   d. Species specific in nature

514. Periodic opthalmia in horses is a sequel of
   a. Glanders
   b. Mycoplasmosis
   c. Equine leptospirosis
   d. Babesiosis

515. Chlamydia can be stained with following stains except:
   a. Gram's stain
   b. Macchiavello stain
   c. Gimenez stain
   d. Castaneda stain

516. Tuberculin test is based on
   a. Delayed hypersensitivity
   b. Arthus reaction
   c. Anaphylactic reaction

d. All of above

517. Calf hood vaccination is advisable for
   a. Brucellosis
   b. Salmonellosis
   c. Pasteurellosis
   d. Neonatal calf diarrhoea
518. The germ tube production is characteristic of
   a. *Candida albicans*
   b. Corynebacterium pyogenes
   c. Cryptococcus neoformans
   d. Pseudomonas aeruginosa
519. Experimentally *Mycobacterium leprae* can be cultivated on
   a. Bacterial media with mycobactin.
   b. Cell culture system.
   c. Nine banded armadillo
   d. None of the above
520. Viruses that exist in cells and cause recurrent disease are considered
   a. Oncogenic
   b. Cytopathic
   c. Latent
   d. Resistant
521. For transformation reactions competent *E. coli* cells can be prepared by treating log phase *E. coli* cells with:
   a. Calcium Chloride
   b. Magnesium Chloride
   c. EDTA
   d. None of the above
522. A DNA molecule from external source can be inserted into the host cells by following methods:
   a. Heat shock treatment
   b. Electroporation
   c. Lipofection
   d. All of the above
523. In a PCR reaction two short oligonucleotide used which flank the DNA sequence to be amplified is called:
   a. Primer
   b. Probe
   c. Template
   d. None of the above
524. The source of *Taq polymerase* used in the PCR reaction is:
   a. E. coli
   b. Thermus aquaticus
   c. Both
   d. None
525. The source of "Reverse transcriptase" enzyme used for c-DNA synthesis is:
   a. Moloney murine leukemia virus (MuLV)
   b. Avian myeloblastosis virus (AMV)
   c. Both
   d. None
526. Quantitative studies using PCR technique can be done with:
   a. RT-PCR
   b. Real Time PCR
   c. Micro array
   d. None of the above
527. Most type II restriction endonucleases recognize and cleave DNA within particular sequence of 4-8 nucleotides which have two fold rotational symmetry. Such sequences are called:
   a. Palindromes
   b. Short tandem repeats
   c. Both
   d. None
528. For restriction analysis of DNA molecule, the type of "restriction endonucleases" used are:
   a. Type I RE
   b. Type II RE
   c. Type III RE
   d. None
529. c-DNA can be synthesized on a RNA template using following primers:
   a. Sequence specific primers
   b. Oligo dT
   c. Random hexamers
   d. All of the above
530. *Isoschizomers* are Restriction enzymes which:
   a. Recognize and cut the same sequence
   b. Recognize the same sequence but cut site vary
   c. Both
   d. None
531. What is the name of the main lymphatic duct that arises in the abdomen?

   a. tracheal duct

   b. cisterna chyli

   c. right lymphatic duct

   d. cisterna magna

532. Which part of the respiratory system is also responsible for the production of sound?

a. hyoid apparatus

b. eustachian tube

c. pharynx

d. larynx

533. Which muscle is responsible for increasing the volume of the thoracic cavity during inspiration?

a. diaphragm

b. hypxial

c. external oblique

d. epaxial

534. The basin shaped structure in the center of the kidney is called

a. cortex

b. hilus

c. pelvis

d. medulla

535. In which layer of the skin are the sensory nerve endings found?

a. hypodermis

b. epidermis

c. dermis

d. subcutis

536. Which is the most developed special sense in the birds?

a. sight

b. touch

c. smell

d. taste

537. The space between the incisors and the cheek teeth of rabbits and rodents is known as the

a. diastema

b. philtrum

c. dewlap

d. acromion

538. Visceral skeleton present in camel

a. Os penis

b. Os phrenic

c. Os cardis

d. Os rostrum

539. Which is the type of placenta present in bitch?

a. Zonary

b. Diffuse

c. Discoidal

d. Cotyledonary

540. Total number of incissor teeth in ox

a. Six

b. Four

c. Eight

d. Ten

541. Outer covering of the nerve is

a. Endoneurium

b. Perineurim

c. Epineurium

d. Epitendineum

542. Which one of the following is a exoskeleton?

a. Hoof

b. Metacarpus

c. Sternum

d. Ulna

543. Which one of the gland is a apocrine gland?

a. Mammary gland

b. Testes

c. Parotid salivary gland

d. Pancreas

544. Part of the peritoneum that covers the fallopian tube with abdominal cavity:

a. Mesometrium

b. Mesosalphinx

c. Mesoovarium

d. Broad ligament

545. Which of the following plays a part in thermoregulation?

a. Hair

b. Claws

c. Sebaceous gland

d. Meibomian gland

546. Which of the following is used for predicting future performance of individuals

(a) Heritability

(b) Repeatability
(c) Genetic correlation
(d) None of the above

547. The response to selection increases when

(a) Proportion of individuals selected decreases

(b) Proportion of individuals selected increases

(c) Heritability of the trait is low

(d) None of the above

548. The heritability of a character in narrow sense will be more when it is controlled by

(a) Genes with non-additive effects

(b) Genes with additive effects

(c) Both (a) and (c)

(d) None of the above

549. The genotypic value of quantitative traits is

(a) Sum total of effects

(b) sum total of gene effects

(c) Sum total of additive effects

(d) None of the above

550. The specific combining ability of a line is due to gene effects

(a) Epitasis

(b) Dominance

(c) Over-dominance

(d) All of above

551. The dry period in buffaloes can be reduced by

(a) Individual selection

(b) Better management

(c) Family selection

(d) Progeny testing

552. The change in the fat % when selection is made for higher milk yield is due to

(a) Natural selection

(b) (b) Direct selection
(c) Indirect selection

(d) None of these

553. The estimate of heritability of egg yield cannot be obtained by

(a) Paternal half-sib correlation

(b) Regression of daughter on dam

(c) Regression of daughter on sire

(d) Maternal half-sib correlation

554. The precision of heritability estimate is known by its

(a) Standard error

(b) Magnitude

(c) Method of estimation

(d) Deviation from

555. For selection of individuals for traits measured after life, we will prefer

(a) Indirect selection

(b) Family selection
(c) Pedigree selection

(d) Any of these

556. The regression of offspring on mid parent provides the estimate of

(a) ½ h^2

(b) ¼ h^2
(c) h^2

(d) √ h

557. The accuracy of estimating breeding value of a sire increased by

(a) Decreasing the number of sires under test
(b) Decreasing the number of progeny of sire
(c) Increasing the number of progeny of sire
(d) None of the above

558. The Osborne index for cockerel selection is based on information from

(a) Individual performance and dam and sire families.

(b) Dam and sire families

(c) Progeny and pedigree

(d) Individual performance and pedigree

559. The generation interval can be reduced by using

(a) Genetic markers

(b) Progeny information

(c) Life time information

(d) Multi-trait selection

560. Diploid number of chromosomes in sheep is

(a) 60

(b) 54

(c) 38

(d) 64

561. Both hind limbs retained in the uterus beneath the body of the posteriorly presented fetus

a) Dog sitting posture

b) Breech presentation

c) Poll presentation

d) Wry neck

562. Acute angulation of the vertebral column of the fetus causing dorsal approximation of its head and tail is a

a) Perosomus elumbis

b) Amorphus globosus

c) Otter calf

d) Schistosomus reflexus

563. The release of which hormone is associated with the Fergusion's reflex .

a) Estroegn

b) Oxytocin

c) Progesterone

d) Relaxin

564. Penile Transmissible Neoplasia is observed in the

a) Ram

b) Stallion

c) Dog

d) Bull

565. Androgen Binding protein is secreted by

a) Ley dig cells

b) Sertoli cells

c) Spermatogonia

d) Efferent ducts

566. Eversion of galeacapitis and crater shaped depressions in the nucleus

a) Dag defect

b) Diadem defect

c) Corck screw defect

d) Abaxial defect

567. Effecting a change in the presentation is known as

a) Rotation

b) Version

c) Extension

d) Flexion

568. Non dilation of cervix causing dystocia in ewes is known as

a) Vertex

b) Foot nape

c) Ring womb

d) wry neck

569. Pattern assumed by the semen upon drying on a glass slide

a) Fern pattern

b) Crenellation pattern

c) Cork screw pattern

d) Zig Zag pattern

570. Test used to know the functional integrity of sperm membrane

a) Sperm mucus penetration test

b) Hypo osmotic swelling test

c) Hamster egg penetration test

d) High temperature viability test

571. The end of the diestrus period is due to

a. Recruitment of the ovulatory follicular wave.
b. A decrease in estradiol negative feedback.
c. Regression of the corpus luteum.
d. An increase in estradiol levels coming from the preovulatory follicle.

572. In the mare, transition from the non-breeding to the breeding season is caused by

a. A decrease in melatonin.
b. A decrease in the day length.
c. A switch from positive to negative feedback by estradiol.
d. The presence of progesterone coming from the corpus luteum.

573. Granulosa cells are similar to Sertoli Cells in that both

a. Have FSH receptors.
b. Have LH receptors.
c. Produce testosterone.
d. Have very low levels of cAMP.

574. The blood testis barrier is due to

a. The inhibition to growth of blood vessels in the seminiferous tubules.
b. The presence of gap junctions between Sertoli cells.
c. The presence of tight junctions between Sertoli cells.
d. The basement membrane between the Sertoli cells and the interstitial space where the Leydig cells are located.

575. It has been demonstrated that dogs can be trained to detect estrus in cattle. Which of the following senses is being used by the dog to accomplish this task?

a. Smell
b. Sight
c. Touch
d. Hearing

576. Intense educational activity for motivation and mobilization of community to action Is known as

(A) Awareness

(B) Campaign

(C) Demonstration

(D) G.D.

577. Diagram presentation of facts or ideas is known as

(A) Chart

(B) Poster

(C) Diagram

(D) Book

578. A statement of policy to guide decision and action in a consistent manner is

(A) Principle

(B) Law

(C) Philosophy

(D) Hypothesis

579. Call mode by farmers at the veterinary hospital for getting information is called

(A) Office call

(B) Personal call

(C) Community call

(D) Tall call

580. A visual display which is never used alone for teaching programmed is

(A) Chart

(B) Flipchart

(C) Poster

(D) Banner

581. Chepest, Oldest & most effective aids of teaching is

(A) Black Board

(B) White board

(C) Display board

(D) Interactive board

582. A Statement of assumption validity of which is yet to be tested is known as

(A) Hypothesis

(B) Theory

(C) Principles

(D) Philosophy

583. A miniature replica of an object is called

(A) Specimen

(B) Model

(C) Sample

(D) Picture

584. A System of social relationship in and through which we live is known as

(A) Society

(B) Communication

(C) Cast

(D) Creed

585. Combination of seeing, hearing, and doing may help to retain----------in teaching Learning

(A) 50%

(B) 60%

(C) 70%

(D) 80%

586. AMUL was established in

(A) 1846

(B) 1848

(C) 1850

(D) 1950

587. Air and water are nature of goods

(A) Material

(B) Nominated

(C) Free

(D) Consumable

588. The demand is salt is

(A) Inelastic

(B) Elastic

(C) Prefect elastic

(D) Non elastic

589. AGMARK indicates

(A) Quality & Purity

(B) Quality

(C) Quantity

(D) Purity

590. Top level function is known as

(A) Management

(B) Administration

(C) Bureaucracy

(D) Line of control

591. Herd registration scheme in Gujarat is running for the breed
   a. Mehasana buffalo
   b. Gir cattle
   c. Dangi cattle
   d. Banni buffalo

592. The number of calving pen required on dairy farm depends on
   a. Breedable females
   b. Fertility rate
   c. Calving interval
   d. All of above

593. Dehorning in calves can be done at
   a. 1 to 5 days
   b. 7 to 0 days
   c. 11 to 20 days
   d. More than 30 days

594. The pulsation ratio in milking machine should be kept within the limit of
   a. 1 : 1
   b. 2.5 : 1
   c. Both a & b
   d. None

595. The major input for maximum contribution to cost of milk production
   a. Labour
   b. Electricity
   c. Feeding
   d. Breeding

596. The buffalo population (Millions) in Gujarat state as per livestock census 2007
   a. 8.77
   b. 7.97
   c. 2.01
   d. 4.64

597. Nilgai belong to the animal in category
   a. Wild ruminant
   b. Wild non-ruminant
   c. Domestic ruminant
   d. Domestic non-ruminant

598. The gestation period (days) of leopard is
   a. 62 – 65
   b. 92 – 95
   c. 112 – 120
   d. 150 -180

599. The birth weight of piglet in kg is
   a. 2 – 4 kg
   b. 3 – 6 kg
   c. 1 – 2 kg
   d. 0.5 – 1 kg

600. Stag is the term utilize for
   a. Castrated goat
   b. Castrated horse
   c. Castrated sheep
   d. Castrated pig

601. Tongue rolling is the type of behaviour in cow
   a. Detrimental
   b. Stereotyped
   c. Retired
   d. Apathetic

602. Pig farming is the most developed in
   a. Himachal Pradesh
   b. West Bengal
   c. Bihar
   d. Madhya Pradesh

603. Certification agency in organic farming is
   a. IARI
   b. NDRI
   c. APEDA
   d. NPDP

604. Hissardale crossbred sheep breed developed from
   a. Australian merino
   b. Bikaneri
   c. Both
   d. None of above

605. Fat tailed sheep breed found in India is
   a. Macheri
   b. Chokla
   c. Bhakarwal
   d. Marwari

606 A narrow band surrounding the yolk that is almost void of blood vessels is known as
   a. Stream
   b. Stigma
   c. Strake
   d. Strike

607 Chickens lay eggs on successive days is known as
   a. Pause
   b. Clutches
   c. Persistency
   d. Both b and c

608 Sometime the infundibulum loses power to pick up a yolks, and yolks accumulate in

body cavity. Such hen are known as

a. Poor layer
b. External layer
c. Internal layer
d. Faulty layer

609 Pigments responsible for egg shell colour is produced by

a. Magnum
b. Vagina
c. Uterus
d. Isthmus

610 The brown colour of eggshell is due to which pigments

a. Carotenoids
b. Porphyrin
c. Xanthophylls
d. None of above

611 Preheating or pre-warming of egg is done

a. Before candling
b. Before Cold storage
c. Before Setting
d. Before Hatching

612 Eggs of average size and quality incubated in air with 50 to 60 % relative humidity, they will lose approximately _____ % of their initial weight in 19 days of incubation

a. 6 %
b. 12 %
c. 18 %
d. 24 %

613 Best time for artificial insemination to get maximum fertility in poultry is

a. Early morning
b. Before noon
c. After Noon
d. Late evening

614 The ammonia concentration in the poultry house should not be more than

a. 2.5 ppm
b. 25 ppm
c. 50 ppm
d. 75 ppm

615 Nitrogen fixation is poor in

a. Cage house
b. Deep litter house
c. Both A & B
d. None of the above

616 Pullets grown during the period when most of the days have decreasing light are known as

a. In season flocks
b. Out season flocks
c. Mid season flocks
d. Odd season flocks

617 Pullets grown during the period when most of the days have increasing light are known as

a. In season flocks
b. Out season flocks
c. Mid season flocks
d. Odd season flocks

618 Birds were placed in the laying house just before the onset of egg production is known as

a. Housing
b. Shifting
c. Laying
d. None of above

619 Replacing old males in a flock with a set of new and younger male after about two-thirds of the egg production period is known as

a. Replacement of flock
b. Spiking the flock
c. Placement of flock
d. All of above

620 Distance between the bulbs in poultry house should be _____times the distance from the bulb to the bird level.

a. 0.5 times
b. 5.0 times
c. 15 times
d. 1.5 times

621. Herpes simplex seen in….

a) Cattle

b) Dog

c) Elephant

d) None of above

622. Volumetric method for determination of fat% of milk.

a. Waste fall balance

b. Soxhlet method

c. Richmond sliding method

d. Garber method.

623. Which of the disinfectant is effective against wide range of micro organism in floor,wall and equipments

a)quick time
b)cresol 2-3% in hot water
c)costic soda 5%
d)Nil

624. Coagulation of water by chemical is essential in

a)slow sand filter
b)rapid sand filter
c)boiling
d)None

625. The desirable limit for fluoride should be(mg/litre)

a) 0.2
b) 1.5
c) 2.5
d) 0.6-1.8

626. In strong sewage B.O.D. is (mg/litre)

a) 50
b) 100
c) 300
d) None

627. Who was first chief of VPH in WHO

a) Dr.Guerin

b) Dr.Daniel E.Salmon

c) Dr.Karl F.Meyer

d) Dr.Martin Kaplan

628 Example of cyclozoonosis…

a) Toxoplasmosis

b) Taeniasis

c) Echinococcosis

d) Both b) & c)

629. Example of algal zoonosis

a) Scrub typhus

b) Actinomycosis

c) Fascioliasis

d) Protothecosis

630. In anthrax by which reaction Bacillus organism detected in blood smear

a) Mac Fadyean's reaction

b) Zeil Neelsen staining

c) Ascoli's precipitation test

d) None of above

631. Medium which is used in isolation of T.B. organism

A)XLD agar

b) LJ medium

c) EMJH medium

d) blood agar

632. Greenish colors of water is developed due to…

a) Iron

b) Organic matter

c) Algae flora

d) None of above

633. Ozone layer found at which height

a)10-20 km

b)70-80km

c)40-50km

d)90-100km

634. Optimum temperature range for adult pig is between

a) 0-3 ^{0}c

b) 40-50^{0}c

c) 4-30^{0}c

d)30-35^{0}c

635. Which is Iron bacterium

a)Crenothrix

b)Gellionella

c)Klebsiella

d)Both a) & b)

636. Incineration of carcass done by heating at which temperature

a)600^{0}c

b)800^{0}c

c)1300^{0}c

d)1000^{0}c

637. *Oxyuris equi* are commonly known as :

(a) Pin worm
(b) Caecal worm
(c) Stomach worm
(d) None

638. The condition 'Sweating blood' in horse is caused by :

(a) Parafilaria equi
(b) Dirofilaria immitis
(c) *Parafilaria multipapillosa*
(d) None

639. *Seteria labiato-papillosa* of cattle causing :

(a) Lumber paralysis in horse
(b) Lumber paralysis in sheep and goat
(c) Lumber paralysis in cattle
(d) None

640. The largest nematode of domestic animal is :

(a) Macracanthorhynchus hirudinaceus
(b) Dioctophyma renale
(c) *Ascaris sum*
(d) None

641. Acute fasciolosis is common in :

(a) Cattle
(b) Sheep
(c) Buffalo
(d) Horse

642. Triclabendazole is a drug of choice for :

(a) Liver fluke
(b) Haemonchus nematode
(c) Lung worm
(d) None

643. The blood fluke are usually present in :

(a) Hepatic vein
(b) Portal vein
(c) Mesenteric vein
(d) None

644. *Taenia multiceps* is tape worm of dog and it's larval stage present in sheep/cattle

is known as :

(a) Coenurus serialis
(b) Hydatid
(c) *Coenurus cerebralis*

(d) None

645. Sputum is a diagnostic material in two infections of dog

(a) *Ancylostoma caninum* and *Dictophyma renale*
(b) *Filaroides* and *Angiostrongylus*
(c) *Schistosoma nasale* and *Stephanurus*
(d) None

646. Smallest and most pathogenic tapeworm of poultry is :

(a) Amoebotaenia
(b) *Davainea proglotina*
(c) *Raillietina echinobothrida*
(d) None

647. A common term for myiasis caused by members of the calliphoridae is :

(a) Blow-fly Strike
(b) Pediculosis
(c) Mange
(d) None

648. The larval of *Oestrus ovis* are commonly referred to as :

(a) Gnats
(b) Warble
(c) Bots
(d) None

649. The condition 'false gid' in sheep is caused by :

(a) Multiceps multiceps
(b) *Oestrus ovis* larva
(c) *Setaria digitata*
(d) None

650. *Ornithodorous moubata* is :

(a) Hard tick
(b) Soft tick
(c) Mites
(d) Flea

651. Animal Protozoa are unicellular and they are :

(a) Eukaryotic
(b) Prokaryotic
(c) Monera
(d) None

652. Circling disease in cattle is caused by-

(A) *Listeria monocytogenes*

(B) Erysipelothrix rhusiopathiae

(C) Streptococcus equi

(D) Chlamydia psittacii

653. Intranuclear inclusion bodies are seen in-

(A) Pox diseases

(B) Herpes virus infection

(C) Adeno virus infection

(D) Lyssa virus infection

654. Negri bodies are seen in Rabies which are-

(A) Intranuclear

(B) Intracytoplasmic

(C) Both

(D) May be intranuclear or intracytoplasmic

655. Enlargement of Bursa of fabricius in poultry is seen in-

(A) CRD

(B) IB

(C) RD

(D) IBD

656. Zebra marking is predominant feature of-

(A) Johne's disease

(B) Tuberculosis

(C) Rinder pest

(D) Both (A) and (C)

657. CBPP differs from CCPP in-

(A) Both occur in same species

(B) Sequestra formation

(C) Mode of transmission

(D) Pathogenesis

658. Which bacterium is predisposed by *Fasiola hepatica* infestation-

(A) *Bacillus spp.*

(B) Clostridium spp.

(C) Leptospira spp.

(D) Pasturella spp.

659. Which is the most potent aflatoxin-

(A) M1

(B) M2

(C) B1

(D) B2

660. Curled toe paralysis in chicken is due to deficiency of-

(A) Vitamin B12

(B) Vitamin B1

(C) Niacin

(D) Vitamin B2

661. Mn deficiency is chicken will lead to-

(A) Pica

(B) Star grazing condition

(C) Crazy chick disease

(D) Slipped Tendon

662. Phosphorous deficiency in soil will predispose the cattle to-

(A) Haemorrhagic septicemia

(B) Botulism

(C) Anthrax

(D) Mucosal disease

663. Black head disease is predominately a disease of-

(A) Cattle caused by Parasite

(B) Poultry caused by Parasite

(C) Horse caused by Virus

(D) Pig caused by Virus

664. Which of the following is correctly matched-

(A) Tubercular lesions are calcified-Buffalo

(B) Johne's disease-Foul smelling diarrhea

(C) Avian spp.- Dry pus

(D) Lamb dysentery- Clostridium perfringens type D

665. Post mortem of chick shows foul smelling yellow-brown watery Yolk, fibrinous perihepatitis

and pericarditis, suspect the disease

(A)Infectious Coryza

(B) Fowl Typhoid

(C) Coli Bacillosis

(D) Infectious Bronchitis

666. Haemorrhages at the tip of the proventricular gland is the pathognomic lesion s seen in-

(A)Ranikhet disease

(B) Chronic respiratory disease

(C) Infectious bursal disease

(D) Avian influenza

667. The non-invasive confirmative diagnosis of diaphragmatic hernia in buffalo is

a. Auscultation

b. Contrast radiography

c. Rumenotomy

d. Plain radiography

668. Liptek test is performed for the diagnosis of

a. LDA

b. Vagal indigestion

c. Ruminal acidosis

d. Ruminal tympany

669. Metallic foreign bodies are mostly recovered from

a. Esophagus

b. Reticulum

c. Rumen

d. Abomasum

670. The basic cause of vagal indigestion in cattle is

a. Trauma

b. Inflammatory conditions

c. Ruminal impaction

d. Liver dysfunction

671. Distal intestinal obstruction in bullock is diagnosed by

a. Clinical signs

b. Hematology

c. Per rectal examination

d. History

672. Common site for obstructive uroliths in bullock is

a. Prescrotal

b. Neck of bladder

c. Pelvic urethra

d. Post scrotal

673. The surgical correction of teat pea in cattle is performed by

a. Teat slitter

b. Hudson teat spider

c. Teat tumour extractor

d. Teat dilator

674. Umbilical hernia is most commonly seen in

a. Cattle

b. Dog

c. Pig

d. Horse

675. During surgery arterial bleeding is controlled by

a. Haemostat

b. Thumb forceps

c. Allies tissue forcep

d. Rat tooth forceps

676. The best technique for making instruments germ free is

a. Direct flame

b. Boiling water

c. Chemical

d. Autoclave

677. Sweeny is characterized by atrophy of

a. All muscles

b. Gastrocnemious muscle

c. Scapular muscle

d. None of above

678. Laminitis means that

a. Animal walks lame

b. Inflammation of joints

c. Inflammation of laminae

d. None of above

679. Treatment of upward fixation of patella

a, Planter tenotomy

b. Medial patellar desmotomy

c. Middle patellar desmotomy

d. Cunion tenotomy

680. Inflammation of stifle joint is known as

a. Laminitis

b. Omarthritis

c. Gonitis

d. Joint mice

681. Oozing of inflammatory exudates at coronary band in horse hoof is known as

a. Arthritis

b. Side bones

c. Quittor

d. Curb

682. Which blood vessel does NOT bring deoxygenated blood directly to the heart?

a. Pulmonary vein
b. Coronary Sinus
c. Inferior Vena cava
d. Superior Vena Cava

683. If there is a blockage between the AV node and the AV bundle, how will this affect the appearance of the EKG?

a. PR interval would be smaller
b. QRS interval would be shorter
c. There would be more P waves than QRS complexes
d. There would be more QRS complexes than P waves

684. A valve damaged by rheumatic fever fails to open completely. This is known as:

a. Stenosis
b. Heart Block
c. Ischemia
d. MI

685. Accodrding to the Frank-Starling Law of the heart, CO is directly related to:

a. Ventricular muscle mass
b. Heart Rate
c. Amount of blood returning to the heart
d. ESV

686. The T Wave on an EKG represents:

a. Ventricular Depolarization
b. Ventricular Repolarization
c. Atrial Depolarization
d. Atrial Repolarization
e. Ventricular Systole

687. Cardiac output is equal to:

a. HR x SV
b. HR/SV
c. EDV - ESV
d. (EDV-SV) x HR

688. Which of the following represents the outermost layer of the heart?

a. Epicardium
b. Parietal pericardium

c. Myocardium
d. Subendocardium

689. Which of the following cell types is responsible for skeletal muscle regeneration?

a. Myoepithelial cell
b. Myofibril
c. Satellite cell
d. Myofibroblast

690. How many T-tubules lie within a single skeletal muscle sarcomere?

a. 1
b. 2
c. 3
d. 4

691. The connective tissue layer that bundles skeletal muscle fibers into fascicles is the:

a. Perichondrium
b. Perineurium
c. Perimysium
d. Epimysium

692. An overlap of actin and myosin filaments occurs in the:

a. A Band
b. I Band
c. Z Line
d. H Band

693. Which of the following does not describe skeletal muscle fibers?

a. Striated
b. Typically voluntary
c. Multinucleate
d. Branched

694. Which of the following cells is reponsible for myelin formation in the peripheral nervous system?

a. Astrocyte
b. Oligodendrocyte
c. Schwann cell
d. Microglial cell

695. The peripheral nervous system includes the:

a. Somatic nervous system
b. Brain
c. Spinal cord
d. Nuclei

696. A neuron with many short dendrites and a single long axon is a:

a. Multipolar neuron
b. Bipolar neuron
c. Unipolar neuron
d. None of the above

697. Graded Dose- Response curve has

a) Shape of hyperbola on simple graph paper and 'S' shape on semi- log paper

b) Shape of 'S' on both simple and semi-log graph paper

c) Shape of 'S' on simple graph paper and shape of hyperbola on semi log paper.

d) Shape of hyperbola on both simple and semi log graph paper.

698. Which of the following inhibits uptake of acetycholine in to vesicles

a) Vesamicol

b) Cobra toxin

c) Bungaro toxin

d) Botulinum toxin

699 Which of following is G-protein coupled receptors?

a) Muscurinic

b) Nicotinic

c) Alpha adrenergic receptors

d) a and b

700. Which of following is used in the treatment of *myasthenia gravis*

a) Dopamine

b) Neostigmine

c) Atropine

d) Benzodiazepam

701. Which of following is used for relief of heaves in horse?

a) Oxytocin

b) Atropine

c) Methanol

d) Frusemide

702. Which of following drug increases blood pressure, heart rate and force of contractions.

a) Epinephrine

b) Atropine

c) Laetolol

d) Pindalol

703. Which of followings is a not a saline diuretics.

a) Magnesium sulphate
b) Mannitol
c) Sorbitol
d) Acetazolemide

704. What is the site of action of carbonic anhydrase inhibitors?

a) Throughout the length of the tubule
b) Loop of Henle
c) PCT
d) DCT

705. In which of the following animals emetics are not used?

a) Rats
b) Cattle
c) Horse
d) All of the above

706. Furosamide causes all except one

a) Metabolic alkalosis

b) Hypocalcaemia

c) Hypokalemia

d) Oligouria

707) Generally, which of the following is in the correct order as dosage is increased?

a) ED50 < LD50 < TD50
b) ED50 < TD50 < LD50
c) LD50 < TD50 < ED50
d) LD50 < ED50 < TD50
e) TD50 < LD50 < ED50

708) Which of the following is considered the therapeutic index (or ratio)?

a) T.I. = TD50 / ED50

b) T.I. = LD50 / ED50

c) T.I. = ED50 / TD50

d) T.I. = ED50 / LD50

e) A & B

709) Which of the following is considered the brand name?

a) Paracetmol
b) Crocin
c) ß-blocker
c) "off label" use
d) Antipyretics

710) Which of the following is NOT a protein target for drug binding?

a) Side of action (transport)
b) Enzymes
c) Carrier molecules
d) Ion channels

711. The general steps in the viral multiplication cycle are:

a. Adsorption, penetration, replication, maturation and release.
b. Endocytosis, penetration, replication, assembly and lysis.

c. Adsorption, uncoating, replication, assembly and budding.
d. Endocytosis, penetration, replication, maturation and exocytosis.

712. In dog canine adenovirus infection produces
a. Pink eye
b. Blue eye
c. Pearly eye
d. None

713. Choose the laboratory animal most suitable for typing FMD virus
a. Guinea pig
b. Hamster
c. Weaned mice
d. Rat

714. Biological vector of Bluetongue virus is
a. Aedes
b. Culicoides
c. Anopheles
d. House fly

715. Double stranded segmented RNA with 10-12 segments is the features of family
a. Reoviridae
b. Retroviridae
c. Orthomyxoviridae
d. Paramyxoviridae

716. First anti rabies vaccine was developed by
a. Edward Jenner
b. Louis Pasteur
c. Robert Koch
d. Robert Hook

717. Separation of RBCs from virus is called
a. Elution
b. HA
c. HI
d. Eclipse

718. The viral agent produces diphagic fever, respiratory distress, nervous symptoms and hard pad disease in dog is
a. Canine distemper virus.
b. ICH virus
c. Rabies Virus
d. IBH virus

719. Virus having RNA dependent DNA polymerase
a. Retrovirus
b. Reovirus
c. Rabies virus
d. Rubella virus

720. Chicken pox in man is caused by
a. Pox virus
b. Herpes virus
c. Adeno virus
d. Parvo virus

721. Swine Influenza virus associated with current pandemic in humans is
a. H1N1
b. H2N2
c. H3N2
d. H5N1

722. Chief source of leptospira is
a. Blood
b. Urine
c. Milk
d. Faeces

723. Growth of brucella organisms is favored due to
a. Erythritol
b. Sorbitol
c. Glucose
d. Protein

724. *E.coli*
a. Grows at 15-40^0 C.
b. Lactose fermenter
c. Motile
d. All of these

725. Spore forming bacteria
a. Bacillus
b. Clostridium
c. Both a and b
d. None

726. *Isoschizomers* are Restriction enzymes which:
a. Recognize and cut the same sequence
b. Recognize the same sequence but cut site vary
c. Both
d. None

727. *Neoschizomers* are Restriction enzymes which:
a. Recognize and cut the same sequence
b. Recognize the same sequence but cut site vary
c. Both
d. None

728. The enzymes used for joining two DNA molecule is:
a. DNA gyrase
b. DNA ligase
c. Topoisomerase
d. Helicase

729. Which of the following has the highest density:
   a. Relaxed genomic DNA
   b. Supercoiled DNA
   c. Plasmid
   d. RNA

730. Homo polymer tail can be added by using enzyme:
   a. Ligase
   b. Phosphate kinase
   c. Terminal deoxytransferase
   d. None

731. The plasmid which is maintained in the host cell in multiple copies are called:
   a. Relaxed
   b. Stringent
   c. Conjugative
   d. None

732. The plasmid which is maintained in the host cell in limited number of copies are called:
   a. Relaxed
   b. Stringent
   c. Conjugative
   d. None

733. RNAs that catalyze biological reactions, such as self-splicing introns, are known as:
   a. Enzyme
   b. Ribozyme
   c. Sliceosome
   d. None

734. The 2 µm plasmid is found in:
   a. Escherichia coli
   b. Pneumococcus
   c. Bacillus anthracis
   d. Sacchromyces cerevisiae

735. Which of the following statement is true for life cycle of Lysogenic phages:
   a. They immediately induce lysis of host cells for release of new virions
   b. Phage DNA is integrated with the host DNA and retained for several generations
   c. Both the above depending upon the environmental condition
   d. None of the above

736. Genes cloned with M 13 based vector can be obtained in the form of:
   a. Single stranded DNA
   b. Double stranded DNA
   c. Single stranded RNA
   d. None of the above

737. At 600 nm, one unit optical density (OD) of *E. coli* culture corresponds roughly to:
   a. 1×10^6 cells/ml
   b. 1×10^7 cells/ml
   c. 1×10^8 cells/ml
   d. 1×10^9 cells/ml

738. EDTA present in lysis solution has following functions:
   a. Chelates Mg^{++} ions and thus inhibits the activity of enzyme DNase
   b. Removes Mg^{++} ions that are essential for preserving the overall structure of cell envelope
   c. Both of the above
   d. None of the above

739. Which of the following match is incorrect:
   a. SDS: Cell Lysis
   b. EDTA: Chelating Mg^{++} ions
   c. Proteinase K: Degradation of Protein
   d. Isoamyl alcohol: precipitation of DNA

740. CTAB used is isolation of DNA forms complexes with:
   a. DNA
   b. Proteins
   c. Carbohydrates
   d. None of The above

741. Guanidinium thiocynate is useful in DNA isolation because:
   a. It forms complexes with DNA molecule
   b. It denatures and dissolves all biochemical substances other than nucleic acid
   c. In its presence DNA binds tightly to silica particles
   d. Both b & c

742. Which one of the following type of placenta is found in goat?

   a. Zonary

   b. Cotyledonary

   c. Diffuse

   d. Discoidal

743. The lymphatis are absent in

   a. Intestine

   b Uterus

   c. Brain

d. Udder

744 The pancreatic acinus is characterized by presence of

a. Hassal's corpusle

b. Centro-acinar cells

c. central artery

d. central vein

745 The accentric placed central artery is found in

a. Hepatic lobule

b. Osteon

c. Spinal cord

d. Spleen

746 The purkinjee cells are found in

a. Heart

b. Cerebrum

c. Cerebellum

d. Spinal cord

747 The tendon cell is

a. Fibroblast

b. Myoblast

c. Osteoblast

d. Chondroblast

748 Which one of the following placenta found in mare?

a. Cotyledonary

b. Diffuse

c. Zonary

d. Discoidal

749 Which of the following nerve is the largest cranial nerve?

a. Trigeminal

b. Vagus

c. Sciatic

d. None of the above

750 Which one of the following contains cerebrospinal fluid?

a. Epidural space

b. Subdural space

c. Subarachnoid space

d. None of above

751 Which one of the following ligament is great importance for treatment of upward fixation of patella in the bullock?

a. Medial patellar ligament

b. Middle patellar ligament

c. Lateral patellar ligament

d. Cruciate ligament

752 Which one of the following species presents single occipital condyle in skull?

a. cattle

b. Horse

c. Dog

d. Poultry

753 Which one fo the following animal vomits only through nostril because of its very long and well developed soft palate?

a. Ox

b. Horse

c. Dog

d. Pig

754 Animal which walks on the hoof is called as?

a. Plantigrade

b. Unguligrade

c. Digitigrade

d. None of above

755 Which type of placenta present in cow?

a. Syndesmochorial

b. Epi theleochorial

c. Endotheliochorial

d. Haemochorial

756 Which of the following animal presents ovulation fossa on its ovary?

a. Cow

b. Mare

c. Bitch

d. Doe

757 Which of the following structure produces voice in the fowl?

a. Larynx

b. Pharynx

c. Syrinx

d. None of the above

758 Which is the space present between vertebral canal and spinal duramater?

a. Subarachoid space

b. Subdural space
c. Epidural space
d. Dural space

759 Which one of the following vein is called as milk vein in cow?

a. External jugular vein

b. Subcutaneous abdominal vein

c. Umbilical vein

d. None of above

760 All the spinal nerves are:

a. Mixed type

b. Sensory type

c. Motor type

d. None of the above

761 Which one of the following foetal membrane encloses embryo in fluid sac?

a. Chorion

b. Amnion

c. Yolk sac

d. Allantois

762 Down syndrome is an example of

(a) Monosomy

(b) Trisomy

(c) Triploidy

(d) Polyploidy

763 Outward expression of a trait is called

(a) Genotype

(b) Phenotype

(c) Karyotype

(d) all of these

764. Colour blindness in human is

(a) Sex limited trait

(b) Sex linked trait

(c) Sex influenced trait

(d) None of above

765 What should be the performance of progeny above the herd average in order to declare the bull as a proven bull?

(a) 20 %
(b) 5 %
(c) 10 %
(d) 15 %

766 The nullisomy is an example of

(a) Anuploidy

(b) Euploidy

(c) Both

(d) None

767 The structural change in a chromosome in which a segment is oriented in a reverse order is called as

(a) Tranlocation

(b) Duplication

(c) Deletion

(d) Inversion

768 The regression of offspring on mid-parent value estimates

(a) ½ h^2

(b) ¼ h^2

(c) h^2

(d) None of these

769 The criss cross pattern of inheritance is seen in

(a) Sex limited trait

(b) Sex linked trait

(c) Sex influence trait

(d) None of above

770 The sudden heritable changes in genetic material is called as

(a) Duplication

(b) Mutation

(c) Deletion

(d) None of these

771 Mutation resulting from replacement of base pair of purine with purine or pyrimidine with pyrimidine is called as

(a) Transition

(b)Tansversion

(c) Translocation

(d) None of these

772 The Coiling Pattern of Shell in Snail is an example of

(a) Extra nuclear inheritance

(b) Maternal inheritance

(c) Cytoplasmic inheritance

(d) all of above

773 The sex index (X/A) value of 0.5 in Drosophila indicates

(a) Nomal male

(b) Nomal female

(c) Super male

(d) Super female

774 Genotype of purebred Pea combed birds is

(a) RrPp

(b) RRpp

(c) rrPP

(d) rrpp

775 The phenotypic ratio of recessive epistasis is

(a) 9:3:4

(b) 9:7

(c) 12:3:1

(d) 15:1

776 The medium sized milch breed of buffalo which requires less maintenance is

(a) Murrah

(b) Jafarabadi

(c) Surti

(d) None

777 Central Institute for research on goat is located at

(a) Karnal

(b) Izzatnagar

(c) Makhdoom

(d) Hissar

778 Booroola gene in Garole sheep refers to

(a) Fecundity

(b) Wool production

(c) Body weight

(d) Milk production.

779 The choice of exotic breed for improving milk production in cattle in hilly areas is

(a) HF

(b) Jersey

(c) both

(d) none

780 Red Kandhari cattle belongs to

(a) U.P.

(b) M.P.

(c) A.P.

(d) Maharastra

781 The exotic cattle breed of choice for improving milk production is

(a) HF

(b) Jersey

(c) Brown Swiss

(d) Guernsey

782 Vibriosis in a herd can best be diagnosed by

a) Serum agglutination test

b) Vaginal mucus agglutination test

c) Milk ring test

d) Rose Bengal plate test

783 Induction of estrus by premature regression of the corpus luteum can be done by using

a) PRID

b) GnRH

c) PGF2 α

d) HCG

784 Under which of the following conditions animal is acyclic

a) Delayed ovulation

b) Silent heat

c) Anovulation

d) None of the above

785 Time of ovulation in a cow is

a) 12-24 hrs before the end of estrum

b) 30-40 hrs after the end of estrum

c) About the last day of estrum

d) 10-15 hrs after the end of estrum

786 Flehman's reaction is not observed in

a) Bull

b) Boar

c) Stallion

d) Ram

787 The condition in which fetal bones crepitate within the uterus on rectal examination

a) Mummification

b) Hydroallantois

c) Maceration

d) None of the above

788 The true bacterial venereal disease is

a.) Brucellosis

b.) Campylobacteriosis

c.) Genital tuberculosis

d.) Leptospirosis

789 Endometrial cups secrete PMSG hormone during

a.) 20-60 days

b.) 100-180 days

c.) 40-120 days

d.) 180-250 days

790 In bitch the abdominal palpation can be best performed for early pregnancy diagnosis during

a.) 15-20 days

b.) 28-32 days

c.) 45-50 days

d.) 55-60 days

791 Which of the following vulval suture technique has the least disadvantages for the retention of prepartum cervicovaginal prolapse?

a.) Caslicks operation

b.) Matress suture

c.) Quill suture

d.) Buhner`s suture

792 Cuboni test is done to detect the presence of

a.) Progesterone

b.) PMSG

c.) Estrogen

d.) None of the above

793 Defective fetal deglutition is thought to be one of the causes of

a.) Hydroallantois

b.) Hydroamnios

c.) Hydrocephalus

d.) Fetal ascitis

794 "Buller cow" is representing the

a.) Follicular cyst

b.) Luteal cyst

c.) Cystic corpora lutea

d.) Par ovarian cyst

795 Yellowish or whitish, thick, opaque uterine secretion nourishing the ovum and embryo is called

a.) Lochia

b.) Yolk sac

c.) Uterine milk

d.) Oviductal fluid

796 Length of diestrus period of estrus cycle in bovine is

a) 10 days

b) 13 days

c) 18 days

d) 15 days

797 Period of embryo in cattle is

a) 13- 45 days

b) 18-50 days

c) 10-12 days

d) 45-280 days

798 Fremitus can be best felt earliest during pregnancy in cattle

a) 30-40 days

b) 40-60 days

c) 150-170 days

d) 90-120 days

799 Causative organism for contagious equine metritis

a) Campylobacter fetus

b) Trypenosoma equiperdum

c) Herpes virus

d) Teylorella equigenitalis

800 Abortion storm is a characteristic sign of

a) Vibriosis

b) Trychomoniasis

c) Brucellosis

d) Leptospirosis

801 The location of seminal vesicles in the bovine is

a) On the floor of pelvis

b) Caudal to the bladder, around the neck of bladder

c) On the either side of the pelvis urethra near ischiatic arch

d) None of the above

802 Head office of Directorate of Marketing and inspection is located at

(A) Delhi

(B) Ahmedabad

(C) Faridabad

(D) Jaipur

803 CACP headquarter is located at

(A) Jaipur

(B) Pune

(C) Kolkata

(D) Delhi

804. It is the sheep breed with high fecundity trait
   a. Nellore
   b. Garole
   c. Black Bengal
   d. Nail

805. Ringing is the practice followed by sheep owner as
   a. Tied bell on neck
   b. Pass through ring of grasses
   c. Clipping of hair around neck
   d. Clipping of hair around penis

806. Milling is the process of wool related to
   a. Removal of grease and dirt
   b. Raises individual fibres on surface
   c. Marking at brisket with colour
   d. Process of removal of objectionable part

807. Low burr content (LB) is graded in wool at burr content level
   a. Below 2 %
   b. Below 3 %
   c. 3 to 6 %
   d. More than 6 %

808. Vautha fair is famous for trading of
   a. Horse
   b. Cow
   c. Camel
   d. Donkey

809. It is the location were disowned and orphan animal are kept
   a. Animal pound
   b. Gaushala
   c. Panjarapole
   d. None

810. India ranks total milk production in the world.
   a. Third
   b. Second
   c. Fifth
   d. First

811. Gujarat has total breeds of buffaloes.
   a. Two
   b. Four
   c. Three
   d. Six

812. First ring on a horn at the age in cattle.
   a. 2 years
   b. 4 years
   c. 3years
   d. 5years

813. Principle object of running dairy farm.
   a. Meat production
   b. Milk production
   c. Sale of heifers
   d. Fodder

814. Sahiwal cow is breed pertaining to the group.
   a. Milch
   b. Dual
   c. Draught
   d. None

815. Calf starter is a feed for.
   a. Calf
   b. Heifer
   c. Cow
   d. Buffalo

816. Nose ring should be applied in bull at the age.
   a. 1.5 years
   b. 2 years
   c. 2.5 years
   d. 3 years

817. Hormone responsible for letdown of milk.
   a. Oxytocin
   b. Prolactine
   c. Lactate
   d. Hyluronidase

818. Dehorning is done in the calf at the age.
   a. 4-10 days
   b. 10-20 days
   c. 3 months
   d. 6 months

819. Common chemical used for dehorning.
   a. Sodium bromide
   b. Potassium iodide
   c. Caustic potash
   d. HCL

820. It is not a sexual behavior of bull.
   a. chin resting
   b. libido
   c. courtship
   d. reactivity
821. Banas dairy is located at.
   a. Palanpur
   b. Deesa
   c. Bharuch
   d. Mehsanas
822. Khillar is the breed found at.
   a. Gujarat
   b. Andhrapradesh
   c. Maharashtra
   d. Karnataka
823. Calf starter is a feed
   a. liquid feed for calf
   b. liquid feed for heifer
   c. solid feed for calf
   d. solid feed for heifer

824) Calcium requirement in layer poultry per day is about

   a. 0.5 %
   b. 1.5 %
   c. 3.5 %
   d. 10 %

8 Incubation period if chicken egg

   a. 19 days
   b. 23 days
   c. 21 days
   d. 18 days

8 Nutritional roup in poultry is due to deficiency of

   a. Vit A
   b. Vit B6
   c. Vit K
   d. Vit E

8 which of the fowl has a single medium wattle

   a. red jungle fowl
   b. ceylon jungle fowl
   c. grey jungle fowl
   d. javan jungle fowl

8 The best breed for using as male line in broiler production is

   a. White rock
   b. Cornish
   c. New Hampshire
   d. Australorp

8 White leghorn are white because

   a. No colour gene
   b. A dominant gene which inhibits color
   c. Recessive white gene
   d. They have silver gene

8 The wild .....is the ancestor of all domestic duck breeds

   a. Mallard
   b. Campbell
   c. Red fowl
   d. Both a & b

8 The black and white barring in barred Plymouth rock is due to .....barring gene

   a. Sex linked gene
   b. Sex limited gene
   c. Sex influence gene
   d. Dominant gene

8 The wild .....is the ancestor of all domestic duck breeds

   e. Mallard
   f. Campbell
   g. Red fowl
   h. Both a & b

8 In a sex-linked cross involving barring, the female parent is a .....

   a. Barred Plymouth Rock
   b. Non Barred Plymouth Rock
   c. Both
   d. None of above

8 In a sex-linked cross involving silver and gold, the silver gene carrying .....parent is used

   a. Male
   b. Female
   c. Both
   d. None of above

8 In a sex-linked cross involving silver and gold, the gold gene carrying .....parent is used

   a. Male
   b. Female

c. Both
d. None of above

8 In a sex-linked cross involving feathering gene, a late feathering .....parent is used

a. Male
b. Female
c. Both
e. None of above

8 Which one is sex linked

a. dwarfism
b. nakedness
c. Albinism
d. rapid feathering

8 Egg shell treatment is done to reduce the rate of .....loss

a. Oxygen loss
b. Carbon dioxide loss
c. Both a and b
d. Energy loss

8 Shank length and width is a good indicator of .....

a. Egg production
b. Meat production
c. Skeleton size
d. Health of birds

8 Shank length and width is a good indicator of .....

a. Egg production
b. Meat production
c. Skeleton size
d. Health of birds

8 Poultry need one more essential aminoacid .....than cattle

a. Lysine
b. Metheonin
c. Glysine
d. Cystene

8 Hens egg contains about.....grams of protein

a. 6-7
b. 12-13
c. 2-3
d. 21-22

8 A component of egg white having antibacterial activity

a. Lysozyme
b. Avidine
c. Transferine
d. All of above

844 Host which provides a medium for larval or asexual phase of life cycle of an infectious agent.

a) Intermediate host
b)Final host
c)Obligatory host
d)None of the above

845 Zoonotic disease are perpetuated in nature by a single vertebrate species.

a) Cyclozoonosis

b) Direct zoonosis

c) metazoonosis

d) Amphizoonosis

846 These are the bacterial zoonosis.

a)brucellosis

b)leptospirosis

c)listeriosis

d)all of the above

847 Yello fever is transmitted by.

a)Ades aegypti

b)Argus

c)Ioxides

d)Simules

848 Epedemic in bird population.

a)Epizootic

b)Epidemic

c)Epornitics

d)all of the above

849 Zone comprises the ozone layer.

a) Troposphere
b) stratosphere
c) mesosphere
d) thermosphere

850 Method of carcass disposal are

a) cremation

b) burial

c) flamegium

d) incineration

851 The term refers to smoke mixed with dust

a)smog

b)smust

c)soot

d)mist

852 Rotten egg odour in water is due to

a) Hyrogen sulfide

b) Algae

c) Cyanide

d) Ammonia

853. Standard of ventilation

a) cubic space

b)air space

c)floor space

d)all of the above

854 Type of transmission caused by physical contact.

a) direct

b)indirect

c)contect

d)vehicle.

855 Test use for diagnosis of brucellosis in cattle.

a) MRT

b) coagulation test

c)hensa test

d) gmelin test.

856 Yellow fever cause by which virus.

a)flavi virus

b)lyssa virus

c)hendra virus

d)picorna virus.

857 Constant present of a disease or organism in a community-

a)Epidemic

b)Sporadic

c)Endemic

d)Panzootic

858 Diseases transmitted from man to lower vertebrate animals called as

a) Zooanthropozoonosis

b)Anthropozoonosis

c) Amphixenosis

d)Sporozoonosis

859 Unit of radiation

a) Meds

b) Reds

c) calori

d)Joule

860 Who is the first chief of VPH in WHO?

a) Dr martin Kalpan

b)Dr Smith

c)Dr nayadu

d)Dr B B Jack

861 Test for residual chlorine

a)chlorine

b)florine

c)organoleptic

d)orthitolidine

862 The term reffered to mixture of smoke and fog

a) smog

b)must

c)sute

d)mist

863 ozogase present in ozonlayer of stratosphere

a)0.5 to 1 mg/l

b)0.2 to 0.3 mg/l

c)4 to 5 mg/l

d)2 to 3 mg/l

864 Tick paralysis is mainly caused by ticks belonging to

a) *Hyalomma*
b) *Ixodes spp.*
c) *Boophilus spp.*
d) *Amblyomma spp*.

865 Accidental myiasis causing fly

a) *Musca spp.*
b) *Chrysomia spp.*
c) *Calliphora spp.*
d) *Sarcophaga spp*.

866 'Flea collars' of dogs and cats are usually impregnted with

a) BHC
b) DDT
c) Malathion
d) Dichlorovas

867 The condition 'butchers jelly' is caused by the larvae of

a) *Oestrus ovis*
b) *Gastrophillus intestinalis*
c) *Hypoderma lineatum*
d) *Callitroga hominivorax*

868 The two pairs of antennae are present in artropodas belonging to the class

a) Arachnida
b) Crustaecia
c) Insecta
d) Myriapoda

869 Formation of hairballs in the stomach of calves may occur due to

a) Fly infestation
b) Lice infestation
c) By both of the above
d) None of the above

870 Which of the following is not a larviparous fly

a) *Oestrus ovis*
b) *Sarcophaga dux*
c) *Pseudolynchia canariensis*
d) *Gastrophillus intestinalis*

871 The following is known as wing louse of poultry

a) *Lipeurus caponis*
b) *Goniodes gigas*
c) *Menopon gallinae*
d) *Menacanthus stramineus*

872 The budy of an arachnid is divided into two parts the anterior gnathosoma and posterior

a) Podosoma
b) Idiosoma
c) Opisthosoma
d) Prosoma

873 A key role in the transmission of artropod borne diseases is played by the

a) Circulatory system
b) Excretory system
c) Respiratory system
d) Digestive system

874 Hexagonal discal cell is present in the wings of

a) Tabanus spp.
b) Stomoxys spp.
c) *Phlebotomus spp*.
d) All the above

875 wool-staining in sheep is caused by

a) Oestrus ovis
b) *Damalinia ovis*
c) Melophagas ovinus
d) None of the above

876 Brown-dog tick is

a) Rhipicephalus appendiculatus
b) Rhipicephalus sanguineus
c) *Haemaphysalis leachi*
d) None of the above

877 'Gavac' vaccine is used against

a) Hyalomma anatolicum
b) Dermacentor andersoni
c) Haemaphysalis leachi
d) *Boophilus microplus*

878 'Sweet itch' in horses is caused by

a) Simulium indicum
b) Phlebotomus sergenti
c) Culicoides robertsi
d) *Climex lecturalius*

879 How are hosts affected directly by arthropods?

a) Infestation
b) Bites
c) Anaphylactic shock
d) All of the above

880 The term 'entomophobia' means

a) A fear of insects
b) The science of insect classification
c) The study of insects
d) The study of insect behaviour

881 Which of the insects listed below could cause myiasis?

a) Dragon fly
b) Flea
c) Screwworn fly
d) Mite

882 In insects, the body part which acts as a protective structure and which provides for the attachment of muscles is known as the

a) Endoskeleton
b) Sclerites
c) Abdomon
d) Exoskeleton

883 Insects which posses sponging mouth parts and do not bite are

a) House flies
b) Fleas
c) Mosquitoes
d) Deer flies

884 Which of the following is not correctly matched-?

(A) Zn deficiency-Pig

(B) Epidemic tremor-Virus

(C) Siderosis-silica dust

(D) Alkali disease-Se

885 Pachymeningitis is inflammation of-

(A) Piamater

(B) Brain

(C) Duramater

(D) Spinal cord

886 Liquifactive necrosis is most commonly seen in-

(A) Kidney

(B) Liver

(C) Heart

(D) Brain

887 Which of the following is correctly matched-?

(A) Picorna virus-Ranikhet disease

(B) Lumpy skin disease- Pox virus

(C) Diamond skin disease-Herpes virus

(D) Paramyxo virus-FMD

888 Enlargement of Sciatic nerve is seen in-

(A) Ranikhet disease

(B) Marek's disease

(C) Chronic respiratory disease

(D) Infectious Coryza

889 Apennosis is-

(A) Intracellular edema of epidermis

(B) Congenital lack of feathers in fowl

(C) Absence of pineal gland

(D) Lack of cell differentiation during embryogenesis

890 Which is incorrect about avain tuberculosis-?

(A) Calcification absent

(B) Liver and bones are most commonly affected

(C) Lungs are most commonly affected

(D) Intradermal test is performed on wattle.

891 Post mortem of cattle reveals too much emaciated carcass,mucosa of intestine thrown into corrugated folds, most probable cause will be-

(A) Rinder pest

(B) Johne's disease

(C) Tuberculosis

(D) Pasterellosis.

892 Spondylitis is inflammation of-

(A) Prepuce

(B) Vertebrae

(C) Bone

(D) Spermatic cord

893 Which of the following is correct regarding poultry diseases-?

(A) In pullorum disease, green constant diarrhea is seen

(B) Face is swollen and edematous in Haemophilus infection

(C) Bloody mucous expelled from trachea in Infectious Bronchitis

(D) In pullorum disease, nervous signs are seen along with diarrhoea

894 In which outbreak at poultry farm maximum mortality of birds will be expected?

(A) Ranikhet disease

(B) Infectious Bronchitis

(C) Infectious Lanyngiotracheitis

(D) Avain Encephalomyelitis

895 Dohle's bodies are toxic granules of-

(A) Macrophages

(B) Eosinophils

(C) Neutrophils

(D) Lymphocytes

896 East coast fever is caused by-

(A) *Theleria parva*

(B) Theleria annulata

(C) Babesia bovis

(D) *Anaplasma centrale*

897 Edema consisting of gelatinous material in neck and brisket region seen in cattle in-

(A) Black Quarter

(B) Deganala disease

(C) Botulism

(D) Haemorrhagic Septicemia

898 Which is the main chemical mediator of inflammation-?

(A) Serotonin

(B) Bradykinin

(C) Histamin

(D) Interleukin-1

899 Big liver disease is also known as-

(A) IBD

(B) CRD

(C) Fowl cholera

(D) Fowl typhoid

900 In Angara disease, the pathological finding is-

(A) Haemopericardium

(B) Hydropericardium

(C) Myocarditis

(D) Pneumopericardium

901 In Left side heart failure, the heart failure cells are seen in-

(A) Lungs

(B) Heart

(C) Kidney

(D) Spleen

902 Sway back condition is seen due to deficiency of-

(A) Cu

(B) Co

(C) Mn

(D) Se

903 Most pathogenic species/disease affecting Snakes-

(A) Pasteurellosis

(B) Histomoniasis

(C) Salmonellosis

(D) Listeriosis.

904 Abnormal large amount of granulation tissue is known as

a. Proud flesh

b. Callus

c. Adenoma

d. Wound

905 Who introduced the basic principles of surgery

a. W. S. Halsted

b. Joseph Lister

c. W. T. G. Morten

d. Michal Harward

906 Gangrene occurs most commonly in buffaloes at

a. Udder

b. Ear pinna

c. Tail

d. All of above

907 Perineal hernia is common in

a. Mares

b. Castrated dogs

c. Spayed bitches

d. Adult uncastrarted dogs

908 Peterson's block is practiced to anaesthetize

a. Teeth

b. Eye

c. Flank

d. Limb

909 If the content of hernia is urinary bladder, then it is termed as

a. Enterocele

b. Epiplocele

c. Vesicocele

d. Hysterocele

910 Radical surgery is done to

a. Conserve damaged tissue

b. Remove damaged tissue

c. Eliminate root cause

d. Correct malformations

911 Preanesthetic medication is employed to make

a. Induction of anaesthesia smooth

b. Recovery complication minimum

c. Animal more controllable

d. All of above

912 Reaction of living tissue to injury is known as

a. Infection

b. Inflammation

c. Infestation

d. Sarcoma

913 Irreducibility of hernia is a due to

a. Adhesion

b. Strangulation

c. Incarceration

d. All of above

914 One of the following is the congenital defect of eye

a. Dermoid cyst

b. Hypopia

c. Exophthalmos

d. Conrneal ulcer

915 Exposure factor for taking radiograph is

a. mA

b. kVp

c. Second

d. All of above

916 Amputation of horn can be done under

a. Cornual nerve block

b. Caudal epidural

c. Anterior epidural

d. Retrobulbar nerve block

917 Adhesion of iris to cornea is known as

a. Anterior synechia

b. Posterior synechia

c. Epiphora

d. Chemosis

918 Surgical operation for providing drainage from middle ear is known as

a. Zepps' operation

b. Bulla osteotomy

c. Hyovertebrotomy

d. Ventriculectomy

919 FFD for taking diagnostic radiography should be

a. Minimum

b. 90 cm

c. 36 inch

d. Maximum

920 Reflecting layer is present in

a. X-ray film

b. X-ray tube

c. Intensifying screen

d. All the above

921 Frequency mainly used for the purpose of diagnostic ultrasound

a. 1 to 10 MHz

b. More than 50 MHz

c. Less than 20000Hz

d. None of the above

922 Barium sulphate is exclusively used for

a. Outlining alimentary tract

b. Outlining urinary tract

c. Outlining spinal canal

d. Outlining abdominal cavity

923 Reducing agent used in x-ray developer

a. Metol

b. Sodium carbonate

c. Potassium bromide

d. Sodium sulphite

924 Cells found in the choroid plexus that secrete cerebrospinal fluid are:

a. Astrocytes
b. Microglia
c. Ependymal cells

d. Oligodendrocytes

925 Action potentials are conducted more rapidly in:

a. Small diameter axons than large diameter axons
b. Large diameter axons than small diameter axons
c. Unmyelinated axons than myelinated axons
d. Axons that lack a wrapping of Schwann cells

926 Neurotransmitters are stored in vesicles that are located primarily in specialized portions of the:

a. Soma
b. Axon
c. Dendrite
d. Perikaryon

927 Which of the following organelles is responsible for the appearance of Nissl bodies in the cell bodies of motor neurons?

a. Smooth endoplasmic reticulum
b. Rough endoplasmic reticulum
c. Golgi apparatus
d. Mitochondria

928 Which of the following structures is a component of a reflex arc?

a. Afferent neuron
b. Efferent neuron
c. Effector organ
d. All of the above

929 The testosterone-producing cells of the testes are called:

a. Sertoli cells
b. Granulosa cells
c. Spermatogonia
d. Leydig cells

930 An oocyte surrounded by one layer of squamous follicle-like cells is most likely a:

a. Primordial follicle
b. Primary follicle
c. Secondary follicle
d. Graafian follicle

931 Podocytes make up the:

a. Visceral layer of the nephron
b. Visceral layer of the glomerulus
c. Visceral layer of the renal capsule
d. Visceral layer of the Bowman's Capsule

932 Glucose is:

a. Filtered, reabsorbed, and secreted
b. Filtered, and reabsorbed, but not secreted
c. Filtered, and secreted, but not reabsorbed
d. Filtered, and neither secreted nor reabsorbed

933 While the kidneys process about 180L of blood-derived fluids per day, the amount that actually leaves the body is:

a. 50%, or 90L
b. 100%, or 180L
c. 10%, or 18L
d. 1%, or 1.8L

934 The fluid in the capsular space is similar to plasma except that it does not contain a significant amount of:

a. Glucose
b. Sodium
c. H^+
d. Albumin

935 Aldosterone causes:

a. Decreased K^+ in the urine
b. Increased Na^+ in the urine
c. Increased urine output
d. Decreased urine output

936 Which of the following is not one of the 3 external coverings of the kidney?

a. Renal capsule
b. Adipose capsule
c. Renal fascia
d. Renal adventitia

937 The addition of a strong acid to the extracellular fluid would result in the increased formation of:

a. $NaHCO_3^-$
b. H_2CO_3
c. OH^-
d. All of the above

938 Severe vomiting can result in:

a. Septic shock

b. Anaphylactic shock

c. Hypovolemic shock

d. All of the above

939 A patient with a hypothalamic tumor has hypersecretion of ADH. Which of the following BP readings would be most likely for this patient?

a. 95/65

b. 115/80

c. 120/60

d. 165/100

940 The space in the middle of the thoracic cavity where the heart resides is the:
a. pericardial cavity
b. pericardium
c. pleural cavity
d) mediastinum

941 Blood returning from the lungs enters the heart through the:
a. pulmonary semilunar valve
b. mitral valve
c. right ventricle
d. left atrium

942 The precursor of ketone body is
a. Acetyl CoA

b.Acetoacetic acid

c. Betahydroxybutyric acid

d. Cholesterol

943) For intravenous (IV) dosages, what is the bioavailability assumed to be?

a) 0%

b) 25%

c) 75%

d) 100%

944) Which of the following is NOT a pharmacokinetic process?

a) Alteration of the drug by liver enzymes
b) Drug metabolites are removed in the urine
c) Movement of drug from the gut into general circulation
d) The drug causes dilation of coronary vessels

945)

side effects?

a) Paracetamol
b) Aspirin
c) Meloxicam
d) None of above

946) Most drugs are either ____ acids or ____ bases.

a) Strong; Strong

b) Strong; Weak

c) Weak; Weak

d) All of above

947) Which of the following enteral administration routes has the largest first-pass effect?

a) SL (sublingual)

b) Buccal

c) Rectal

d) Oral

948) Which of the following would receive drug slowly?

a) Liver

b) Brain

c) Fat

d) Muscle

949) Pharmacokinetics is the effect of the ____ and Pharmacodynamics is the effect of the ____.

a) Drug on a drug; Body on the drug
b) Body on the drug; Drug on a drug
c) Drug on the body; Body on the drug
d) Body on the drug; Drug on the body

950) Which of the following is NOT an action of the body on a drug?

a) Absorption
b) Distribution
c) Metabolism
d) Side effects

951) Which of the following is the amount of a drug absorbed per amount administered?

a) Bioavailability

b) Bioequivalence

c) Drug absorption

d) All of above

952)

blood-brain barrier (BBB)?

a) Large and lipid-soluble

b) Large and lipid-insoluble

c) Small and lipid-soluble

d) Small and lipid-insoluble

953)

W
h
a
t

t
y
p
e

o
f

d

Ta

phase II substrate?

a) Glucuronic acid
b) Sulfuric acid
c) Acetic acid
d) Amino acids

954) Which of the following reaction is phase II and NOT phase I?

a) Oxidations
b) Reductions
c) Conjugations
d) Deaminations

955) What is the Cytochrome-P450 system?

a) Metabolism of substances
b) Detoxification of substances
c) Decreasing pH of compartments containing substances
d) A & B

956) Weak acids are excreted faster in ____ urine and weak bases are excreted faster in____ urine.

a) Acidic; Alkaline
b) Alkaline; Acidic
c) Acidic; Neutral
d) Alkaline; Neutral

957) Which organ is responsible for metabolism in the “first pass effect”?

a) Brain
b) Heart
c) Kidney
d) Liver

958) Reacti

movement of a drug between body compartments?

a) Partition constant
b) Degree of ionization
c) Size
d) All of the above

959 Following is responsible for agglutination of RBC in animal body.

a) Abrin

b) Ricin

c) Renin

d) Thiamine

960 Bovine Bunker is synonym to

a) Urea toxicity

b) Salt toxicity

c) Oxalates toxicity

d) Selenium toxicity

961 Severe and acute pneumonia (Drowning syndrome) indicates probability of poisoning due to

a) ANTU

b) OCTP

c) MB

d) OP

962s All of following except one is not used for doping in animal

t
h
e
d
e
g
r
e
e
o
f

a) Furasemide
b) Phenylbutazone
c) Steroids
d) Adrenaline

963. The dry matter requirement of goat is

a. 2 – 3 %
b. 6 – 8 %
c. 4 -5 %
10 %

964. Nagler's reaction with *Cl.perfringens* on egg yolk agar is due to

a. Haemolysin
b. Hyaluronidase
c. Lecithinase
d. Leucocidin

965. Cytochemically Rickettssia are

a. Weak gram positive
b. weak gram negative
c. Acid fast
d. None

966. Corynebacteria can be characterized as

a. Non motile, non sporing, aerobic, gram positive bacilli
b. Motile, non sporing, aerobic, Gram positive bacilli
c. Motile, sporing, aerobic, Gram positive bacilli
d. Non motile, sporing, anaerobic, Gram positive bacilli

967. The cells parasitized in host by Rickettsia are

a. Erythrocytes
b. Vascular endothelial cells
c. Neutrophills

d. Monocytes

968. Dimorphic fungi produces

a.Mold type growth at 37^0 C
b. Yeast type growth at 22^0 C
c. Mold type growth at 37^0 C and Yeast type growth at 22^0 C.
d. Yeast type growth at 37^0 C.and mold type growth at 22^0 C

969. The organism present in high concentration in pigeon droppings is

a . *Candida albicans*

b. Cryptococcus neoformans

c.Rhinosporidium seeberi

d. Aspergillus flavus

970. Which of the following is incorrect match.
   a. Diene's stain: Mycoplasma
   b. Fontana stain: Spirochaetes
   c. Machiavello stain: Chlamydia
   d. Acid fast stain: *Staphylococci*

971. Strauss reaction is positive for
   a. *Brucella abortus*
   b. *Pseudomonas mallei*
   c. *Actinobacillus ligneresii*
   d. All of above

972. The Weil-Felix test is an agglutination reaction between.
   a. Antibody against Rickettsia and antigen from Pseudomonas
   b. Antibody against Rickettsia and antigen from Staphylococci.
   c. Antibody against Rickettsia and antigen from Brucella.
   d. Antibody against Rickettsia and antigen from Proteus.

973. IMViC pattern of Salmonella is
   a. + + - -
   b. + - + -
   c. - - + +
   d. - + - +

974. Virus having criss cross pattern on its surface is
   a. Contagious pustular dermatitis virus
   b. Fowl pox virus
   c. Adeno virus
   d. Parvo virus

975. Virus having cyclic DNA is
   a. Papova virus
   b. Parvovirus
   c. Pestivirus
   d. Poxvirus

976. Diploid genome is the characteristic of virus family
   a. Retroviridae
   b. Rhabdoviridae
   c. Reoviridae
   d. None of these

977. Bovine viral diarrhea virus belongs to family
   a. Togaviridae
   b. Reoviridae
   c. Herpes viridae
   d. Flaviviridae

978. Which animal is not susceptible to vesicular exanthema virus.
   a. Pig
   b. Horse
   c. Cow
   d. All of above

979. Samples suspected for Pox virus are inoculated in embryonated eggs by the route of
   a. Allantoic cavity
   b. Amniotic cavity
   c. CAM
   d. Yolk sac

980. Bovine ephemeral fever virus belongs to the family
   a. Herpes viridae
   b. Rhabdoviridae
   c. Reoviridae
   d. Togaviridae

981. EDS-76 is
   a. Herpes virus
   b. Corona virus
   c. Adenovirus
   d. Poxvirus

982. Paired serum samples means
   a. Serum sample collected at two different stages of a disease from an animal
   b. From two different animals.
   c. Samples divided in two aliquots.
   d. Samples collected from two parents.
   f. Newcastle disease virus infection in human can cause
   a. Generalized infection
   b. Contagious respiratory infection.
   c. Contgious conjunctivitis and mild influenza like symptoms
   d. Encephalitis

983. Which of the following showing buoyant density of DNA, RNA and Protein is correct:
   a. RNA>DNA>Protein
   b. Protein>RNA>DNA
   c. DNA> RNA>Protein
   d. Protein>DNA>RNA

984. Intercalation of ethidium bromide (etBr) in DNA molecule will:
   a. Increase the buoyant density of DNA molecule
   b. Decreases the buoyant density of DNA molecule
   c. Does not affect the buoyant density of DNA molecule
   d. None of the above

985. Exonucleases:
   a. Removes nucleotides one at a time from the end of DNA molecule
   b. Break internal phospho-diester bonds within DNA molecule
   c. Removes nucleotides only in 3'-5' direction
   d. Removes nucleotides only in 5'-3' direction

986. Endonucleases:
   a. Removes nt one at a time from the end of DNA molecule
   b. Break internal phospho-diester bonds within DNA molecule
   c. Removes nts only in 3'-5' direction
   d. Removes nts only in 5'-3' direction

987. The enzyme used to remove phosphate group at the 5' end of DNA molecule is:
   a. Alkaline phosphatase
   b. Polynucleotide kinase
   c. Terminal deoxytransferase
   d. Topoisomerase

988. The enzyme used to add phosphate group at the free 5' end of DNA molecule is:
   a. Alkaline phosphatase
   b. Polynucleotide kinase
   c. Terminal deoxytransferase
   d. Topoisomerase

989. The enzyme that changes the conformation of covalently closed circular DNA by introducing of removing supercoils is:
   a. Alkaline phosphatase
   b. Polynucleotide kinase
   c. Terminal deoxytransferase
   d. Topoisomerase

990. *Eco* RI produces:
   a. Blunt end
   b. Sticky end
   c. Both
   d. None

991. The specific position on a DNA molecule where DNA replication begins is called:
   a. Replication fork
   b. Origin of replication
   c. Start Point of replication
   d. None of the above

992. An algorithm used to search homology is:
   a. BLAST
   b. CLAST
   c. PUBSCAN
   d. HOMOSCAN

993. The fact that not all codons are used equal frequency in the genes of a particular organism is called:
   a. Codon preference
   b. Codon bias
   c. Codon choice
   d. None of the above

994. A technique that can be used to construct a clone contig by identifying overlapping fragments of cloned DNA:
   a. Gene walking
   b. Chromosome walking
   c. Clone fingerprinting
   d. None of the above

995. The ability of two different types of plasmid to co-exist in same cell is called:
   a. Competence
   b. Compatibility
   c. Interference
   d. None of the above

996. The non coding sequence within genes that do not translate into protein is:
   a. Intron
   b. Exon
   c. Transposons
   d. None of the above

997. The coding sequence within genes that translate into protein is:
   a. Intron
   b. Exon
   c. Transposons
   d. None of the above

998. The process of modification of RNA after transcription in which introns are removed and exons are joined is called:
   a. Splicing
   b. Recombination
   c. Translocation
   d. Assortment

999. A relatively short fragments of DNA synthesized on the lagging strand during DNA replication is called:
   a. Primer
   b. Okazaki fragment
   c. Klenow fragment

d. None of the above

1000. Which of the following is not a stop codon:
   a. AUG
   b. UAA
   c. UGA
   d. UAG

1001. Which of the following is a start codon:
   a. AUG
   b. GUG
   c. Both
   d. None

1002. Which of the following is incorrect about genetic code:
   a. It is non overlapping
   b. It is redundant
   c. It is ambiguous

d. None of the above

ANSWER KEY

Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer
1.	a	46	b	91	c	136	b	181	a
2.	d	47	b	92	c	137	b	182	c
3.	b	48	a	93	b	138	a	183	d
4.	d	49	a	94	c	139	b	184	b
5.	B	50	c	95	a	140	b	185	d
6.	C	51	b	96	a	141	b	186	a
7.	d	52	b	97	c	142	a	187	c
8.	b	53	b	98	a	143	b	188	a
9.	a	54	c	99	a	144	b	189	c
10.	b	55	c	100	a	145	b	190	a
11.	b	56	b	101	c	146	a	191	a
12.	a	57	c	102	a	147	a	192	c
13.	c	58	d	103	b	148	a	193	b
14.	a	59	c	104	b	149	a	194	b
15.	a	60	a	105	a	150	a	195	b
16.	a	61	d	106	b	151	b	196	d

17.	b	62	a	107	a	152	d	197	b
18.	c	63	a	108	a	153	c	198	c
19.	a	64	c	109	c	154	b	199	A
20.	d	65	d	110	b	155	b	200	C
21.	c	66	d	111	d	156	b	201	A
22.	B	67	a	112	b	157	b	202	C
23.	c	68	d	113	b	158	a	203	C
24.	c	69	a	114	a	159	c	204	C
25.	b	70	a	115	a	160	d	205	C
26.	a	71	c	116	a	161	b	206	B
27.	c	72	a	117	b	162	c	207	A
28.	a	73	d	118	a	163	d	208	B
29.	c	74	c	119	c	164	a	209	A
30.	d	75	a	120	d	165	b	210	A
31.	c	76	c	121	b	166	c	211	A
32.	d	77	d	122	b	167	d	212	B
33.	b	78	a	123	a	168	a	213	C
34.	c	79	c	124	b	169	c	214	A
35.	d	80	d	125	a	170	b	215	D
36.	b	81	b	126	d	171	b	216	D
37.	a	82	a	127	a	172	a	217	D
38.	a	83	d	128	a	173	c	218	C
39.	b	84	a	129	a	174	b	219	A
40.	a	85	a	130	b	175	a	220	A
41.	d	86	c	131	a	176	c	221	A
42.	b	87	c	132	a	177	b	222	C
43.	c	88	a	133	a	178	d	223	A
44.	a	89	c	134	a	179	c	224	B
45.	b	90	a	135	b	180	c	225	B

Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer
226	c	271	b	316	a	361	a	406	B
227	c	272	a	317	c	362	d	407	A
228	b	273	d	318	c	363	a	408	B
229	b	274	a	319	c	364	b	409	A
230	a	275	a	320	a	365	b	410	b
231	a	276	a	321	a	366	d	411	b
232	c	277	b	322	a	367	c	412	a
233	a	278	a	323	c	368	a	413	a
234	b	279	c	324	b	369	b	414	b
235	a	280	b	325	d	370	c	415	a
236	b	281	c	326	b	371	c	416	b
237	c	282	c	327	c	372	d	417	d
238	c	283	b	328	d	373	c	418	b
239	d	284	c	329	a	374	c	419	a
240	d	285	b	330	c	375	d	420	d
241	b	286	d	331	d	376	b	421	d
242	d	287	b	332	d	377	a	422	c
243	d	288	a	333	c	378	c	423	d
244	c	289	b	334	a	379	C	424	b
245	a	290	b	335	d	380	D	425	b
246	d	291	c	336	d	381	C	426	d
247	c	292	a	337	a	382	B	427	b
248	d	293	a	338	d	383	a	428	a
249	d	294	a	339	a	384	b	429	d
250	a	295	a	340	b	385	A	430	b
251	a	296	c	341	b	386	A	431	b
252	c	297	b	342	d	387	B	432	a

253	c	298	a	343	c	388	C	433	b
254	c	299	b	344	c	389	B	434	d
255	d	300	a	345	d	390	B	435	b
256	a	301	a	346	b	391	B	436	b
257	b	302	a	347	a	392	C	437	c
258	b	303	c	348	d	393	B	438	a
259	b	304	c	349	b	394	C	439	b
260	d	305	a	350	a	395	D	440	b
261	b	306	b	351	a	396	D	441	c
262	b	307	d	352	c	397	B	442	b
263	c	308	d	353	d	398	C	443	a
264	a	309	a	354	a	399	B	444	c
265	d	310	b	355	a	400	B	445	b
266	b	311	b	356	b	401	B	446	a
267	d	312	a	357	c	402	B	447	a
268	a	313	a	358	d	403	A	448	a
269	a	314	b	359	a	404	B	449	d
270	b	315	a	360	d	405	A	450	D
Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer
451	c	496	d	541	c	586	a	631	b
452	a	497	b	542	a	587	c	632	c
453	b	498	a	543	a	588	a	633	c
454	a	499	b	544	b	589	a	634	c
455	a	500	a	545	a	590	b	635	d
456	a	501	B	546	b	591	b	636	c
457	c	502	C	547	b	592	d	637	a

458	b	503	B	548	b	593	b	638	c
459	c	504	A	549	b	594	c	639	b
460	a	505	D	550	d	595	c	640	b
461	c	506	D	551	b	596	a	641	b
462	d	507	A	552	c	597	a	642	a
463	a	508	A	553	a	598	b	643	c
464	c	509	B	554	a	599	c	644	c
465	d	510	A	555	d	600	d	645	b
466	b	511	b	556	c	601	b	646	b
467	b	512	a	557	c	602	b	647	a
468	a	513	b	558	b	603	c	648	c
469	c	514	c	559	a	604	c	649	b
470	b	515	a	560	b	605	c	650	b
471	b	516	a	561	b	606	b	651	a
472	d	517	a	562	d	607	b	652	a
473	b	518	a	563	b	608	c	653	c
474	b	519	c	564	c	609	c	654	b
475	a	520	c	565	b	610	b	655	d
476	c	521	a	566	b	611	c	656	c
477	d	522	d	567	b	612	b	657	b
478	d	523	a	568	c	613	d	658	b
479	a	524	b	569	b	614	b	659	c
480	a	525	c	570	c	615	a	660	d
481	d	526	b	571	c	616	a	661	d
482	d	527	a	572	a	617	b	662	b
483	b	528	b	573	a	618	a	663	b
484	d	529	d	574	c	619	b	664	c
485	a	530	a	575	a	620	d	665	c
486	d	531	b	576	b	621	d	666	a

487	b	532	d	577	b	622	d	667	b
488	d	533	a	578	c	623	c	668	a
489	d	534	c	579	a	624	b	669	b
490	d	535	c	580	c	625	a	670	b
491	a	536	a	581	a	626	c	671	c
492	b	537	a	582	a	627	d	672	d
493	c	538	b	583	b	628	d	673	c
494	a	539	a	584	b	629	d	674	a
495	d	540	c	585	c	630	a	675	A
Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer
676	d	721	a	766	a	811	b	856	a
677	c	722	b	767	d	812	c	857	c
678	c	723	a	768	c	813	b	858	a
679	b	724	d	769	b	814	a	859	B
680	c	725	c	770	b	815	a	860	A
681	c	726	a	771	a	816	b	861	D
682	a	727	b	772	d	817	a	862	A
683	c	728	b	773	a	818	a	863	D
684	a	729	d	774	c	819	d	864	B
685	c	730	c	775	a	820	d	865	A
686	b	731	a	776	c	821	a	866	D
687	a	732	b	777	c	822	d	867	C
688	a	733	b	778	a	823	a	868	B
689	c	734	d	779	b	824	c	869	B
690	b	735	b	780	d	825	c	870	D
691	c	736	a	781	a	826	a	871	A

692	a	737	d	782	b	827	d	872	B
693	d	738	c	783	c	828	b	873	D
694	c	739	d	784	d	829	b	974	A
695	a	740	a	785	d	830	a	875	C
696	a	741	d	786	b	831	a	876	B
697	a	742	b	787	c	832	a	877	D
698	a	743	c	788	b	833	a	878	C
699	d	744	b	789	c	834	b	879	D
700	b	745	d	790	b	835	a	880	A
701	b	746	c	791	d	836	b	881	C
702	a	747	a	792	c	837	d	882	D
703	a	748	b	793	b	838	b	883	A
704	c	749	a	794	a	839	c	884	C
705	b	750	c	795	c	840	c	885	C
706	d	751	a	796	b	841	c	886	D
707	b	752	d	797	a	842	a	887	B
708	b	753	b	798	d	843	a	888	B
709	b	754	b	799	d	844	a	889	B
710	d	755	a	800	c	845	b	890	C
711	a	756	b	801	b	846	d	891	B
712	a	757	c	802	c	847	a	892	B
713	c	758	c	803	d	848	c	893	B
714	b	759	b	804	b	849	b	894	C
715	a	760	a	805	d	850	b	895	C
716	b	761	b	806	b	851	b	896	A
717	a	762	b	807	b	852	a	897	D
718	a	763	b	808	d	853	d	898	C
719	a	764	b	809	c	854	c	899	A
720	b	765	a	810	d	855	a	900	B

Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer	Sr. No	Answer
901	A	946	C	991	b				
902	A	947	D	992	a				
903	C	948	C	993	b				
904	A	949	D	994	b				
905	A	950	D	995	b				
906	C	951	A	996	a				
907	D	952	C	997	b				
908	B	953	D	998	a				
909	C	954	C	999	b				
910	C	955	D	1000	a				
911	D	956	B	1001	c				
912	B	957	D	1002	c				
913	D	958	D						
914	A	959	B						
915	D	960	a						
916	A	961	A						
917	A	962	D						
918	B	963	B						
919	B	964	C						
920	C	965	B						
921	C	966	A						
922	A	967	B						
923	A	968	D						
924	C	969	B						
925	B	970	D						
926	B	971	D						

927	B	972	D						
928	d	973	D						
929	D	974	A						
930	A	975	A						
931	d	976	A						
932	b	977	D						
933	D	978	B						
934	D	979	C						
935	D	980	B						
936	d	981	C						
937	B	982	A						
938	C	983	a						
939	D	984	b						
940	D	985	a						
941	D	986	b						
942	D	987	a						
943	D	988	b						
944	D	989	d						
945	d	990	b						

1. The incidence of ketosis is higher in……lactation.
2. Primary ketosis usually develops during ……..period.
3. Alimentary form of ketosis is also known as ……...or……ketosis.
4. Nervous form of ketosis is mainly due to…….
5. Milk fever type of ketosis is also known as ……
6. Milk fever type ketosis is a condition of …….. associated with ……
7. Ketosis is basically a problem related to…….balance.
8. Clinical ketosis usually occurs when plasma glucose level goes below ……..and NEFA concentration goes greater than …….
9. Glucorticoids reduced ketone body formation by utilization of ……
10. Vetalog (triameinolene) is very much active against ……
11. Anabolic steroid never increase blood …….level but increases blood……. Level and help in the elimination of preformed ……..
12. Parturient paresis is a metabolic disease occurring most commonly within ……..of parturition.
13. Parturient paresis also known as …….or……
14. Parturient paresis is frequently found in high yielding……and rare in sow.
15. When milk fever is associated with hypocalcaemia, hypophosphataemia and hypomagnesemia it is also known as …….or……
16. The normal ratio of Ca to Mg in blood is …….
17. Detection of Ca in the urine of animal is done by…….test.
18. A decreased ionized ……. Lead to milk fever.
19. Chances of development of milk fever is more in ……due to ……..binding.
20. Carbol (C.B.G.) contains …….parts Ca-gluconate and ……parts boric acid.
21. Eclampsis in bitches is also known as ……,……,or…… ……....
22. Post parturient haemoglobinurea is also known as ……..and…… …….
23. Sodium and potassium rich diet ……. The chance of development of milk fever.
24. …….posture occurs in milk fever.
25. Myoglobin in urine can be differentiated from hemoglobin by …….
26. Hypomagnesaemic tetany is also known as ……...,……, ……
27. ……syndrome occurs primarily in light horses.
28. Young green grass are ……. In magnesium than mature grass.
29. A decrease in the ratio of magnesium : calcium will stimulate the secretion of …… ……. Which is responsible for titanic sign.
30. Drug of choice for malignant hyperthermia is …….
31. Porcine stress syndrome is also known as ……..
32. Baby pig cannot utilize …….. and ……. Excepting……..

33. Pregnancy toxaemia is highly fatal metabolic disease of …….. and …….
    Occur in late pregnancy.
34. Hypoglycaemia Is also known as……or……
35. Porcine stress syndrome is due to ……
36. In preganacy toxaemia the level of cortisone is…….
37. Pregnancy toxaemia is also known as ……
    Or……or……..
38. Absence of corneal reflex and star gazing posture may be noted in …….
39. A decrease in the ratio of magnesium : calcium will stimulate secretion of ……
    which is responsible for tetanic sign.
40. Normal level of Mg in the blood is…….
41. ……....specific gravity of urine is found in ……myoglobinurea.
42. Paralytic myoglobinurea is popularly known as ……
43. Eclampsia in bitches is generally restricted to …… breed of dog (Spitz) and generally not susceptible in ……...breed of dog (Alsatian).
44. Biot's spot is associated with deficiency of …….
45. Enzyme …… Causes conversion of carotene to vitamin A in ……
46. In kerato malacia cornea become soft due to…… necrosis.
47. Day blindness is also known as…….
48. Night blindness is also known as……..
49. Configuration of epithelial tissue is maintained by……..
50. …….hormone helps in the conversion of carotene to vitamin A.
51. During heat stress additional …… Should be supplemented to the feed.
52. Mature pasture is deficient in…….. content.
53. Low …….levels retards the conversion of carotene to vitamin A.
54. ……. And ……fertilizers interfere with the conversion of carotene too vitamin A.
55. …….. is the store house of vitamin A.
56. Animal deficient in ……..Absorbs vitamin A insufficiently.
57. Karatomalacia is a …… Ocular sign in vitamin A deficiency.
58. Corneal scar is a …… Ocular sign in vitamin A deficiency.
59. Conjunctival xerosis is usually confined to …… part of conjunctiva.
60. …… associated with Vitamin A deficiency appears as a small silver grey raised plaque on the conjunctiva.
61. In corneal xerosis cornea turns hazy due to…….. and assumes…….
62. In corneal xerosis anterior chamber of the eye may be filled with cellular exudates leading to a condition known as……..
63. Cells of eye responsible for vision in day light are…….
64. Cells of eye responsible for vision in night are ……..
65. Corneal opacity is a condition frequently observed in ……and ……
66. Corneal scar may be taken up as a sequelae to……..
67. In hypo vitaminosis A there is decrease in ……. Activity of bones.
68. Hyperkeratinized condition of skin is known as ……..

69. …….. and ……. Diet accentuates the formation of calcium phosphate caliculi in the bladder and kidney.
70. Deficiency of …….. leads to loss of cell mediated immunity.
71. The varieties of vitamin D having physiological function are…… and……
72. Abnormal dryness of the conjunctiva occurs in xeropthalmia due to non functioning…….
73. Vitamin d helps in the absorption of …….. from gut.
74. Vitamin D2 and D3 are…….. effective in most of the animals but in case of chicken …… is more effective.
75. In older animals vitamin D deficiency causes ……..
76. Deficiency of …….. causes pilioencephalomalacia.
77. ……..., ……..., ……Is due to deficiency of nicotinic acid.
78. A disease called …… is seen in sheep in Britain where there is loss of wool and debility.
79. Pine is a disease of sheep which is due to deficiency of …….
80. Vitamin E functions in animal body mainly as …….
81. …… disease of pigs is a deficiency sign of vitamin E.
82. Vitamin E is also known as ……. Factor.
83. White muscle disease is due to deficiency of ……..
84. ……. syndrome in horses is due to deficiency of vitamin E.
85. Vitamin K1 is also known as……..
86. Vitamin K2 is also known as…….
87. Vitamin K 3 is also known as……..
88. Vitamin K is …… soluble and heat……
89. Vitamin K takes part in normal …… process of blood.
90. Sweet clover disease is due to dicoumarol poisioning due to deficiency of……..
91. About 90% of copper remains in plasma as ……
92. Mineral essential for metabolism of propionate is……
93. Copper deficiency produces nervous manifestations known as …… and.....
94. Copper deficiency causes depigmentation of hairs and wool known as……
95. Copper deficiency causes myocardial degeneration and this condition is known as……..
96. Copper deficiency causes ……. Oestrus in cattle.
97. In dairy cattle excess thickening of skin known as ……Is due to deficiency of Zn.
98. Deficiency of Zn causes imperfect keratinization of the epithelial cells of the skin in pigs known as……..
99. …… is known as anti infection vitamin.
100. Chondromalacia is due to……
101. Deficiency of vitamin A in fowl causes…….
102. Vitamin A is required for maintenance of specialized ……of the body.
103. Hyper-vitaminosis causes development of ……(intense osteoclastic activity).

104. Crazy chick disease is due to deficiency of ……
105. Vitamin C is water…….. and heat……
106. Battery sickness among fowl is due to deficiency of ……
107. Beri-beri is due to deficiency of……
108. ……. Paralysis is due to deficiency of riboflavin.
109. In dog deficiency of niacin causes……or……
110. Canine pellagra is formerly called as…….
111. Pellagra which means rough skin is manifested by……
112. Hyperplasia of bone marrow is due to deficiency of……
113. Biotin has an important role in …… fixation.
114. Fatty liver condition is due to deficiency of ……
115. In fowl perosis is due to deficiency of ……and……
116. Vitamin B12 is also known as ……. factor.
117. …… Is due to acute poisioning of selenium.
118. Alkali disease is due to chronic poisioning of…….
119. Deficiency of …….. causes fatty liver and heavy deposition of hemosiderin in the spleen are noticed at postmortem. This condition is enzootic in New Zealand and is known as……..
120. Zinc is an important constituent of enzymes……and……
121. In sheep a condition known as ……. Is due to deficiency of Cu in which wool loses its crimps.
122. Deficiency of copper may cause fatal syncope in cattle known as……
123. …….. is necessary for the synthesis of cartilage matrix.
124. The epiphyseal cartilage fails to ossify due to deficiency of……
125. Slipped tendon is due to deficiency of ……..
126. Pica or ……Is due to deficiency of ……
127. In horses a condition developed called ……. Also called big head,…….. disease or barn disease is due to excess intake of phosphorus.
128. The normal inorganic phosphorus content of blood is ……
129. Calcium and phosphorus must be fed in a definite ratio of……
130. Causative agent of kennel cough is……..
131. Major infectious diseases of lambs which causes mortality are……..…and……
132. Viral infection causing cerebellum hypoplasia in calves is…….
133. Enzootic ataxia in lamb is caused by deficiency of……
134. Lamb dysentery is caused by…….
135. Inflammation of external aspect of umbilicus is known as……
136. Feeding of …….. To neonates provides passive immunity.
137. Clostral immunoglobulin present in intestine protects new born against……
138. Colisepticemia is a common cause of ……. Mortality.
139. **Tracheobronchitis** is a highly contagious canine illness characterized by inflammation of the upper……
140. Kennel cough can be …… And ……
141. Parvo virus infection produces antibodies are categorized as……. And later as……
142. The parvo virus has got affinity towards ……. And the …… system.
143. In porcine strees syndrome the death occurs due to excess …… level causing cardiac arrest.

144. The inherited defect of HAL gene causes……. In porcine.
145. Other name of milk fever type of ketosis is…….
146. The enzyme which is required for conversion of fatty acid to glucose is…….
147. NEFA stands for……
148. Blood NEFA on oxidation produces……..
149. Blood NEFA on esterification produces…….
150. The amount of glucose required for synthesis of lactose in high yielding dairy cattle is……
151. In a cow, yielding 20-40 litres of milk daily will drain out about …… fat and about…… protein per day.
152. Antiketogenic volatile fatty acid is…….
153. …….. Hormone stimulates formation of glucose from fat and protein.
154. Precursor of Acetyl CoA is……
155. Woody appearance of cow is due to……
156. In ketosis, the DLC picture shows……..
157. In clinical ketosis, usually plasma glucose level is below……. And NEFA greater than….....
158. …… can be done for diagnosis of ketone bodies in urine.
159. In rothera test, if urine is not available then…….. can also be used for diagnosis.
160. Nervous form of ketosis can be differentiated from nitrate poisioning by the absence of ……... In ketosis.
161. Parturient paresis occur most commonly within …….. days of parturition.
162. There is deficiency of…… mineral in parturient paresis.
163. Hypocalcemia occurs in most cows with their …….. calving.
164. Milk fever occurs commonly in…….. and…….. season.
165. The normal ratio of calcium and phosphorus in blood of cow is……
166. The amount of calcium in colostrum is about ……. Times more than normal milk.
167. ……..... shape posture appears in cattle in milk fever.
168. Non parturient milk fever occurs in about…….. percent cases.
169. Sulkowitch test is based on detection of …… in……..
170. Carbol conatins ……..parts Ca-gluconate and …… parts boric acid.
171. During toxicity of carbol the antidote …… may be given.
172. The ratio of Ca : P should be …….. in cattle during last month of pregnancy to prevent milk fever.
173. Eclampsia in bitches can be differentially diagnosed from……. , ……. , …… and……..
174. Lahu-mutna is other name for…….
175. Red water is caused due to deficiency of …….. in diet.
176. …… are formed due to oxidative changes in haemoglobin of RBC in post parturient hemoglobinurea.
177. Normal phosphorus amount in blood of cattle is……..
178. Monday morning sickness is caused due to excessive accumulation of …… in muscles.
179. Normal magnesium level of cow's blood is……
180. ……is a disease of civilization.
181. The most susceptible breed of cow to downer cow syndrome is……

182. If the mastitis and metritis are the cause of downer cow syndrome then the prognosis is……
183. If in case of downer cow syndrome both hind legs are spread laterally then the prognosis is……..……..
184. Pregnancy toxaemia is caused due to deficiency of……..
185. ……. Is the choice of drug in porcine stress syndrome.
186. The dose of dantrolene is……
187. …… is also known as pro-viatmin D_3.
188. The vitamin produced in skin on exposure to sunlight is…….
189. The vitamin also known as antisterlity factor is……
190. Mineral present in enzyme glutathionate peroxidase is…….
191. Vitamin which cannot be obtained from plant sources is……
192. …… acts as coenzymes for carboxylase.
193. Polyneuritis may be caused due to deficiency of……..
194. Maturation of RBC delays due to deficiency of……
195. …….. is also known as anti-pellagra factor.
196. ……..is also known as antidermatitis vitamin.
197. Other name for vitamin B_6 is……
198. Other name for Niacin is…….
199. Anti-anaemic vitamin is……
200. Cynacoblamin is obtained from fungus……
201. …… acts as coenzyme in oxidation of tyrosine and phenylalanine.
202. The vitamin that is destroyed in rumen is……
203. Water soluble vitamins are……..
204. Fat soluble vitamins are……..
205. Iron deficiency anaemia caused due to parasitic burden is characterized by……Condition.
206. Haemitinic mixture contains ferritic ammonium citrate……..gm, copper sulfate…… mg, and cobalt sulfate……mg.
207. About ……. Of copper remains in plasma as……
208. Runting is seen in…….
209. Starvation and crushing are major cause of pre-weaning mortality in……
210. Piglets is subjected to cold stress when the temperature goes below…….
211. Colisepticaemia is common cause of …… mortality.
212. New born should be fed colostrums with in …….. of birth.
213. Young one of porcine are more susceptible to……. Deficiency.
214. Secondary deficiency of copper may occur due to excess of ……
215. High level of copper causes …… of liver.
216. The requirement of copper is about…… in an adult animal.
217. Metallic component of enzyme carbonic anhydrase is……
218. Metallic component of enzyme alkaline phosphatase is……
219. Canine distemper is also known as……. Disease.
220. In cattle deficiency of zinc causes excess thickening of skin known as……
221. Due to deficiency of zinc in pigs, there is imperfect keratinization of epithelial cells of skin known as……..
222. …….. responsive dermatitis often respond to zinc therapy.
223. Normal level of zinc in cattle is……

224. …….. is a component of cyanocoblamin.
225. Dietary ……..increases while……decreases the chances of production of milk fever.
226. Selenium is absorbed from…….. but not from…… and……..
227. Non inflammatory degenerative necrotic changes in cardiac and skeletal muscles due to deficiency of selenium is known as……..
228. In acute enzootic muscular dystrophy…….. muscles are affected.
229. In sub-acute enzootic muscular dystrophy…….. muscles are affected.
230. In white muscle disease white areas of muscles shows …….. degeneration.
231. Hepatosis dietecia is seen in pigs due to deficiency of…….. and……
232. There is reduction of enzyme…….. level in blood and tissues in white muscle disease.
233. Cobalt acts as a source of amino acid……..
234. Cobalt is conserved in liver as……
235. Cobalt bound to plasma protein is known as…….
236. Cobalt is released into cell cytosol as ……
237. Liver and muscle specific enzymes…… ,……. And……. Increases in cobalt deficiency.
238. Iodine deficiency can be caused in animals when there is excessive feeding of …….. mineral.
239. An example of goiterogenic substance is……
240. …….. is caused due to deficiency of iodine.
241. Naval ill is called so because the infection starts at…….. and may reach upto joints.
242. The inflammation of umbilicus is called……..
243. Cabbage conatins…… which acts as goiterogen.
244. In Monday morning sickness, mostly…….. limbs are affected.
245. In milk fever there are three stages…….. , ……. And…….
246. Animals which are unable to rise after 24 hours and also after two treatments of calcium can be classified as……..
247. Therapeutic dose of vitamin A in a calf suffering from hypovitaminosis A is…… ……...I.U./Kg. B.wt.
248. Excessive Ca without complementary P & vitamin D may lead to…….
249. Treatment of acute hypothiaminosis in goat is…….
250. Normal range of blood calcium in cow is……..

ANSWER –

1. Third
2. Post partum
3. Digestive from, ketogenic
4. Hypoglycemia
5. Complicated ketosis
6. Hypoglycemia, hypocalcaemia
7. Negative energy balance
8. 35 mg/dl, 100µeq/l
9. Acetyl CoA
10. Ketosis
11. Glucose, nitrogen, ketone bodies
12. 72 hours
13. Calving paralysis, milk fever
14. Jersey cow

15. Milk fever syndrome, milk fever complex
16. 6:1
17. Sulkowitch
18. Calcium
19. Metabolic alkalosis, albumin
20. 83, 17
21. Lactation tetany, puerperal tetany, post parturient tetany
22. Hypophosphatemia, nutritional hemoglobinurea
23. Increases
24. S-shaped
25. Spectroscopic examination
26. Lactation tetany, wheat pasture poisoning, grass stagger
27. Tying up syndrome
28. Poor
29. Acetylcholine esterase
30. Dantrolene
31. Autosomal recessive gene
32. Sucrose, starch, lactose
33. Sheep, goat
34. Baby pig disease, 3 days pig disease
35. Malignant hypothermia
36. Increased
37. Kidding sickness, sleepy sick, twin lamb disease
38. Pregnancy toxaemia
39. Acetylcholine esterase
40. 2.3 mg/dl
41. High
42. Monday morning sickness
43. Small breed of dog, Large (alsation)
44. Vitamin A
45. Carotene
46. Coagluative
47. Amblyopia
48. Nyctopia
49. Vitamin A
50. Thyroxine
51. vitamin A
52. Carotene
53. Phosphorus
54. Nitrate and nitrite
55. Liver
56. Vitamin E
57. Primary
58. Secondary
59. Bulbar
60. Biot's spot
61. Cellular infiltration, bluish milky appearance
62. Hypopyon
63. Cone
64. Rods
65. Calf, dog
66. Xeropthalmia
67. Osteoblastic
68. Xerodermia
69. Low vitamin A, calcium
70. Vitamin A
71. D_2 and D_3
72. Goblet cells
73. Ca
74. Equally, D_3
75. Osteomalacia
76. Thiamine
77. Diarrohea, dysentery, dementia
78. Pine
79. Vit. B_{12}
80. Antioxidant
81. Mulberry heart disease
82. Antisterlity
83. Vitamin E
84. Tying up
85. Phytonadione
86. Farnoquinone
87. Menadione
88. Fat, stable
89. Coagulation
90. Vitamin K
91. Ceruloplasmin
92. Cobalt
93. Neonatal ataxia, sway back
94. Achromotrichia
95. Falling disease
96. Delayed
97. Hyperkeratosis
98. Parakaratosis
99. Vitamin A
100. Hypervitaminosis
101. Nutritional roup
102. Epithelial surface
103. Osteoporosis
104. Vitamin E
105. Soluble, labile
106. Battery sickness
107. Vitamin B_1
108. Curled toe
109. Black tongue, canine distemper
110. Stuttgart disease
111. Dermatitis
112. Pyridoxine
113. CO_2
114. Choline
115. Choline and Mg
116. Anti pernicious anaemia
117. Blind stagger
118. Selenium
119. Cobalt
120. Carboxyl anhydrase, carboxy peptidase
121. Steely wool
122. Falling disease
123. Manganese
124. Manganese
125. Manganese
126. Allotriopathy, phosphorus

127. Osteitis fibrosa, miller's
128. 4-6 mg/100 ml
129. 2:1
130. Bordetella bronchiseptica
131. Struck, lamb dysentery
132. BVD-MD
133. Copper
134. *Clostridium perfringens* type-B
135. Naval ill
136. Colostrum
137. Diarrhea
138. Calf
139. Respiratory tract
140. Viral, bacterial
141. Ig M, Ig G
142. Lymphocytes, lymphatic system
143. Potassium
144. Porcine stress syndrome
145. Complicated ketosis
146. CoA
147. Non Esterified Fatty Acid
148. Ketone bodies
149. Triglycerides
150. 1 kg
151. 0.4 kg
152. Propionate
153. Thyroxine, cortisone
154. Fatty acid
155. Hypoglycemia
156. Lymphocytosis
157. 35 mg/dl, 1000µeq/l
158. Rothera
159. Milk
160. Diarrhea
161. 3
162. Calcium
163. 3-7th
164. Later winter, spring
165. 2.3:1 or 2:1
166. 12
167. S
168. 5-7 %
169. Ca, urine
170. 83, 17
171. $MgSO_4$
172. 1:3.3
173. Tetanus, strychnine poisoning, rabies, epilepsy
174. Post parturient hemoglobinurea
175. Phosphorus
176. Heinz bodies
177. 4-7 mg/dl
178. Glycogen
179. 2.3 mg/dl
180. Hypomagnesemi c tetany
181. Holstein breed
182. Hopeful
183. Hopeless
184. Blood glucose
185. Dentrolene
186. 4-5 mg/kg, I/V
187. 7-dehydrocholesterol
188. Vitamin D_3
189. Vitamin E
190. Selenium
191. Vitamin B_{12}
192. Thiamine
193. Thiamin/Aneurin
194. Cyanocoblamin
195. Nicotinic acid(niacin)
196. Pyridine(Vitamin B_6)
197. Pyridoxine
198. Nicotinic acid
199. Cyanocoblamin
200. Streptomyces grisens
201. Ascorbic acid
202. Ascorbic acid
203. Vitamin B, vitamin C
204. Vitamin – A,D,E,K
205. Bottle jaw
206. 1.2, 60, 15
207. 90 %, ceruplasmin
208. Pig
209. Porcine
210. 93° F
211. Calf
212. 3 hours
213. Iron
214. Molybdenum
215. Cirrhosis
216. 5 PPM
217. Zinc
218. Zinc
219. Hard pad/carre's disease
220. Hyperkeratosis
221. Parakaratosis
222. Zinc
223. 20-120mg/dl
224. Cobalt
225. Cation, Anion
226. Duodenum, abomasum, rumen
227. White muscle disease/ stiff lamb disease
228. Cardiac
229. Skeletal
230. Zenker's
231. Selenium, Vitamin E
232. Glutathione peroxidase
233. Methionine
234. Methylcobalamin e
235. Transcobalamine
236. Hydroxocobalam ine
237. CPK, SGOT, SGPT
238. Calcium

239. Thiouracil (cabbage)
240. Goiter
241. Umbilical cord
242. Oomphelitis
243. Thiouracil
244. Hind
245. Very fleeting stage, stage of sitting on sternum, stage of lateral placement of body
246. Downer cow syndrome
247. 10-15 lakh
248. Osteomalacia
249. Yeast
250. 8-10.5 mg/dl

1. To improve the negative energy balance in a dairy animal which of the following statement stands correct
    a. The “input” into the animal must be equal or less than “output”.
    b. The “input” into the animal must be equal to “output”.
    c. The “input” into the animal must be equal or more than “output”.
    d. The “input” into the animal must be less than “output”.
2. Compton metabolic test for prediction of health status of dairy animals based on blood biochemical profiles includes the following tests except one;
    a. Blood Manganese, Iodine
    b. Blood Sodium, nitrogen
    c. Serum Copper, Iron, Potassium
    d. All the above
3. Ketosis in dairy cattle can be caused by;
    a. Glucose availability, negative energy balance, imperfect NEFA utilization.
    b. Glucose availability, negative energy balance, perfect NEFA utilization.
    c. Glucose non-availability, negative energy balance, imperfect NEFA utilization.
    d. Glucose non- availability, negative energy balance, perfect NEFA utilization.
4. Muscular dystrophy can be treated by supplementing :
    a. Vitamin E
    b. Phosphorus
    c. Calcium
    d. Protein
5. Feeding of cereals containing high contents of potassium for longer period may cause:
    a. Lactation tetany
    b. Iron deficiency anaemia
    c. Ketosis
    d. Milk fever
6. Xeropthalmia occurs due to deficiency of:
    a. Riboflavin
    b. Ascorbic acid
    c. Vitamin A
    d. Vitamin D
7. Majority of clinical cases of parturient paresis occurs:
    a. During advance stage of pregnancy
    b. During first 48 hours of parturition
    c. Between 10-25 days after parturition
    d. One month after parturition

8. Enzootic ataxia in lambs is caused by deficiency of which of the following:
    a. Copper
    b. Selenium
    c. Manganese
    d. Iron
9. Molybdenum poisioning can cause deficiency of :
    a. Copper
    b. Iron
    c. Zinc
    d. Selenium
10. Wasting type of bovine ketosis can be confused by:
    a. Indigestion
    b. Abomasal displacement
    c. Traumatic reticulitis
    d. All the above
11. Milk fever can be prevented by feeding the animal pre-partuma:
    a. High calcium diet
    b. High protein diet
    c. High phosphorus and low calcium diet
    d. None of the above
12. Polioencephalomalacia in animals occurs due to deficiency of
    a. Thiamin
    b. Vitamin D
    c. Vitamin E
    d. All the above
13. Symptoms of hypomagnessemic tetany in animals occur when the:
    a. Hypomagnesemia alone
    b. Hypocalcaemia alone
    c. Hypocalcaemia and hypomagnesemia both
    d. Hypophosphatemia alone
14. The production disease of farm animals include:
    a. Ruminal load
    b. Selenium vitamin-E in-adequency
    c. Rumen acidosis/alkalosis
    d. Nine of the above
15. In the Compton metabolic profile test the blood Is analysed for
    a. Calcium
    b. Inorganic phosphorus
    c. Blood urea nitrogen
    d. Total serum proteins
16. Peat scour is due to which of the following:
    a. Deficiency of cobalt
    b. Deficiency of copper
    c. Deficiency of molybednum
    d. Deficiency of iron
17. Pregnancy toxaemia in ewes occurs during:
    a. Early pregnancy
    b. Mid-pregnancy
    c. Parturition
    d. Last month of pregnancy
18. Feeding of wheat bran containing high contents of phosphorus, in excess for longer periods to horse can cause which of the following:
    a. Phosphorus deficiency
    b. Milk fever
    c. Osteodystropic fibrosa
    d. Rickets
19. Azoturia is seen in horses :
    a. During exercise after resting on full ration
    b. During rest on full ration
    c. During exercise on poor ration
    d. All the above
20. Pica is caused by:
    a. Dietary deficiency of bulk
    b. Dietary deficiency of nutrients
    c. Boredom
    d. All the above
21. Hypomagnesemic tatany may occur after:
    a. Long stressful transport
    b. Grazing on grass dominant pasture
    c. Grazing on pastures heavily top dressed with N and K fertilizers
    d. All the above
22. In the healthy animals, intake of iron from gastro intestinal tract contents into circulation is:
    a. 10%
    b. 20%
    c. 15%
    d. Less than 1%
23. If iron is taken for long time, it may cause:
    a. Constipation
    b. Diarrohea
    c. Phosphorus deficiency
    d. All the above
24. Oral dose of iron preparation in anaemia in cattle is:
    a. 20 – 25 gms
    b. 25 – 30 gms
    c. 5 – 10 gms
    d. 50 – 60 gms
25. In iron deficiency there is:

a. Microcytic hypochromic anaemia
b. Macrocytic hypochromic anaemia
c. Microcytic normochromic anaemia
d. Microcytic normochromic anaemia

26. Nervous form of ketosis can be confused with:
    a. Rabies
    b. Lead poisoning
    c. Nitrate poisioning
    d. All the above
27. Biot's spot is associated with:
    a. Vitamin B deficiency
    b. Vitamin C deficiency
    c. Vitamin A deficiency
    d. Vitamin E deficiency
28. Which of the following vitamin acts an antioxidant:
    a. Vitamin A
    b. Vitamin E
    c. Vitamin C
    d. Both b and c
29. Menadione is also known as
    a. Vitamin K_1
    b. Vitamin K_2
    c. Vitamin K_3
    d. Vitamin K_5
30. farnoquinone is also known as
    a. Vitamin K_1
    b. Vitamin K_2
    c. Vitamin K_3
    d. Vitamin K_5
31. Approximately how much percent of body iron remains functionally as haemoglobin, myoglobin, etc.:
    a. 10%
    b. 35%
    c. 50%
    d. 70%
32. Iron deficiency may be as a result of:
    a. Magnesium deficiency
    b. Cobalt deficiency
    c. Copper deficiency
    d. Manganese deficiency
33. Secondary deficiency of copper may be due to:
    a. Low level of molybdenum
    b. High level of molybdenum
    c. Low level of iron
    d. High level of iron
34. Neonatal ataxia can be caused due to deficiency of
    a. Zinc
    b. Copper
    c. Iron
    d. Molybdenum
35. Depigmentation of hairs and wool known as achromotrichia is caused due to
    a. Hyper manganesemia
    b. Hypo manganesemia
    c. Iron deficiency
    d. Copper deficiency
36. Falling disease is caused due to
    a. Hyper manganesemia
    b. Hypo manganesemia
    c. Iron deficiency
    d. Copper deficiency
37. Deficiency of zinc causes imperfect keratinization of the epithelial cells of the skin which is also known as "parakaratosis". This disease is caused in
    a. Cattle
    b. Pig
    c. Poultry
    d. Goats
38. Deficiency of zinc causes imperfect keratinization of the epithelial cells of the skin which is also known as "hyper-karatosis". This disease is caused in
    a. Cattle
    b. Pig
    c. Poultry
    d. Goats
39. The blood sample of an animal seems to be anaemic reveals the presence of "Heinz bodies". The animal is probably suffering from
    a. Zinc deficiency
    b. Iron deficiency
    c. Copper deficiency
    d. Magnesium deficiency
40. Consider the following statement:
    I. Cobalt acts as growth inducer
    II. Cobalt acts as a source of amino acid – cysteine
    III. Cobalt helps in erythropoiesis process

    Which of the above statement/s is/are correct?
    a. 1 only
    b. 2 and 3 only
    c. 1 and 3 only
    d. 1,2,3
41. Deficiency of cobalt in diet causes:
    a. Microcytic anaemia
    b. Macrocytic anaemia
    c. Hypochromic anaemia

d. Megaloblastic anaemia

42. Cobalt is essential for the production of vitamin B12. The production of vitamin B12 occurs in
    a. Liver
    b. Muscles
    c. Rumen
    d. Abomasum
43. Which of the following acts as antioxidants:
    a. Selenium
    b. Methionine
    c. Vitamin C
    d. All the above
44. In Nutritional myopathy there is a non inflammatory degenerative or necrotic changes in cardiac and skeletal muscles caused due to deficiency of:
    a. Copper
    b. Molybdenum
    c. Cobalt
    d. Selenium
45. Mulberry heart disease and yellow fat disease in pigs is caused due to:
    a. Deficiency of selenium and Vitamin C
    b. Deficiency of selenium and Vitamin E
    c. Deficiency of copper and Vitamin C
    d. Deficiency of copper and vitamin E
46. Which of the following animal disease is more commonly found to occur in sub-Himalayan region:
    a. Anaemia
    b. Goiter
    c. Rickets
    d. Pica
47. Photophobia in animals can be caused due to deficiency of:
    a. Thiamine
    b. Pyridoxine
    c. Riboflavin
    d. Biotin
48. Of the three varieties of tocopherols which is most active
    a. α - tocopherol
    b. β - tocopherol
    c. ϒ- tocopherol
    d. Both a and c
49. Which of the following cow seldom suffers from ketosis:
    a. Low producing
    b. Plain diet fed cow
    c. Both a and b
    d. None of the above
50. Ketonurea with hypoglycemia occur in which disease:
    a. Ketosis
    b. Acidosis
    c. Diabetic ketoacidosis
    d. None of them
51. Ketosis occur during adequate dietary supply is known as:
    a. Starvation ketosis
    b. Secondary ketosis
    c. Absolute ketosis
    d. Nervous ketosis
52. Does a normal cow produce ketone bodies?
    a. Yes & may cause ketosis
    b. No
    c. Yes & they are used in her body
    d. Both a and c are correct
53. Hematological change in ketosis is :
    a. Eosinophilia
    b. Neutrophilia
    c. Lymphocytosis
    d. Monocytosis
54. Normal calcium : phosphorus in blood is about:
    a. 2:1
    b. 4:1
    c. 1:6
    d. 6:1
55. Milk fever of bitch is known as
    a. Downer’s syndrome
    b. Parturient paresis
    c. Eclampsis
    d. None of them
56. An animal was brought to the hospital suffering from hyperkeratosis of skin. The animal may be suffering from deficiency of :
    a. Vitamin A
    b. Vitamin C
    c. Vitamin D
    d. Vitamin E
57. Which hormone helps in the conversion of carotene to vitamin A:
    a. FSH
    b. Thyroxin
    c. Calcitonin
    d. Adrenaline
58. Consider the following statements:

I. Nitrate and nitrite fertilizers interfere with the conversion of carotene to Vitamin A.
II. Cathartic drugs increase the availability of vitamin A from gut.

Which of the above statements are true?

a. I only
b. Both I and II
c. II only
d. Both are false

59. Night blindness due to deficiency of vitamin A is:
    a. Primary ocular sign
    b. Secondary ocular sign
    c. Biot's spot
    d. Due to corneal xerosis
60. In keratomalacia there is softening of cornea due to:
    a. Liquefactive necrosis
    b. Colliquative necrosis
    c. Caeseous necrosis
    d. Fat necrosis
61. Consider the following statements;
    I. Due to deficiency of vitamin A there may be increase in the osteoblastic activity during growth stage.
    II. There is decrease in osteoclastic activity due to hypovitaminosis A.

    Which of the above statement/s is/are correct?

    a. I
    b. II
    c. Both I and II are true
    d. Both I and II are false
62. Consider the following statements;
    I. Vitamin D_2 is also known as cholecalciferol.
    II. Vitamin D_3 is also known as ergosterol.

    Which of the above statement/s is/are correct?

    a. I
    b. II
    c. Both I and II are true
    d. Neither I and II is true
63. Cortinase enzyme is very much required for conversion of carotene to vitamin A in
    a. Liver
    b. Gut
    c. Intestinal mucosa
    d. Muscles
64. There may be vitamin A absorption insufficiency due to deficiency of:
    a. Vitamin C
    b. Vitamin H
    c. Vitamin B complex
    d. Vitamin E
65. Day blindness is also known as:
    a. Nyctalopia
    b. Amblyopia
    c. Myopia
    d. Hypermetropia

66. Nyctalopia is due to defective formation of:
    a. Visual red
    b. Visual blue
    c. Visual purple
    d. Visual green
67. The cells of eye which helps in the day vision are:
    a. Rod cells
    b. Cone cells
    c. Corneal cells
    d. Retinal cells
68. There may be formation of renal stones due to:
    a. High vitamin A and low calcium in diet
    b. High vitamin A and High calcium in diet
    c. Low vitamin A and low calcium in diet
    d. Low vitamin A and high calcium in diet
69. The precursors of vitamin D_2 and vitamin D_3 are:
    a. 7-dehydrocholesterol and ergosterol respectively
    b. 7-hydroxycholesterol and ergosterol respectively
    c. Ergosterol and 7-dehydrocholesterol respectively
    d. Ergosterol and 7-hydroxychloesterol respectively
70. Which of the following vitamin is produced in the skin on exposure to sunlight:
    a. Vitamin D_2
    b. Vitamin D_3
    c. Vitamin D_{12}
    d. Vitamin D_5
71. Rickets due to deficiency of vitamin D is caused in

a. Neonates
b. Young animals
c. Adult animals
d. Old animals

72. Consider the following statements;
    I. Osteomalacia is a disease of older animals due to deficiency of vitamin D.
    II. It is a common condition found in farm animals.

    Which of the above statement/s is/are true?

    a. Only I
    b. Both II and II
    c. Only II
    d. Both are true

73. The amount fo 1,2,5-dihydroxy cholecalciferol produced by the kidney is controlled by:
    a. Thyroid hormone
    b. Parathyroid hormone
    c. Calcitonin
    d. Thyrotropin hormone
74. Vitamin E functions as an antioxidant in association with the selenium containing enzyme:
    a. Hydroperoxidase
    b. Glutathione peroxidase
    c. Alkaline peroxidase
    d. Guanine peroxidase
75. 'Tying up' syndrome in horse is due to deficiency of:
    a. Vitamin E
    b. Vitamin A
    c. Vitamin D
    d. Vitamin B complex
76. 'Mulberry heart disease' can be caused in pigs due to deficiency of:
    a. Vitamin E
    b. Vitamin A
    c. Vitamin D
    d. Vitamin B complex
77. 'White muscle disease' of young calf is due to deficiency of:
    a. Vitamin E
    b. Vitamin A
    c. Vitamin D
    d. Vitamin B complex
78. Which of the following vitamin is also known as antisterlity hormone:
    a. Vitamin E
    b. Vitamin A
    c. Vitamin D
    d. Vitamin B complex
79. Which of the following vitamin cannot be obtained from plant sources:
    a. Pantothenic acid
    b. Cyanocobalamin
    c. Nicotinic acid
    d. Biotin
80. Which of the following vitamin acts as co-enzyme in the oxidation of tyrosine and phenylalanine:
    a. Choline
    b. Biotin
    c. Ascorbic acid
    d. Pyridoxine
81. A disease called pine is seen in sheep in Britain due to deficiency of:
    a. Biotin
    b. Cyanocobalamin
    c. Ascorbic acid
    d. Biotin
82. Acrodyna is caused due to deficiency of :
    a. Pyridoxine
    b. Cyanocobalamin
    c. Biotin
    d. Pantothenic acid
83. *Streptomyces grisens* is a rich source of:
    a. Choline
    b. Ascorbic acid
    c. Cyanocobalamin
    d. Pyridoxine
84. Antidote of arsenic poisoning is
    a. Folic acid
    b. Nicotinic acid
    c. Pantothenic acid
    d. Ascorbic acid
85. Which vitamin is required for DNA synthesis:
    a. Folic acid
    b. Nicotinic acid
    c. Pantothenic acid
    d. Ascorbic acid
86. Which vitamin takes part in methylation and thus helps in phospholipid metabolism:
    a. Folic acid
    b. Choline
    c. Pantothenic acid
    d. Biotin
87. Which vitamin is destroyed in rumen:
    a. Folic acid
    b. Nicotinic acid
    c. Pantothenic acid
    d. Ascorbic acid

88. Which vitamin is required for fast healing of wounds:
    a. Choline
    b. Ascorbic acid
    c. Cyanocobalamin
    d. Pyridoxine
89. Aneurin is the other name for:
    a. Pyridoxine
    b. Thiamine
    c. Biotin
    d. Choline

90. In man 3D (dementia, diarrhea, and dermatitis) is associated with the deficiency of which vitamin?
    a. Riboflavin
    b. Nicotinic acid
    c. Pantothenic acid
    d. Choline
91. Photophobia in animals is caused due to deficiency of:
    a. Folic acid
    b. Nicotinic acid
    c. Riboflavin
    d. Ascorbic acid
92. Which of the following vitamin is not required by dog to be added in the feed:
    a. Choline
    b. Ascorbic acid
    c. Cyanocobalamin
    d. Pyridoxine
93. Bottle jaw condition is caused due to deficiency of:
    a. Copper
    b. Zinc
    c. Iron
    d. Calcium
94. Which of the following pair of metals is required for the synthesis of hemoglobin:
    a. Copper and magnesium
    b. Copper and iron
    c. Copper and selenium
    d. Iron and magnesium
95. Normal copper range in animals is:
    a. 0.5-1.5 µg/ml
    b. 0.5-1.5 mg/ml
    c. 0.5-1.5 gm/ml
    d. 0.5-1.5 gm/dl
96. Consider the following statements;
    I. Copper absorption and retention is not affected by Ca and Zn.
    II. Copper deficiency can be caused by high level of molybdenum.

    Which of the above statement/s is/are true?

    a. I only
    b. II only
    c. Both I and II
    d. None
97. Consider the following statements;
    I. Copper absorption and retention is affected by Ca and Zn.
    II. Copper deficiency causes ‘sway back’ and ‘neonatal ataxia’.

    Which of the above statement/s is/are true?

    a. I only
    b. II only
    c. Both I and II
    d. None
98. Consider the following diseases in animals;
    i. Sway back disease
    ii. Achromotrichia
    iii. Falling disease
    iv. Spectacle disease

    Which of the above is are caused due to deficiency of copper?

    a. i and iv
    b. i, ii and iii
    c. Ii and iii
    d. All of the above
99. Consider the following statements;
    1. If vitamin A is available over and above body requirements, it is stored in the animal body in substantial amounts.
    2. Vitamin E is not stored in the animal body in large amounts for any length of time and hence a regular dietary supply is required.

    Which of the above statement/s is/are true?

    a. 1 only
    b. 2 only
    c. Both 1 and 2
    d. None of the above
100. In cattle, symptoms like abnormal appetite and chewing of wood, bones, rags and other foreign materials indicate the deficiency of
    a. Co
    b. NaCl
    c. P
    d. All the above

101. Ketosis can be prevented by which of the combination of feed additives?
    a. Dicalcium phosphate and calcium propionate
    b. Sodium propionate and propylene glycol
    c. Sodium bicarbonate and propylene glycol
    d. Calcium phosphate and niacin

102. Match list I with list II and select the correct answer using the code given below the list

List I
List II
(Type of ketosis)
(Characteristic)

A. Primary ketosis
B. Secondary ketosis
C. Starvation ketosis
D. Alimentary ketosis

Code

	A	B	C	D
a.	2	4	3	1
b.	2	3	4	1
c.	3	4	1	2
d.	3	1	4	2

103. A mare with a history of recent foaling was presented in a veterinary clinic with symptoms of sweating, stiffness in gait and anurea, the intravenous administration of calcium provided immediate symptomatic relief. What would be the most likely disease?
    a. Azoturia
    b. Eclampsia
    c. Strangles
    d. Tetanus

104. Lactation tetany in high yielding dairy cow is a well recognized production disease. Which of the following factors serve as a predisposing cause for the occurrence of same?
    a. High ammonia content of rumen
    b. Increased Mn and decreased Co concentration in diet
    c. Feeding high energy diet which interferes with Mn absorption
    d. None of the above is justified predisposing cause of the syndrome

105. Which one of the following trace mineral is required for growth chicks and maintenance of xanthine oxidase content of tissues?
    a. Selenium
    b. Zinc
    c. Molybdenum
    d. Copper

106. Consider the following statements;
    1. Vitamin A deficiency mostly occurs during the latter half of gestation and is characterized by absorption or by birth of a dead calf.
    2. Vitamin A requirements are higher
1. Poor quality of feed stuffs having Deficiency of propionate and Protein
2. Excessive amount of butyrate in silage
3. Cow in good condition fed good quality ration
4. Disease causing reduction of food intake

...paralysis
4. Ischemic muscle necrosis

Etiology of downer cow syndrome includes which of the above?

    a. 1 and 2 only
    b. 1 and 4 only
    c. 1,2 and 4
    d. 2,3 and 4

108. The brain parts of chick affected by encephalomalacia caused by vitamin E deficiency are:
    a. Cerebellum
    b. Strail hemisphere
    c. Medulla oblongata
    d. Mesencephelon

109. Star gazing attitude in poultry is observed in the deficiency of:
    a. Riboflavin
    b. Thiamine
    c. Niacin
    d. Pantothenic acid

110. Consider the following:
    1. Vitamin B complex
    2. Vitamin C
    3. Calcium
    4. Iron

Meat is the rich source of which of the above?
   a. 1 and 2
   b. 1 and 3
   c. 2 and 3
   d. 1 and 4

111. Cerebrocortical necrosis is a condition associated with
   a. Riboflavin
   b. Pantothenic acid
   c. Thiamin
   d. Biotin

112. Ketosis / acetonemia is defined as:
   a. Relative lack of CHO in the body
   b. Absolute lack of CHO in the body
   c. Both a and b
   d. None of them

113. Time of occurrence of ketosis in animal is which of the following:
   a. One month before calving
   b. In new born calf
   c. In calf at one year age
   d. One month after calving

114. Starvation ketosis result in symptoms related to which form of ketosis:
   a. Wasting form
   b. Nervous form
   c. Both a and b
   d. None

115. Ketogenic amino acid are which of the following:
   a. Acetate and propionate
   b. Propionate and butyrate
   c. Acetate and butyrate
   d. All of the above

116. High protein in diet lead to ketosis due to excess production of :
   a. Propionate
   b. Butyrate
   c. Acetate
   d. None

117. Border line ketosis/ spontaneous ketosis/ feeding ketosis occurs in:
   a. High yielding cattle
   b. Low yielding cattle
   c. In heifer
   d. In 7^{th} lactation of cow

118. Milk fever type ketosis have which of the following:
   a. Hypoglycemia
   b. Hypoglycemia and hypomagnesaemia
   c. Hypoglycemia and hypocalcaemia
   d. Hypocalcaemia and hypomagnesaemia

119. End result of stress in high yielding cow is:
   a. Acidosis
   b. TRP
   c. Pneumonia
   d. Ketosis

120. Which of the following cow seldom suffers from ketosis:
   a. Low producing
   b. Plain diet fed
   c. Both a and b
   d. None of them

121. Which vitamin deficiency may cause ketosis?
   a. Vitamin B_1
   b. Vitamin B_{12}
   c. Vitamin B_5
   d. Vitamin C

122. Level of acetoacetic acid, β-hydroxy butyrate and free fatty acids in the blood in ketosis is:
   a. 0.1 mg/100 ml, 8%, 9%
   b. 0.1 mg/100 ml, 30%, 9%
   c. 7%, 15%, 28%
   d. 7%, 30%, 28%

123. Test of urine for ketosis is which of the following:
   a. Rothera test
   b. Ross test
   c. California test
   d. Benzedene test

124. Which of the following is Rothera reagent?
   a. Ammonium sulfate
   b. Sodium nitrate
   c. Sodium nitro prusside
   d. All of the above

125. Is ketosis a self limiting disease?
   a. Yes
   b. No
   c. In some extent
   d. None

126. Pregnancy toxaemia is which of the following?
   a. Caprine ketosis
   b. Ovine ketosis
   c. Cow ketosis
   d. Both a and b

127. Ketonurea with hyperglycemia occurs in which disease:
   a. Ketosis
   b. Acidosis
   c. Diabetic ketoacidosis
   d. None

128. Ketonurea with hypoglycemia occurs in which disease:
    a. Ketosis
    b. Acidosis
    c. Diabetic ketoacidosis
    d. None
129. Deficiency of insulin causes which of the following?
    a. Ketosis
    b. Acidosis
    c. Diabetic ketoacidosis
    d. None
130. Ketolactia is a term for which of the following?
    a. Ketone bodies in urine
    b. Ketone bodies in milk
    c. Ketone bodies in blood
    d. Ketone bodies in milk and food
131. Ketonaemia is a term for which of the following?
    a. Ketone bodies in urine
    b. Ketone bodies in milk
    c. Ketone bodies in blood
    d. Ketone bodies in milk and food
132. Ketonurea is a term for which of the following?
    a. Ketone bodies in urine
    b. Ketone bodies in milk
    c. Ketone bodies in blood
    d. Ketone bodies in milk and food
133. Ketosis occur during adequate dietary supply is known as:
    a. Starvation ketosis
    b. Primary ketosis
    c. Relative ketosis
    d. Secondary ketosis

134. Ketosis occur when dietary supply is less than requirement is known as:
    a. Starvation ketosis
    b. Diabetic ketosis
    c. Relative ketosis
    d. Absolute ketosis
135. Ketosis represents the use of which of the following:
    a. CHO
    b. Fat
    c. Protein
    d. Vitamins
136. Cause of ovine pregnancy toxemia is which of the following:
    a. Increase of adrenal cortical level
    b. Stress of late pregnancy
    c. Increase demands of nutrition by twins
    d. All the above
137. Iron deficiency anaemia is a common anemias in:
    a. Cattle and horses
    b. Adult pigs
    c. Piglets and dogs
    d. Piglets only
138. Which of the following occurs in ketosis:
    a. Vinegar smell in urine
    b. Vinegar smell in milk
    c. Both of above
    d. None
139. Ketone level in milk and urine in ketosis is:
    a. 40 mg/100 ml in milk & 500-1000 mg/100 ml in urine
    b. 500-1000 mg/100 ml in milk & 40 mg/100 ml in urine
    c. 250 mg/100 ml in milk & 80 mg/100 ml in urine
    d. 80 mg/100 ml in milk & 250 mg/100 ml in urine
140. Hematological change in ketosis is which of the following:
    a. Eosinophilia
    b. Neutropenia
    c. Lymphocytosis
    d. All the above
141. Ketone body test in milk is called
    a. Rothera test
    b. Ross test
    c. California mastitis test
    d. Turbidity test

142. Level of dextrose for treatment of ketosis:
    a. 5% dextrose 500 ml I/V
    b. 10% dextrose 500 ml I/V or S/C
    c. 50% dextrose 500 ml S/C
    d. 50% dextrose 500 ml I/V
143. Triamacilone corticoid used for Rx of which disease:
    a. Milk fever
    b. Ketosis
    c. Acidosis
    d. Alkalosis
144. In milk fever the temperature is generally which of the following:
    a. Subnormal
    b. Normal
    c. Increase
    d. None
145. Level of calcium in normal blood is:
    a. 1-2 mg %
    b. 2-6 mg %

c. 6-8 mg %
d. 9-10 mg %

146. Level of calcium in case of milk fever is:
a. 1-2 mg %
b. 2-6 mg %
c. 6-8 mg %
d. 9-10 mg %

147. Normal ratio of calcium to phosphorus in blood is
a. 2:1
b. 4:1
c. 6:1
d. 3:1

148. Normal ratio of calcium to magnesium in blood is
a. 2:1
b. 4:1
c. 6:1
d. 8:1

149. Which reflex is lost in IInd stage of milk fever:
a. Pupillary reflex
b. Rectal reflex
c. Both a and b
d. None

150. Test for milk fever is:
a. Sulphudryl test
b. Sulkowitch test
c. Ascoli test
d. Rors test

151. Milk fever like stances with normal voiding of feces and urine and normal appetite indicates:
a. Downer cow syndrome
b. Parturient paresis
c. Eclampsis
d. None

152. Milk fever of bitch is known as:
a. Downer cow syndrome
b. Parturient paresis
c. Eclampsis
d. None

153. Composition of CBG is which of the following:
a. Mg gluconate 80%, Boric acid 20%
b. Ca gluconate 83%, Mg gluconate 17%
c. Ca gluconate 83%, boric acid 17%
d. Calcium gluconate 83%, DW 17%

154. Prerequisite for CBG administration is which of the following:
a. Warm up to body temperature
b. Slow I/V infusion
c. Both a and b
d. None

155. Rapid CBG leads to:
a. Rapid recovery
b. Ventricular fibrillation
c. Toxemia
d. None of the above

156. Ventricular fibrillation by rapid CBG administration is cured by:
a. $CuSO_4$
b. $K2SO_4$
c. $CaSO_4$
d. Mg

157. Temperature in Eclampsia is which of the following:
a. Subnormal
b. Normal
c. Increase
d. None

158. Hypophosphatemia is also known as:
a. Post parturient hemoglobinurea
b. Lahu mutana
c. Red water
d. All of the above

159. Striking consequence of the Hypophosphatemia is:
a. Leucosis
b. Hemolysis
c. Polycythemia
d. Polyurea

160. Body formed in RBC in lahumutana is:
a. Heinz body
b. Howell jolly body
c. Both a and b
d. None

161. Excess of which mineral leads to red water:
a. Mg
b. P
c. Ca
d. S

162. Death in red water is due to which of the following:
a. Anemia
b. Septicemia
c. Toxemia
d. All the above

163. Red water disease can be due to deficiency of which of the following:
a. P
b. Cu
c. Mg
d. Both a and b

164. Normal level of P in blood is:
a. 0.5-3 mg/100 ml
b. 3-5 mg/100 ml

c. 4-7 mg/100 ml
d. 5-9 mg/100 ml

165. Level of phosphorus in red water is:
a. 0.5-3 mg/100 ml
b. 3-5 mg/100 ml
c. 4-7 mg/100 ml
d. 5-9 mg/100 ml

166. After administration of which medicine the color of urine becomes red:
a. Phenothiazine
b. Pyridium
c. Methylene blue
d. Methyl red

167. Monday morning sickness is also known as:
a. Enzootic hemoglobinurea
b. Paralytic myoglobinurea
c. Chronic Cu poisoning
d. All the above

168. Bracken fern poisoning is which of the following:
a. Enzootic hemoglobinurea
b. Paralytic myoglobinurea
c. Chronic Cu poisoning
d. All the above

169. In which of the following the color of the urine is red:
a. Enzootic hemoglobinurea
b. Paralytic myoglobinurea
c. Chronic Cu poisoning
d. All the above

170. Black water or tying up occur due to secretion of which substance in urine:
a. Hemoglobin
b. Ketone bodies
c. Myoglobin
d. Sugar

171. Accumulation of which substance in muscle leads to Azoturia:
a. Myoglobin
b. Hemoglobin
c. Sarcolactate
d. Ketone body

172. Color of urine in black water becomes:
a. Pink
b. Coffee
c. Black
d. Red brown

173. A horse trying to lift hind quarter indicates which disease:
a. Azoturia
b. Hypomagnesaemia
c. Hemoglobinurea
d. None of them

174. Most common muscle affected in myopathy of Azoturia:
a. Deltoid
b. Femoral
c. Facial
d. Gluteal

175. If red urine on centrifugation have supernatant of red color it indicate:
a. Presence of myoglobin
b. Presence of hemoglobin
c. Presence of Phenothiazine
d. Presence of parasite

176. Salt used to differentiate myoglobin and hemoglobin:
a. NaCl
b. $MgSO_4$
c. NH_4SO_4
d. NH_4OH

177. Serum creatinine phosphokinase enzyme level increased in which of the following disease:
a. Hypomagnesaemia/ grass tetany
b. Azoturia
c. Chronic Cu poisoning
d. Excess of vitamin A

178. High green grass feeding leads to which disease:
a. Hypomagnesaemia/ grass tetany
b. Azoturia
c. Chronic Cu poisoning
d. All the above

179. Consider the following statement:
I. Tissue culture vaccines are used against canine distemper.
II. Measles virus vaccine is used against canine distemper.
Which of the above is true?
a. I
b. II
c. Both I & II
d. Both are not used

180. Wheat pasture poisoning is due to:
a. Mg
b. Mn
c. Cu
d. Fe

181. Calves exclusively fed on milk lead to which of the following:
a. Whole milk tetany
b. Grass tetany
c. Fatty cow syndrome
d. Downer cow syndrome

182. Pregnancy toxaemia of cow is known as:
a. Whole milk tetany
b. Grass tetany

c. Fatty cow syndrome
d. Downer cow syndrome

183. Post parturient recumbency is a symptom of which of the following disease:
a. Whole milk tetany
b. Grass tetany
c. Fatty cow syndrome
d. Downer cow syndrome

184. Septic mastitis, hepatosis, myocardosis, nerve and muscle injuries and low level of phosphorus, Mg, K, Ca are the etiology of:
a. Downer cow syndrome
b. Fatty cow syndrome
c. Grass staggers
d. Milk fever

185. Ophisthotonus posture occurs in which disease:
a. Tetanum and grass tetany
b. Milk fever and botulism
c. Downer cow syndrome
d. Crush syndrome

186. In creeper cow disease which condition occurs:
a. Hypocalcaemia
b. Hypoglycemia
c. Hypokalemia
d. Hypophosphatemia

187. 3 day pig or baby pig disease represents which of the following condition:
a. Hypocalcaemia
b. Hypoglycemia
c. Hypokalemia
d. Hypophosphatemia

188. Only source of CHO for piglet is which of the following:
a. Milk
b. Grain
c. Both a and b
d. None

189. Course of downer cow syndrome is:
a. 1-2 weeks
b. 2-4 weeks
c. 4-6 weeks
d. 6-8 weeks

190. Well fed highly obesed cow during latter part of pregnancy show:
a. Crush syndrome
b. Downer cow syndrome
c. Fatty cow syndrome
d. All the above

191. In which disease the Ca, P, Mg and Glucose blood level remains normal:
a. Ketosis
b. Milk fever
c. Downer cow syndrome
d. None

192. A metabolic disease of unknown etiology and is characterized by paresis is known as:
a. Ketosis
b. Milk fever
c. Downer cow syndrome
d. Fatty cow syndrome

193. If animal quickly responds to calcium therapy then we predict which of the following disease:
a. Ketosis
b. Milk fever
c. Downer cow syndrome
d. None

194. If in biochemical test (benzedine test) on microscopic examination, there is 8 RBC/high field or more than animal is suffering from which disease:
a. Hematurea
b. Hemoglobinurea
c. Myoglobinurea
d. All the above

195. If there is less than 8 or no RBC / high field the animal is suffering from which of the following disease:
a. Hematurea
b. Hemoglobinurea
c. Myoglobinurea
d. All the above

196. When blood may be voided in the form of clot and causes deep red to brown coloration of urine then it is:
a. Hematurea
b. Hemoglobinurea
c. Myoglobinurea
d. All the above

197. Which of the following occurs in chronic copper poisoning and in blood transfusion reactions:
a. Hematurea
b. Hemoglobinurea
c. Myoglobinurea
d. All the above

198. Which of the following statement is incorrect?
a. The order of ketogenic substance is concentrate > ensilage > hay
b. In ketosis animal refuse to eat grain and ensilage but continue to eat hay
c. In ketosis the temperature, pulse and respiration is normal

d. Milk yield is fully regain after recovery from ketosis

199. Which of the following is not the form of Hypomagnesemic tetany:
   a. Lactation tetany
   b. Summer tetany
   c. Transit tetany
   d. Milk tetany

200. In which of the following disease, there is Ophisthotonus posture, rise of temperature:
   a. Eclampsia
   b. Milk fever
   c. Ketosis
   d. None

201. Puerperal tetany is which of the following:
   a. Eclampsia
   b. Milk fever
   c. Ketosis
   d. None

202. Which of the following treatment is given in Eclampsia:
   a. 10 % calcium gluconate
   b. Phenobarbital Na
   c. Cortisone
   d. All the above

203. Which of the following is incorrect statement in relation to porcine stress syndrome:
   a. Death occurs due to excess K^+ level causing cardiac arrest.
   b. Death occurs due to low K^+ level causing respiratory failure.
   c. Death occurs due to excess Mg^{2+} level causing cardiac arrest.
   d. Death occurs due to low Mg^{2+} level causing cardiac arrest.

204. Which type of anemia occurs in sweet clover poisoning:
   a. Microcytic Hypochromic
   b. Macrocytic Hypochromic
   c. Macrocytic normochromic
   d. Microcytic normochromic

205. Which is diagnosed by spectroscope:
   a. Hematurea
   b. Hemoglobinurea
   c. Myoglobinurea
   d. None of the above

206. If tetany and hyperesthesia do not disappear in 2nd stage of milk fever indicate:
   a. Ca deficiency
   b. Ca and P deficiency
   c. Ca and Mg deficiency
   d. K deficiency

207. Rickets in pup is deficiency of which of the following:
   a. Ca, Vitamin D
   b. Ca, P, vitamin D
   c. P, vitamin D
   d. Vitamin D

208. Rickets in piglet is due to deficiency of:
   a. Ca, Vitamin D
   b. Ca, P, vitamin D
   c. P, vitamin D
   d. Vitamin D

209. Rickets in calf is due to deficiency of:
   a. Ca, Vitamin D
   b. Ca, P, vitamin D
   c. P, vitamin D
   d. Vitamin D

210. Rickets is uncommon in which of the following:
   a. Pup
   b. Foal
   c. Lamb
   d. Piglet

211. Less susceptibility of rickets is in which of the following:
   a. Pup
   b. Foal
   c. Lamb
   d. Piglet

212. Joint commonly involved in rickets is:
   a. Knee joint
   b. Shoulder joint
   c. Pastern joint
   d. Intervertebral joint

213. Excess of parathyroid hormone leads to excessive removal of calcium from bone known as:
   a. Osteodystrophy fibrosa
   b. Osteoporosis
   c. Osteomalacia
   d. Osteoid leukemia

214. Depraved appetite/ pica is due to deficiency of which of the following:
   a. P
   b. Ca
   c. Mn
   d. Mg

215. Molecular destruction of cement and dentine due to Ca, P deficiency which small cavity formation on table known as:
   a. Scurvy
   b. Dental caries
   c. Fluorosis
   d. All the above

216. Indirect Ca deficiency due to heavy feeding of phosphorus known as:
    a. Pica
    b. Osteomalacia
    c. Osteodystrophy fibrosa
    d. Polioencephalomalacia
217. HypovitaminosisC in dog is known as:
    a. Scurvy
    b. Dental caries
    c. Fluorosis
    d. All the above
218. Bottle jaw occurs due to deficiency of which of the following:
    a. P
    b. Cu
    c. Fe
    d. Ca
219. Enterotoxaemia produced by E. coli are of two types viz. Heat stable and Heat labile. Which is most common?
    a. Heat stable
    b. Heat labile
    c. Both are common
    d. Both are less common
220. Dog sitting posture of horse followed by lateral recumbency is which of the following:
    a. PEM
    b. Azoturia
    c. Eclampsia
    d. All the above
221. Cause of death in Azoturia is which of the following:
    a. Uremia & nephrosis
    b. Decubital septicemia
    c. Myoglobinurea
    d. All the above

222. Primary lesion in Azoturia is which of the following:
    a. Myopathic
    b. Neuropathic
    c. Both a and b
    d. None
223. Secondary lesion of Azoturia is:
    a. Myopathic
    b. Neuropathic
    c. Both a and b
    d. None
224. Muscles involved in Azoturia is which of the following:
    a. Gluteal
    b. Quadriceps
    c. Rectus femoris
    d. All the above
225. Enzootic goiter commonly occurs in:
    a. Hilly area
    b. Plains
    c. Costal area
    d. Both a and c
226. Demyelination and cerebral ataxia is due to deficiency of which of the following:
    a. Cu
    b. Ca
    c. K
    d. Na
227. Polioencephalomalacia is due to deficiency of:
    a. Vitamin A
    b. Vitamin C
    c. Vitamin B_1
    d. Vitamin D
228. Post hemorrhagic anemia is always:
    a. Sickle cell anaemia
    b. Parasitic anaemia
    c. Both a and b
    d. None
229. Deficiency anaemia is due to deficiency of:
    a. Co
    b. I
    c. Fe
    d. Mg
230. Folic acid deficiency can cause which type of anaemia:
    a. Hypochromic
    b. Hyperchromic
    c. Microcytic
    d. Both a and c
231. Mannose binding test is performed in case of:
    a. Calf scour
    b. White diarrhea
    c. Only a
    d. Both a and b
232. Hemolytic anaemia in the post parturient animals is due to:
    a. Phosphate deficiency
    b. Copper deficiency
    c. Molybdenosis
    d. All the above

233. Consider the following statements:
    I. Anticanine distemper serum may be tried to safe guard the life of the patient.
    II. Antiviral canine distemper vaccine is also available for CD.
    Which of the above is correct?
    a. I

b. II
c. Both I & II
d. None

234. A young pup was brought to the clinics with signs of inappetance, refusal of food, polydipsia, frothy yellow colored vomitus, retching and restlessness. The probable diagnosis that you will make is that pup is suffering from:
a. Parvo virus enteritis
b. Parvo virus enteritis
c. Parvo virus lymphangitis
d. Canine distemper

235. In parvo virus infection there is an initial surge of:
a. Ig G
b. Ig D
c. Ig A
d. Ig M

236. Lamb dysentery prophylaxis can be given to lambs:
a. In the month of winter
b. In the month of autumn
c. In lambing season
d. In any month of year

237. Canine distemper affect mostly pups of age:
a. Above 12 months
b. Within 1 week after birth
c. Upto 3-6 months of age
d. Over 9 months of age

238. Porcine stress syndrome is a:
a. Calcium deficiency disorder
b. Vitamin deficiency disorder
c. Mineral deficiency disorder
d. Genetic disorder

239. Malignant hyperthermia of porcine is caused due to defective gene which is:
a. BAL gene
d. Vitamin A deficiency

245. The most specific drug for the treatment of Azoturia is:
a. Corticosteroids
b. Thiamine hydrochloride
c. Antihistaminic
d. Antibiotics

246. Which of the cell is most affected in canine distemper:
a. Respiratory epithelial cell
b. Neuron
c. Intestinal villi
d. RBC

247. Consider the following statements:
I. High glucose level retards fat mobilization.
II. Insulin retards fat mobilization.

b. HAL gene
c. GAL gene
d. FAL gene

240. Possible cause of downer cow syndrome is/are:
a. Persistent hypocalcaemia
b. Hypokalemia
c. Hypomagnesaemia
d. All the above

241. Consider the following statements;
I. There is congenital goiter in all domesticated animals.
II. Impairment of sexual urge in breeding bull

Which of the above are the clinical signs of Iodine deficiency?

a. I
b. II
c. Both I and II
d. None

242. Increase in CSF pressure is observed in:
a. Hypocalcaemia
b. Hypovitaminosis A
c. Hypomagnesaemia
d. Hypovitaminosis E

243. In rodenticide poisoning, which of the following vitamin injection is rhe drug of choice:
a. Vitamin A
b. Vitamin C
c. Vitamin K
d. Vitamin D

244. The common cause of calf mortality is:
a. Colisepticaemia
b. Hypoglycemia
c. Pneumonia

III. Nor-epinephrine retards fat mobilization.
Which of the above is correct?
a. I & II
b. I, II & III
c. II & III
d. Only III

248. Which of the following is not a form of canine distemper:
a. Pulmonary
b. Digestive
c. Ocular
d. Cardiac

249. Certain plants are responsible for causing PPH because of:
a. Toxic substance
b. High saponin content

c. High fiber content
d. High potassium content

250. Hard pad disease or canine distemper is synonym for:
a. Carres
b. Canine parvo virus
c. Canine influenza
d. Both a and c

ANSWER:-

1. C
2. A
3. c
4. a
5. d
6. c
7. b
8. a
9. a
10. d
11. c
12. a
13. c
14. d
15. c
16. c
17. d
18. c
19. a
20. d
21. d
22. b
23. b
24. d
25. a
26. d
27. c
28. b
29. c
30. b
31. d
32. c
33. a
34. b
35. d
36. d
37. b
38. a
39. c
40. c
41. d
42. c
43. a
44. d
45. b
46. b
47. b
48. a
49. d
50. c
51. b
52. c
53. a
54. a
55. c
56. a
57. b
58. a
59. b
60. b
61. d
62. d
63. c
64. d
65. b
66. c
67. b
68. d
69. c
70. b
71. b
72. a
73. b
74. b
75. a
76. a
77. a
78. a
79. b
80. c
81. b
82. a
83. c
84. a
85. a
86. b

87. d
88. b
89. b
90. b
91. c
92. b
93. c
94. b
95. a
96. b
97. c
98. d
99. c
100. d
101. b
102. b
103. a
104. a
105. c
106. c
107. c
108. a
109. b
110. d
111. c
112. c
113. d
114. a
115. c
116. b
117. a
118. c
119. d
120. c
121. b
122. a
123. a
124. d
125. a
126. d
127. c
128. a
129. c
130. b
131. c
132. a
133. d
134. a
135. b
136. c
137. d
138. c
139. a
140. d
141. a
142. d
143. b
144. a
145. d
146. b
147. a
148. c
149. a
150. b
151. a
152. c
153. c
154. c
155. b
156. d
157. c
158. d
159. b
160. a
161. d
162. a
163. d
164. c
165. a
166. a
167. b
168. a
169. a
170. c
171. a
172. b
173. a
174. d
175. a
176. c
177. a
178. a
179. b
180. a

181. a
182. c
183. d
184. a
185. c
186. a
187. b
188. a
189. a
190. c
191. d
192. c
193. b
194. a
195. b
196. a
197. b
198. d
199. b
200. a
201. a
202. d
203. a
204. a
205. c
206. b
207. a
208. a
209. b
210. b
211. b
212. a
213. a
214. a
215. b
216. c
217. a
218. c
219. b
220. b
221. d
222. a
223. b
224. d
225. a
226. a
227. c
228. b
229. c
230. d
231. d
232. a
233. a
234. a
235. d
236. c
237. c
238. d
239. b
240. d
241. c
242. a
243. c
244. a
245. b
246. a
247. a
248. d
249. b
250. d

PHYSIOLOGY OF THE GASTROINTESTINAL TRACT (GIT)

Main function: The GIT provides the body with a supply of water, nutrients, electrolytes, vitamines.

Actions:

1) Digestion of the food
2) Absorption of the products of digestion

Ad 1) Digestive processes: - mechanical
- chemical

Mechanical methods: - mastication (chewing)
- swallowing (deglutition)
- movements of the GIT (motor functions)

Chemical means (secretions): - saliva
- gastric juice
- pancreatic juice
- intestinal juice
- bile

PHYSIOLOGY OF MOUTH

Functions:
1/ Mechanical and chemical digestion of the food
2/ The source of the unconditioned reflexes
3/ Control of physical and chemical properties of the food

Ad 1 a Mechanical activity – mastication
The anterior teeth – a cutting action
The posterior teeth – a grinding action

Thee maximal **closing force** - incissors 15 kg
- mollars 50 kg

Inervations of the muscles of chewing – 5th, 8th, 12th cranial nerves
Centers – near the brain stem and cerebral cortex centers for taste

Act of mastication:
The movement of the lower jaw down:
- Contraction of m. biventer mandibulae (m.digastricus), m. pterygoideus ext., m.m. infrahyoidei →

The movement – up: *the drop initiates a stretch reflex*
Contraction of m. masseter, m. temporalis, m. pterygoideus
Rebound of antagonists- inhibition – the jaw drops +
compression of the bolus of the food against the linings of the mouth - rebound – repetitive actions.....
Mastication reflexive and voluntary
Function of the mastication: - grinding the food
- mixing with saliva
- prevention of excoriation of GIT
- makes easy swalowing

- aids subsequent digestion

SALIVATION

Ad 1 b) Adjustment of the food by the saliva

The salivary glands: - parotid
- submandibular
- sublingual
- buccal

Secretion of the saliva: - basal - 800 – 1500 ml/day
- during intake of food

Regulation of salivary secretion

– nervous - parasympathetic
- sympathetic

Unconditioned reflexes:
Taste and tactile stimuli increase 8-20 times the basal rate of secretion
Conditioned reflexes:
Visual, olphactoric, acoustic stimuli
Centers: salivatory nuclei (at the juncture of the medulla and pons):
superior – submandibular (70%), sublingual (5%)
inferior – parotid (serous saliva)

Parasympathetic nerves: n.VII, n.IX – stimulation of the salivation.
Parasympathetic nerves – acetylcholine – kallikrein – alpha 2 globuline (plasma) – bradykinine – vasodilatation – stimulation of the secretion of saliva (serous)

Sympathetic nerves: stimulation of the secretion of the mucinous saliva

Composition of the saliva

99.5 % - water; 0.5 % substances – organic – 0.3 %
- anorganic – 0.5 %

Organic substances: Mucin, digestive enzymes – ptyalin, lingual lipase, proteolytic enzymes, cytochromoxidase, carbanhydrase, phosphatase, IgA, lysozyme, blood groups s....
Cells: leukocytes,epithelial cells,...
Anorganic substances: Na^+, K^+, Cl^-, HCO_3^-

Functions of saliva

Saliva - keeps the mouth moist, aids speech
- facilitates swallowing
- serves as a solvent for the molecules that stimulate the taste buds
- serves a solvent for irritating foods - helps wash away the pathogenetic bacteria,
- destroy bacteria (thiocyanate ions, proteolytic enzymes),by proteins antibodies

can destroy oral bacteria, lysozyme = antibacterial
- keeps the mouth and teeth clean

Deficient salivation = xerostomia

Swallowing (Deglutition)

Three stages:

1) **oral** – voluntary – the food is squeezed into the pharynx by tongue
2) **pharyngeal** – automatic – cannot be stopped (1 s)

Involuntary contraction in the pharyngeal muscles – that pushes the food into the oesophagus.
Concomitant actions: Inhibition of respiration, closing of the posterior nares by the soft palate, pulling the larynx upward (enlargement the opening of the oesophagus), glottic closure

Control of the pharyngeal stage of swallowing -**swallowing reflex**:
Swallowing center – in the medulla and lower pons
Afferent nerves – Vth, VIIth, IXth, Xth
Coordination of the swallowing with respiration

3) oesophageal stage of swallowing:

Oesophagus - the first third striated muscle
- the last third smooth muscle
- the middle – mixed

Innervation – n. vagus, sympathetic nerves and others endings
Function – to transport food from the pharynx to the stomach by gravity and by peristalsis

Peristalsis – primary = a continuation of the peristaltic wave from pharynx
- secondary waves result from distention of the oesophagus by the retained food. Speed 4 cm/s

The swallowing time – for a compact food 6-9 s
a fluid 4-5 s

Regulation of the oesophageal peristalsis:
- by intrinsic neural circuits – myenteric and submucosal plexus
- by vagal efferent fibers

Functions of the upper and lower oesophageal sphincters
Upper – pharyngoesophageal junction – 3 cm segment – with high resting tone – relaxes reflexly upon swallowing
Lower – cardia – sphincter cardiae – 2-5 cm above the juncture of the oesophagus with the stomach. Circular muscle – tonically constricted.
Receptive relaxation – allows propulsion of the swallowed food into the stomach. The relaxation through VIP.

Disorders of the swallowing:
- **dysphagia** – pain

- **achalasia** – weak oesoph. peristalsis, accumulation of the food in the oesophagus – dilatation, increased tonus of cardiae. Pneumatic dilatation or myotomy
  - lower oes. sphincter incompetence – **gastrooesophageal reflux** (GER). Surgical treatment.

STOMACH

Anatomy and histology

- Cardia
- Fundus
- Corpus
- Antrum
- Pyloric sphincter

The smooth layers: - longitudinal – ext.
- circular - med.
- transversal - int.

Each muscle layer functions as a syncytium – gap junctions

Innervation: - myenteric plexus – outer between the longitudinal and circular layers
- submucosal plexus – inner

Vagal and sympathetic control

Gastric motility

The motor functions of the stomach:
1) storage of food
2) mixing – " – with gastric secretions – semifluid form – chyme
3) emptying of the food into duodenum

1) Storage: receptive relaxation of the stomach (P = 6 mmHg) by
   - a plasticity of the smooth muscle layers
   - nervous action – reduction of vagal tone
   - humorally (gastrin)

Food forms concentric circles. A limit about 1.5 l.

Storage time: Fats – 6 hours, proteins – 4 hours,
sacharides – 2 hours

2) Mixing: Gastric slow waves – basal electric rhythm – 3/min – pacemaker cells – the circular smooth muscle of the fundus
Velocity – 1- 4 cm/s – weak propulsion to move the chyme toward the antrum.
Raising intensity – peristaltic constrictor rings.

Hunger contractions – when the stomach is empty fora long time (12 hours ...) – intensive contractions – most intense in young people – feeling of hunger – regulation of the food intake.

3) emptying of the stomach

Antral peristaltic contractions – P – 50-70 mmHg pressure against the pylorus.
Pylorus – circular muscle –sphincter – receptive relaxation - after passage of a bolus – contraction – pyloric pump.

Regulation of the emptying:

- **Stretching** of the stomach wall peristalsis inhibits the pylorus
- **Gastrin** – stimulates gastric motility. Acid in the antrum (G-cells) inhibits gastrin secretion – a negative feedback. It enhances the activity of the pyloric pump.
- Duodenal factors:
Enterogastric reflex – distention of the duodenum, activity of „duodenal osmoreceptors" – inhitition in gastric motility through the enteric nervous system

Hormonal feedback – the stimulus – mainly fats in the duodenum hormones:
GIP, CCK – a competitive inhibitor of the gastrin

Disturbances of the gastric emptying
Pylorostenosis – congenital – hypertrophy of the circular layer. Incidence 1:200- boys, 1:800- girls
Symptoms – vomiting – metabolic alkalosis, dehydratation Treatment – surgical – myotomy

Pylorospasm – functional – hyperexcitability of parasympathetics. Symptoms –like pylorostenosis
Treatment – anticholinergic drugs (atropine)

V o m i t i n g

Expulsion of the gastric – gut contents through oesophagus and mouth/nose out.
Vomiting: - peripheral
- central
1) Peripheral: protective reflex against:
- a presence of irritants in the GIT
- an overdistention of GIT
The most sensitive portion – duodenum

2) Central: effect of some drugs (emetic) – e.g. apomorphine, emetin, nikotine, digoxine or hypoxia, ischemia, bacterial endotoxines on the cells of the chemoreceptor trigger zone (near the area postrema). Psychic influences.

The vomiting centre – CNS – RF lies near the tractus solitarius
The vomiting act
Nausea – subjective feeling – a necessity to vomit, pale, sweating, salivation – hyperactivity of the autonomic nervous system
Antiperistalsis of the small intestine, pyloroconstriction, stomach is relaxed.

The vomiting act: 1) a deep inspiratory breath
2) closing of the glottis
3) lifting of the soft palate

4) strong downward contraction of the diaphragm along with contraction of all the abdominal muscles – squeezing the stomach, intragastric P to a high level.

5) Contraction of the stomach, relaxation of the lower oes. sphincter – expulsion of the gastric content through a passive oesophagus.

Complications – alkalosis, dehydration ...

Gastric secretion

2.5 – 3 l of gastric juice daily

Components: - Hydrochloric acid (HCl) – parietal cells
- Pepsinogens – pepsins – chief cells
- Lipase
- Intrinsic factor – parietal cells
- Mucus – neck cells

1) **Hydrochloric acid secretion**

Acid solution containing 150-160 mmols/l, pH = 0.8 – 1.0

a) Cl^- is actively transported from the cytoplasm of the parietal cells into the lumen of canaliculus

b) H_2O is dissociated into hydrogen and hydroxyl ions in the cell cytoplasm. H^+ ions are actively secreted into the canaliculus in exchange for potassium ions.

$$H^+ + Cl^- \Rightarrow HCl$$

HCl – free and attached to the mucin and proteins

Functions of HCl in gastric juice:
1) Activation of pepsinogen
2) Coagulation of proteins
3) Change ferric state of iron (Fe^{3+}) to ferrous form (Fe^{2+}) – for absorption – with ascorbic acid
4) Antibacterial effect

Pepsin:

The chief cells → pepsinogens (precursors) without digestive activity

Pepsinogen + HCl – pepsin – active proteolytic enzyme (and + active pepsin); pH optimum 1.8 – 3.5

Derivates: - Pepsin C (gastricsin, cathepsin) – pH opt. 3.8 – 4.7 in newborns and sucklings
- Chymosin – pH 5.3 – milk

Lipase:

Carnivores – fatsplitting action

Intrinsic factor:

The parietal cells. Glycoprotein.

Essential for aabsorption of vit. B_{12} from distal ileum. B_{12} – for erythropoesis.

Pernicious anemia with megaloblasts.

Mucus:
Neck and surface mucous cells (pyloric mucosa). Glycoprotein.
Film 0.5 – 1.5 mm. pH 7.0. HCO_3^-

Regulation of gastric secretion

Local, neural and humoral mechanisms
Phases: Cephalic, gastric, intestinal

1) Cephalic phase:
Unconditioned reflexes – tactile and chemical stimuli in the mouth
Conditioned reflexes – the sight, smell, acoustic stimuli, phantasy ...
via the dorsal motor nuclei to the vagi – vagal afferent pathway to the gastric glands
Cephalic phase is responsible for 1/3 –1/2 the gastric secretion

2) Gastric phase:
Contact of the food with the gastric mucosa
Intake ⇒ the distention – mechanoreceptors – release of the gastrin from G-cells
⇒ the increase of pH – the release of the gastrin
(The decrease of pH – inhibition of the gastrin secretion)

3) Intestinal phase:
Inhibitory influences:
The presence of AA, fats ... secretion of GIP, VIP and secretion – GIT hormones – blood – inhibition of the gastric secretion

Drugs that influence gastric secretion
Histamine – (H_2 receptors) – cAMP
Alcohol, coffeine
ACTH – glucocorticoids – stimulate secretion of HCl and inhibit secretion of mucus !!

Disturbances of the gastric secretion

Hyposecretion - the decrease of the gastric functions –
- impaired storage and digestive and other functions

Postgastrectomy syndrome – dumping – hyperosmolar chyme in the duodenum – hypoglycemia

Hypersecretion – dysbalance in HCl: mucus ratio – ulceration – autodigestion

Zollinger – Ellison sy.: Gastrinomas-tumors in stomach, duodenum, pancreas – secrete gastrin – the increase in HCl production - ulcers

PHYSIOLOGY OF THE SMALL INTESTINE

Movements of the small intestine

Anatomy of the intestinal wall:
Layers (from the outer surface inward):
- the serosa

- a longitudinal muscle layer – myenteric nerve plexus
- a circular muscle layer – Meissner´s plexus – the submucosa –
- the mucosa

= 2 layers of the smooth muscles, 2 neural plexus

Motility:
Local contractions: - segmentation – ring like – circular muscle layer
- pendular – circular + longitudinal muscles
- villious

Propulsive – peristalsis: Peristaltic waves – analward at a velocity 0.5 – 2 cm/s to 3.5 – 10 cm.

Transport of the chyme 1 cm/min = 3 – 5 hours for passage of chyme from the pylorus to the ileocaecal valve.
Rotation of the chyme.

Regulation of the intestinal motility

Neural:
Myenteric reflex – mechanical stimulation of the duodenum – distention – serotonin
Gastroenteric reflex – distention of the stomach – through myenteric plexus
Parasympathetic +, sympathetic pars -

Humoral:
Acetylcholine +
Pilocarpin, physostigmine (inhibitors of cholinesterase) +, serotonin +, thyroxine +, CO_2 +.

Secretion of the small intestine
Intestinal digestive juice: colorless, alkaline (pH 7-9) fluid
Volume: 2 – 3 l per day
Product of: - Brunner´s glands – mucous glands secret mucus
- the crypts of Lieberkühn

Enzymes:
1) Proteolytic – peptidases - for splitting small peptides into AA
(enteropeptidase – for activation of the trypsinogen)
2) Intestinal lipase – neutral fats into glycerol and FA
3) Enzymes for splitting disaccharides – sucrase, maltase, isomaltase, lactase

Regulation of small intestinal secretion:
1) Local stimuli – tactile, irritative, chemical (the presence of the chyme, HCl, saccharides ...)
2) Neural – through parasympaticus

Valve ileo – caecalis (ileocaecal sphincter)

Function: Prevention backflow of fecal contents from the colon into the small intestine.
Sphincter slows the emptying of ileal contents into the caecum.
Receptive relaxation – neural + gastrin

Feedback control of the sphincter by reflexes from the caecum:
The distention of the caecum intensifies the contraction of the sphincter.

An irritation of the caecum (inflammation of appendix) – can cause intense spasm and paralysis of the ileum - by way of the myenteric plexus.

Movements of the colon

Movements: - mixing – haustrations – for better exposition of the fecal material to the surface of the large intestine
- propulsive - 2-3/day – transport down the colon

Gastrocolic and duodenocolic reflexes – distention of the stomach and duodenum – initiation of mass movements

Defecation

Tonic constriction of 1) internal anal sphincter – smooth muscle
2) external anal sphincter – striated muscle –under voluntary control S_2 -S_4

Distention of the rectum P – 40-50 mmHg – **defecation reflex**
Center S_2 –S_4 : activation of parasympathetic nerve fibers (pelvic nerves) ⇒ intensification of the peristaltic waves, relaxation of the internal anal sphincter.

Voluntary relaxation of the external sphincter. Deep breath, closing the glottis, contraction of the abdominal wall muscles – expulsion the fecal content.

PANCREATIC SECRETION

The pancreas: - endocrine portion – hormones
- exocrine portion – the pancreatic juice

The pancreatic juice: 1-2 1/24 hours, colorless, viscous fluid
(1-2 % of substances), alkaline (pH = 7.5 – 8.5),with a high HCO_3^- content – from gastric venous blood.

The most important **pancreatic digestive enzymes:**

1) The proteolytic enzymes:

Proenzymes – in inactive form –initial step by enteropeptidase in the duodenum.
Trypsin inhibitor – in the cytoplasm of the pancreatic cells. It prevents activation of trypsin both inside the secretory cells and in the acini and ducts.

Prevention of autodigestion.

2) The pancreatic lipase - steapsine – the most important lipase in the GIT.
Secretion in active form – enhancement in the duodenum by Ca^{+2}, amino acids...
The necessity of emulsification of fat.
Patients with deficit of the p. lipase have impaired digestion and absorption of fat = fatty stool = steotorrhea.

3) The pancreatic alpha-amylase – splits starch.

Small amount in the blood – a rise – indicator of acute pancreatitis.

Regulation of pancreatic secretion:
- neural,
- hormonal

1st – neural – 1-2 minutes – after the start of the feeding – via n. vagus ⇒ the juice containing a high concentration of the enzymes - up 10%.

Unconditioned and conditioned reflexes from the mouth ...
Blockade with atropine.

2nd – Neural + hormonal – gastric – distention – n. vagus
- gastrin – large quantities of the enzymes

3rd – Hormonal – also in denervated pancreas - via GIT hormones:

- Secretin – from „S cells" – duodenum – stimulation of secretion of large quantities of fluid with $NaHCO_3$

- Cholecystokinin – pancreozynin – duodenum – by way of the blood to pancreas – causes secretion of quantities of the pancreatic enzymes

- Chymodenin – chymotrypsinogene

- VIP – $NaHCO_3$

LIVER AND BILIARY SYSTEM

Blood Flow: 25 % of CO = 1.5 l/min
- Nutritive – a. hepatica (P = 100 mmHg)
- Functional – v. portae (P = 10 mmHg)

Volume of Blood in liver = 20-30 ml/100 g
Insufficiency of RV – increase of the volume = Hepatosplenomegaly
Increase in P – ascites

Regulation of the Flow and Volume –
Sympathetic nerves – Th_{3-11} – vasoconstriction

reservoir function for blood volume – haemorrhage ...

Metabolic functions of the liver

1) Carbohydrates – storage of glycogen –
1 – 4 % of the liver weight – glycogen
- Gluconeogenesis
- Glycogenesis
- GLUCOSTATIC FUNCTION OF THE LIVER

2) Metabolism of fat – fatty acid oxidation
- formation of ketone bodies
- formation of cholesterol
- formation of phospholipids
- synthesis of lipids

3) Metabolism of proteins – oxidative deaminations
- urea formation
- manufacture of plasma proteins (50 g/day)
- formation of the clotting factors (fibrinogen, prothrombin, proaccelerin, almost all – vit. K – II, VII, IX, X)

4) Cholesterol metabolism – synthesis from acetate
- excretion – in the bile – in the free form and as bile acids.

5) Metabolism of hormones – angiotensinogen
- inactivation of adrenocortical and gonadal steroid hormones
- inactivation of erythropoietin

6) Iron and vitamins metabolism –
- storage of ferritin (apoferritin = globular protein) + iron – in ferric form)
- Vit. A, B, B_{12}, synthesis of 25-hydroxycholecalciferol (from vit. D_3 – reabsorption of Ca^{++} in kidneys)

Detoxification function of the liver

Excretion of bilirubin
- " - of cholesterol → bile salts
Detoxification of the ammonia, indole, skatole, alcohol, nikotine ...

Thermoregulatory function of the liver
Heat production

THE BILE

- product of the liver modified by the gall-bladder

Daily amount: 700 – 1200 ml

Composition of Bile

The bile secreted continually by the liver is stored in the gallbladder (V = 20-60 ml) – where water, Na^+, Cl^- ... are absorbed – concentrating the bile constituents.

Concentration about 5-fold up to 20-fold.

1) Bile pigments – biliverdin + bilirubin

1 g Hb → 40 mg Bi

2) Bile salts

- Cholic acid
- Deoxycholic acid

- -

bacteria - Chenodeoxycholic acid
colon Lithocholic acid

Conjugation with glycine/taurine:

Salts: Glycocholic acid form sodium and
Taurocholic acid potassium salts

200 – 250 mg of the bile salts/day

Actions:

- Reduction of surface tension – a detergent function.
  Breaking the fat globules into minute sizes = emulsifying function
- Forming minute complexes – the bile salts + lipids = micelles – better absorption of FA, cholesterol, lipids from intest. tract.

Without the presence of bile salts – up to 40 % of the lipids are lost into the stool = acholic stool -
-steatorrhoea

Enterohepatic circulation of bile salts
(3-10 x/day, lost 5-10 % per 1 circulation)

3) Cholesterol (0.06%) – proportion

x CH: bile salts 1 : 20-30
If the ratio is < 1 : 13 – formation of the cholesterol gallstones

x Inflammation of the gallbladder – excessive absorption of water – CH begins precipitate – small crystals

x Ca^{2+} - bilirubinate gallstones - deconjugation of the Bi by beta – glucuronidase (bacteria) –

4) Anorganic salts NaCl, $NaHCO_3$ –

pH – 8 – 8.6 - alkaline

Regulation of Biliary Secretion

- Neural – parasympathetic +
- Humoral – CCK – duodenum → blood → gallbladder
  Constriction + relaxation of Oddi sphincter

Functions of the bile

1) Neutralisation of gastric HCl
2) Help for digestion and absorption of fat and for metabolism of vitamins soluble in fat (A, D, E, K)
3) Excretory function – bile pigments, anorganic substances (copper, zinc, mercury), toxins, some drugs ...

THERMOREGULATION

- maintainance of the balance between heat production and heat loss.

1) Heat production -
   a) in chemical reactions – metabolism
   b) during the contraction of skeletal muscles
2) Transport of the heat – in the blood and tissues
   Liver +1ºC, lungs -2ºC – of average temperature
3) Heat loss -
   a) Radiation – transfer of heat from one object to another at a different temperature without direct contact (by infrared electromagnetic radiation)
   b) Conduction – heat exchange between objects in contact
   c) Convection – the movement of molecules away from the area of contact.Wind, draught ...
   d) Vaporization - perspiratio insensibilis (the insensible water loss) – 50 ml/h
      - sweating
      - increased ventilation (panting)

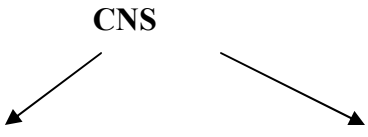
Temperature – regulating mechanisms

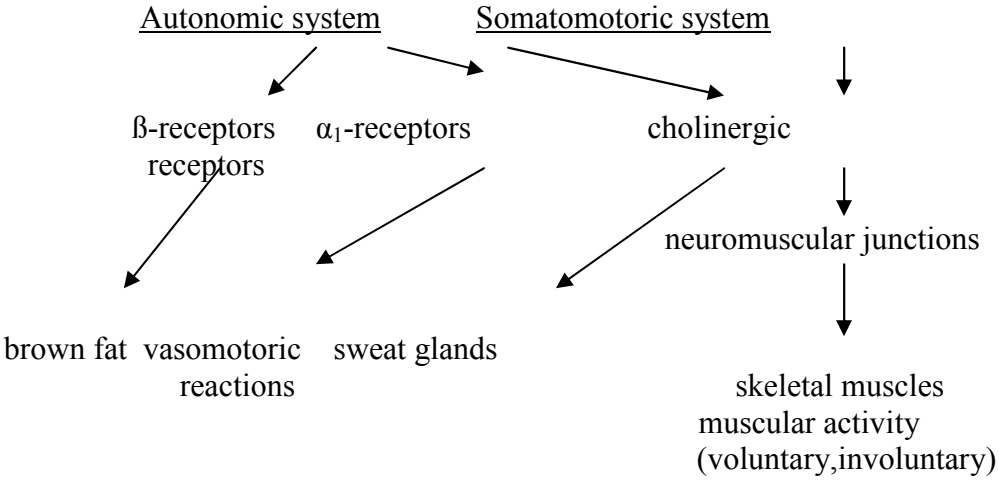
Neural – reflexes – immediate responses
Humoral – long-term adaptation

Neural thermoregulation

Center – hypothalamus – temperature-regulating centers
Afferents – temperature-sensitive cells in the anterior hypothalamus
- cutaneous temperature receptors

Efferents - autonomic nerves
- motor neurons





Body temperature

- manifestation of the thermoregulation efficiency

Species - poikilothermic – „cold-blooded"
- homeothermic – „warm-blooded"

Temperatures:
1) central – organs: brain, hypothalamus ...
constant = 37.0 ˚C
2) core – skin – varies with the changes in environmental T +
changes in perfusion.
Average = 33.0 ˚C

Diurnal rhythm – lowest at about 6 a.m.
Changes of the basal temperature (oral or rectal) in ovulation – the increase due to a secretion of progesteron (thermogenic effect).

Reactions of the adult humans in cold environment

A) The increase heat production and B) The decrease heat loss

Ad A)
1. The increase in metabolic rate
2. Food intake (specific dynamic action – the obligatory energy expenditure that occurs during its assimilation into the body)
3. Muscular activity: a) Shivering – simultaneous contractions flexors and extensors muscles, heat production.
Shivering pathways – hypothalamus – tr.cerebrospinalis and reticulospinalis
b) Voluntary skeletal activity

Ad B)
1. Vasoconstriction in the skin – alpha adrenergic sympathetic nerves – the decrease in heat loss

Lewis´ reaction – during long-term cold application – vasodilatation – red color of the skin – warming up - protective function

2.Position with the smallest body surface – quasi spheric shape

Hormonal changes:

The thyroid gland – in long-lasting stay in cold – calorigenic effect
The adrenal medulla- noradrenalin – vasoconstriction
Hypothalamus – the posterior pituitary – vasopressin – vasoconstriction and water retention

Reactions of the adult humans in hot environment

A) The decrease heat production and B) The increase heat loss
Ad A) 1. The decrease in metabolic rate – T = 25 – 30 ˚C
(higher temperatury – a rise of the metabolic rate)
2. Reduction of the muscular activity

Ad B)
1. Vasodilation in the skin (BF through a-v anastomosis) via the decrease of the sympathetic tone
2. Sweating – vaporizaton – 1 l of sweat → 500 kcal. Maximal volume of the sweat = 3 l/h → 1500 kcal/h
3. Panting – dogs.

Heat dissipation and loss in newborns

- by peripheral vasodilation – the increase of cutaneous BF
- sweating – evaporative loss – in newborns less effective than adults.

Capacity of the sweat glands = only about 1/3 of adult values.

In preterm infants, the maximal rate of sweating is less, and it is minimal or nonexistent in infants of less than 30 week´s gestation – inadequate development of these glands.

Prevention of cold stress and hypothermic for neonatal care –
- clinical implications:

Exposure to cool environment – cold stress often result in pathophysiological changes.
Lowered body temperatures are inversely correlated with survival.

Neutral Thermal Environment = a range of ambient temperatures within which the metabolic rate is minimal and thermoregulation is achieved by basal physical processes alone.
In adults 25 – 30 ˚C – in newborns at higher temperature.
Prevention of heat loss – incubators ...

Physiology of the fever

Fever = only the increase in body temperature (BT) - hyperthermia?
Hyperthermia can exist when heat production exceeds heat dissipation = disequilibrium
Variety of reasons: An increase in metabolic heat production, an impairment of heat dissipating mechanisms, a decrease in the heat –absorbing capacity of the environment due to high ambient temparture

Exogenous hyperthermia, enormous physical effort...evoke the BT increase – is not fever!

Fever = the increase of the BT due to immunologic reactions, by the increase of the set point of the central thermostat with defensive role.

Mechanisms of the fever:

PYROGENS = SUBSTANCES INITIATING FEVER

Microorganisms – viruses – protozoas

Pyrogens exogenous:

Toxins from bacteria, necrotic cells, viruses,
Cancer cells ... – exotoxins – exoproducts →
Monocytes, macrophages, lymphocytes – production of
Pyrogens endogenous:interleukin-1 (IL-1); IL 2; IL 6; TNF alpha, beta; CSFs
PGE_2 – a direct action on the hypothalamus -adjustation of a new set point for temperature.

Effects of the pyrogens

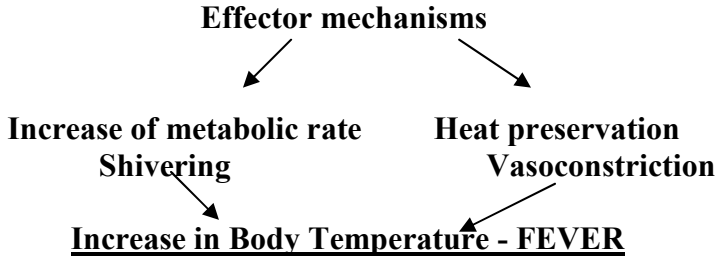
Haematologic – immunologic effects:

- CSFs - lekocytosis
- Stimulation of the lymphocytes activities (LyT,B,NK)
- Increase in phagocytic activity

Metabolic effects:

- negative N_2 balance
- catabolism of muscles
- increase in metabolic rate
- decrease in iron and zinc concentration level in plasma

- **Increase of set-point of the central thermostat**



Role of the fever

Defensive mechanism – Hipocrates (400 BC.) – „fever is a helpful mechanism in the fight against toxins in a body"

Activation of the immune system: phagocytosis, T and B lymphocytes,

- stimulation of the antibodies production
- inhibition of the growth of some microorganisms (due to the decrease of the iron and zinc in plasma)
- slowing the growth of some tumors

- unspecific discomfort

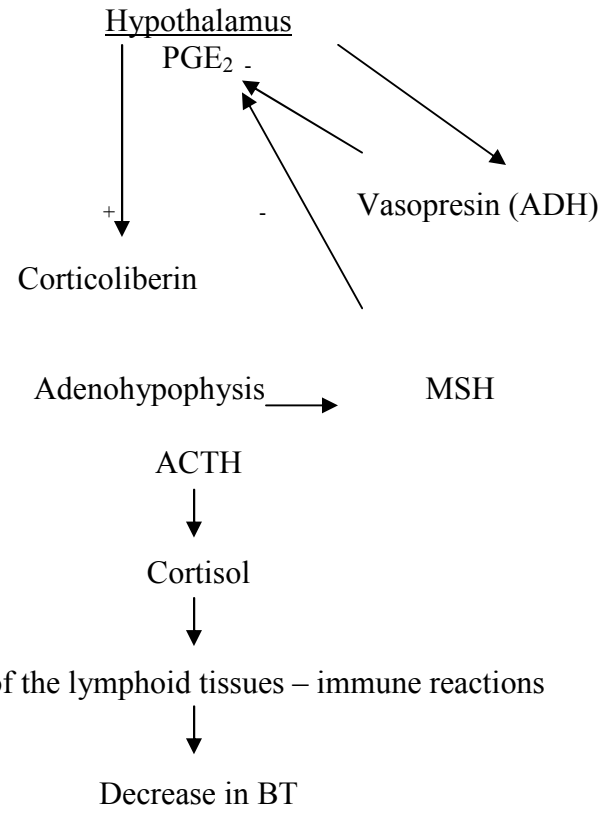
Positive efects up to BT 40º C
Hyperthermic devices

Negative effects of the fever

- Increase in metabolic rate, sweating, loss of minerals, dehydration
- Load of the cardiovascular system (mainly in elderly)
- Musle´s catabolism, hyperglycemia, metabolic acidosis
- Headache, pain in joints, musles – hyperalgesia (PGE – vs endorphins)
- Somnolence, apathy – substance „S" produced in the brain by the pyrogen´s effect
- Decrease of the diuresis
- Decrease of the gastrointestinal functions
- BT higher than 41 C – decrease in immonologic reactions- possible damage of some central proteins – neurons in CNS
-

Physiological Antipyretic Mechanisms

Fever



EXERCISE PHYSIOLOGY

investigation of the effects and their mechanisms of:
- physical exercise on systems, organs
- training
- relaxation after exercise

Quantification of exercise intensity

Energy consumption:
Mild exercise: 120-450 kcal/hod, heavy: 450-600, super heavy 600 and more kcal/hod.

Oxygen consumption:
O_2consumption at rest approx 250 ml/min, max. up 3 000 ml/min

O_2consumption maximum = VO_2 max.
Mild exercise – VO_2 max. to 33%
Moderate = VO_2 max. approx. 50%
Heavy = VO_2 max. approx. 70%
Super heavy – VO_2 max. 70 – 100 %

PULSE OXYGEN (PO) = volume of the oxygen transported by 1 pulse (SV)

Consumption/intake of O_2 (at rest) = 250 ml/min
Heart rate (at rest) = 70/min
PO = 250:70 = 3,5 ml /pulse
During exercise up 20 ml O_2/pulse

Regulation of physiological function in exercise

Neural regulation:
Autonomic nervous system (ANS)
Changes in ANS before exercise – start
1st phase: Parasympathetics – reduction in tone (tachycardia)
2nd phase and endurance exercise: Sympathetics – activation in co-operation with endocrine system.

Humoral regulation in exercise

Adrenal medulla: Catecholamines: Adrenaline – positive effects on heart and liver (mobilisation of glycogen and free fatty acids).

Hypophysis (anterior pituitary):
Increase (20- to 40 – fold after 20 min of exercise) in growth hormone secretion . Stimulation of anabolism – strengthening muscle ligaments and tendons, increasing bone thickness.
ACTH –glucocorticoids – cortisol (rises in heavy and prolonged exercise)– hyperglycemia, it mobilizes both fat and proteins.
Prolactin – increased blood levels following exercise –mobilizes fat + antidiuretic effect upon kidneys
Endorphins: similarity to the opiates. Increased secretion by endurance exercise.
Psychological effects – depression of sensation of fatigue, euphoria. Together with prolactin can be factor responsible for exercise-induced amenorrhoea.

Pancreas:
Insulinemia drops by about 50% during and immediately after exercise. (A decrease in insuline secretion + increased uptake of the hormone by muscles.) Hypoglycemic effect combined with higher consumption of glucose.
Glucagon level rises – mobilization of hepatic glycogen.

EXERCISE AND CARDIOVASCULAR SYSTEM

Heart rate:
- Mild exercise: rapid-onset increase of heart rate by a reduction of vagal tone.After exercise recovery in 3-5 min.
- Heavy exercise: tachycardia by the reduction of vagal tone + activation of the sympathetics and adrenal medulla (catecholamines). Higher values of HR, recovery time up hours.

Limit for the sympathetics activation is individual – on average in exercise with 50 – 60 % of maximal oxygen consumption.

Calculating Heart Rate Training Zones: There are a number of ways to estimate maximum heart rate. Realize that we are estimating maximum heart rate not measuring it so it is not an exact science.

Two methods of Estimating Maximum Heart Rate

1. **220 - Age = Maximum Heart Rate**

Example: 40 year old 220 - 40 = 180 beats per minute (bpm) Max Heart Rate

2. **217 - (0.85 x Age) = Maximum Heart Rate**

Example: 40 year old 217 - (0.85 x 40) = 217 - 34 = 183 bpm Max Heart Rate

Recommended HR according to age for long-lasting exercise (LLE) and maximal HR for short-lasting exercise (SLE)

HR changes in recovery phase (after exercise)

1st min: An imediate exponential decrease in HR. 2nd min continuation + exponential drop of noradrenaline plasmatic level. Reactivation of vagal nerves + progressive reduction of the sympathetic and hormonal activities.

HR changes in recovery phase – used in performance testing (Ruffier´s test, Flack´s test)

Stroke volume and cardiac output:

Increase by 20-30% (from 80 to about 110 ml at 40-50% of maximum oxygen intake) - followed by steady state - constant. SV and CO reflects HR up to some limit. Exceeding of the limit (critical HR value) - accompanied by a drop in the cardiac pumping efficiency.

Tachycardia - shortening of the diastole (ratio St:Dt at rest = 1:2, in maximal tachycardia up 1:1) = a decrease in diastolic refilling of the ventricles.

The increase in stroke volume with exercise is accomodated by both – an increase of EDV and an increase of ejection fraction (normally 55-60%). The Starling relation curve is shifted to the left and up (effect of sympathetic stimulation, catecholamines).

Cardiac Output

The product of HR x SV. CO at rest = 3-3.5l/min/m^2 = 5l/min. Maximum CO = 19 l in young woman and 25 l in man. Endurance athletes up to 35 l/min.

Blood Pressure

Systemic: - syst: rises sharply during isometric and sustained rhythmic exercise. Function of the stroke volume. 200-220 mmHg.
- diast.: +/- influenced mainly by peripheral vascular resistance – *vasodilation in skeletal muscles circulation*

Pulmonary: +/- During isometric exercise (stretching)- impairment of the venous return = pooling of venous blood – an increase in venous pressure.

Distribution of Blood Flow

Muscle Blood Flow:At rest-open 200 capillaries/ mm^2, in working muscle 10-15x more. BF 2-5ml/ min/100g in comparison to 120.
Neural regulation through noradrenergic system (reduction of activity) and specific cholinergic sympathetic vasodilatory system.
Humoral regulation (a decrease in pO_2, adenosine, increased content of potassium, hyperosmolarity, NO, histamine + metabolites).
Different BF during static (isometric) and dynamic work, contraction/relaxation.

Blood Flow to Other Organs

Splanchnic circulation: A decrease in BF through splanchnic organs - redistribution of the blood to skeletal muscles. Visceral BF drops to only 25-30% of the resting value.**Brain:** Cerebral BF remains constant during exercise. However, BF is redirected from one part of the brain to another – motoric zone, visual etc.
Bone: BF to bone can be increased up to 40% in response to mechanical loading.

BLOOD

During exercise - increased hematocrit, viscosity due to higher exsudation (filtration) of plasma in capillaries of skeletal muscles + higher production of erythrocytes.
Leucocytosis – through demargination. Mainly neutrophils and lymphocytes – defensive role.

Plasma

Glycemia: Short-lasting exercise – an increase up + 60%, long-lasting – endurance training – a drop
Lactate: after 15 min lasting exercise up 15-fold rise (from 1 to 15 mmol/l)
FFAs: heavy exercise – an increase 4x

Ventilation and Metabolism:

Ventilation: an increase by rising of V_T and respiratory rate. During mild exercise – proportionally to the oxygen intake – consumption.During heavy exercise – the ventilation is „overproportional“ – additive stimulus - metabolic acidosis (lactic acid) via central chemoreceptors.. *Ventilation is not limiting factor for maximum effort. Ventilation at 80% of MMV covers needs of the maximum effort.*

Oxygen consumption: At rest 250 ml/min,during maximum efforts up 3000 ml/min.Individual limit value. An increase to steady state in 3-5 min.

Maximum aerobic capacity

Increasing of a loading – a linear rise of oxygen consumption to a individual maximum – further increasing – disproportion between requirements and intake = exhaustion - fatigue.
Plateau = maximum oxygen intake/consumption = maximum aerobic capacity.

Oxygen Debt

Aerobic resynthesis of ATP in working muscles cannot keep pace with their utilization. The anaerobic pathway is limiting – during a work – oxygen debt comes. After a period of exertion is over, extra O2 is consumed to remove the excess of lactate, replenish ATP and CP,

and replace O2 that have come from myoglobin. The amount of extra O2 consumed is proportionate to the extent to which the energy demands during exercise exceeded the capacity for the aerobic synthesis of energy stores.
The O_2 debt is measured by determining O_2 consumption after exercise until a constant, basal consumption of O_2 is reached.
After mild exercise the debt is about 4, after heavy 20 l of O_2.

Blood gases

- mild exercise – unchanged
- heavy – a decrease in paO_2 (approx. by 8%). Enhancement of a-v difference $O_2$from 5% to 15%.
A drop in paCO_2 (approx. By 10%) due to hyperventilation

Acid-base balance: -heavy exercise: metaboli acidosis partially compensated by hypocapnia (tendency to the respiratory alkalosis).

Metabolism of the skeletal muscle cell

- Very short-lasting performances (to 20 second): utilization of the intracelular ATP a CP stores. *(In some seconds are exhausted ATP stores.)*

-Exercise duration to 6 min: In the 1st min – anaerobic glycolysis, lactat accumulation. Anaerobic glycolysis -maximum in 45 seconds. Aerobic metabolism starts again after 2 minutes.

- Endurance performances: Aerobic metabolism – glycogen stores + O_2. Time of the exercise is limited mainly by exhausting glycogen stores.

Termoregulation

Muscular work – increase in heat production - central temperature.
Sweating rate up 1 l / hod. Throgh sweat - excretion of lactic acid.
Long lasting sweating – fatigue of sweating glands – arrest of sweat production/evaporation – hyperthermia.

If exercise/heavy muscular work is performed in hot environment – redistribution of blood to skin circulation – limited skeletal muscles perfusion and physical output.

Effects of training on physiological parameters

Training = regular exercise, repetition of sport activities

	Without training	After training
Blood volume (l)	5,6	5,9
HRrest/min	80	40
HR max	180	180
SVrest (ml)	70	140
SV max	100	190

COrest (l/min)	5,6	5,6
CO maxim.	18	35
Heart weight (g)	300	500
Ventilation max (l/min)	100	200
O_2 consumpt max (l/min)	2,8	5,2

Bradycardia in subjects under endurance training:

Mechanisms:

Predominancy of vagal central tone – dynamic balance of the ANS shifted toward PS – enhanced RSA - Reduction of intrinsic heart rate of the sinoatrial (SA) node (rate of the spont diastolic depolarization). - Reduction of beta-adrenergic receptors in the right atrium - Changes in compliance of the heart – morphological adaptation

Morphological adaptation of the heart

Physiological hypertrophy of myocardium and dilation of the heart cavities. Hypertrophy of left ventricle, less of the right ventricle, atria and of pulmonary veins.
Reflection in ECG curves – mainly over LV (V_3-V_5).
Adaptation hypotony – tracking“ to elderly.

Effects of training to the respiratory system

Increase in volumes/capacities (VC, FVC) – by 20-30%
Ventilatory reserve – rise from 1:5-7 to 1:9-15
Longer voluntary apnoic pauses
Increase in max. O_2 intake/consumption (from 3 to 7 l/min)

Bone system

Load – remodelation
Activation of the osteoclasts and osteoblasts.

Fatigue

Limitation of the performances

1)Peripheral, physiological (in muscles): Exhaustion of metabolic reserves,accumulation of metabolites.

2)Psychological (central): CNS – protective mechanism, a subjective feeling, deceleration of the signal transmission, inhibition of thinking and decision processes, sensoric function, anxiety, emotional lability.

1)Physiological: Tachycardia, tachypnoe...
2)Pathological: + spasms of musculature, tremor, hyperemic skin (+ white spots), nausea, headache, hypotension, cyanosis, dyspnoe...shock.

Reactions to non-physical forms of loading

Psychological and emotional load
Reactions similar to physical exercise effects: Tachycardia, hyperventilation, sweating, cutaneous hyperperfusion, sympathoadrenal system activation, increasing of energetic substances concentration in plasma – without increased consumption....
Stress – alarm reaction. Civilisation - psychosomatic diseases.

PHYSIOLOGY OF MUSCLES

1) Skeletal
2) Cardiac
3) Smooth

1) Skeletal Muscle

Anatomy and Histology

Muscle fibers (10-80 microns in diameter) = extrafusal fibres – surrounded by the sarcolemma. Each fiber contains several hundred – thousand myofibrils. Each myofibril has about 1500 myosin filaments and 300 actin filaments.

The filaments are in a matrix – sarcoplasm, in the sarcoplasm
- sarcoplasmatic reticulum.

The T-system – is continuous with the sarcolemma = the transverse tubules – run transverse to the myofibrils, branch among themselves.

Striations:
Bands „I" – light bands contain only actin filaments – isotropis
Bands „A" - dark bands – myosin + actin filaments – anisotropic
Zone „H" – lighter band in the bands „A"
Line „Z" – dark – in the bands „I"

The area between 2 „Z lines" = sarcomere

Biochemical characteristics

The myosin filament – multiple myosin molecules–each m.w. 460 000
1 molecule = six polypeptide chains – 2 heavy chains
- 4 light chains

The actin filament – complex of 3 different protein components: -
- actin,
- tropomyosin,
- troponin

Hexagonal arrangement of actin and myosin filaments =
1 myosin surrounded by 6 actin filaments.

Mechanisms of excitation and contraction of skeletal muscle

1) Mechanisms of excitation

The skeletal muscle fibres are innervated by alpha – motoneurons (myelinated) – from the anterior horns of the spinal cord.
Neuromuscular junction – the „motor end – plate"

Neurotransmitter - Acetylcholine – synthesized in the cytoplasm of the terminal of an end – plate. Enzyme acetylcholinesterase – for destruction of Ach.

Action: When the action potential spreads over the terminal, the voltage – gated calcium channels open and large quantities of Ca++ diffuse to the interior.

The calcium ions exert an attractive influence on the Ach vesicles and these vesicles empty their Ach into the synapsis – by exocytosis.

Ach – opens Acetylcholine – gated ion channels – it allow to large amount of Na+ ions to pour to the inside – carrying large numbers of positive charges = local end-plate potential 50-75 mV – which initiates an action potential.

Action potential of the skeletal muscle

Resting membrane potential = - 80 mV to - 90 mV
Duration of action potential = 1-5 ms (five times as long as in large myelinated nerves)
Velocity of conduction = 3-5 metres/s

Depolarization is a manifestation of Na+ influx, repolarization of K+ efflux – like in nerves.

Transmission of the action potentials along transverse tubules. It causes the release of Ca^{+2} ions form the sarcoplasmatic reticulum – calcium ions cause contraction.

This overall process is called excitation – contraction coupling

Ca++ initiates contraction by binding to troponin C - the binding of troponin I to actin is weakened, tropomyosin moves laterally and uncovers binding sites for the myosin heads.

When the head attaches to an active site, this attachment causes changes in the intramolecular forces between the head and arm.

The head is tilting toward the arm and the actin filament is moved along with it.

After tilting, the head automatically breaks away from the attach site. The head returns to its normal direction. The head combines with a new active site ...next step- **„walk – along“** theory of contraction or **„sliding“** mechanism of contraction.

Sequence of events in contraction and relaxation of skeletal muscle.

Steps in contraction:

1) Discharge of motor neuron.
2) Release of transmitter (acetylcholine) at motor end-plate.
3) Binding of acetylcholine to nicotinic acetylcholine receptors.
4) Increased Na+ and K+ conductance in end-plate membrane.
5) Generation of end-plate potential.
6) Generation of action potential in muscle fibers.
7) Inward spread of depolarization along T tubules.
8) Release of Ca^{2+} from terminal cisterns of sarcoplasmatic reticulum and diffusion to thick and thin filaments.
9) Binding of Ca^{2+} to troponin C, uncovering myosin binding sites on actin.
10) Formation of cross-linkages between actin and myosin and sliding of thin on thick filaments, producing shortening.

Steps in relaxation:

1) Ca^{2+} pumped back into sarcoplasmic reticulum.
2) Release of Ca^{2+} from troponin.
3) Cessation of interaction between actin and myosin.

Manifestations of the skeletal muscle activity

1) **Electrical** - polarisation, depolarisation, repolarisation

Recording of the electrical activity = electromyography.
Surface EMG – by using metal disks
Deep EMG – needle electrodes in a single muscle

2) **Chemical -** three pH changes:
- a decrease – dephosphorylation of ATP
- an increase - - " - of phosphorylcreatin –
- formation of basic creatine
- a decrease – acumulation of the lactic acid

3) **Mechanical**
Record = myographic curve

Latency time for transmission of the action potential through motoneuron, end – plate (2-2 ms), T – tubules – EC coupling

Types of contraction:
- isometric (same length)
- isotonic (same tone)

Mechanisms of excitation and contraction of smooth muscle

Regulation:
Autoregulation – myogenic – pacemaker cells
Humoral - catecholamines, estrogens, oxytocin ...
only unvoluntary control

Neuromuscular junctions of smooth muscle:
Autonomic nerve fibres – diffuse junctions – secretion of a transmitter substance into the interstitial fluid – diffusion to the muscle cells.

Terminal axons have varicosities are vesicles containing transmitter substance – Ach/NA.

The most SM cells are innervated by parasympathetic + sympathetic nerves.
Exceptions: m. arectores pilorum – only sympathetic
m. ciliaris - only parasympathetic nerves

Summation of contractions
All /or none law – valid only for 1 fibril but not for whole skeletal muscle. Muscle as a whole has not a refractory period. Repeated stimulation – summation of contractions – tetanic contraction.

Tetanic contractions: - complete tetanus
- incomplete tetanus

Mechanisms of gradation of muscle response:
– the increase of discharge frequency in individual motor nerve.
The stimulation frequency for complete tetanus (summation of contractions) - in cold-blooded e.g. frogs = 20 Hz
- in mammals + humans = 50-100 Hz
– the recruitment of motor units (MU) = more MU are activated
e.g. with increasing voluntary effort.

Receptor of the skeletal muscle

Muscle spindles – consists of 2-10 muscle fibres = extrafusal fibres + endings (primary, secondary)

Innervation (motor) of the skeletal muscle
- alpha motoneurones – extrafusal fibers
- gamma motoneurons – intrafusal fibers
Both from spinal cord.

The motor unit (MU) = all muscle fibers supplied by a single motor neuron (3-6 muscle fibers/motoneuron – in muscles for precise movement – hand, eye ..., 100-500 in the leg, back ...)

Skeletal muscle blood flow

2000 – 2500 capillaries/mm^2 area
In resting muscle – open only 100/mm^2. BF of resting skeletal muscle 2-4 ml/100 g/min
During contractions BF is stopped – between contractions is increased as much as 30-fold – 50-100 ml/100 g/min
Rhytmic exercise.

Physical manifestations of the skeletal muscle activity

1) The strength (force) = maximal weight held against the gravity
(maximal contraction against a maximal load):
- in cold-blooded animals 3-4 kg/cm2
- in humans 3-10 kg/cm2

Dynamometers.

2) The work – a) positive – during isotonic contraction – against gravity (force/weight/times distance)
b) negative – when weight is lowered – the muscle actively resists the descent of the object – but weight x distance (negative) is done
c) static – during isometric contraction – a muscle generates force but cannot shorten or lengthen

The overall mechanical efficiency of skeletal muscle (work done/total energy consumption) = 0% during isometric contraction up to 35% (isotonic contraction)

3) Heat production
- Resting heat – at rest – in basal metabolic processes
- Initial heat - 1) activation heat – also without contraction
  2) shortening heat – only in isotonic
- Recovery heat – for restoration to muscle´s precontractory state
- Relaxation heat - after isotonic contraction for return of the muscle to its previous length.

Changes in temperature 10^{-3} to 10^{-4} ºC

Energy sources for skeletal muscle contraction

ATP – for transport Ca^{++} and „head“ myosin movements
Resynthesis of ATP – from phosphorylcreatin
Resynthesis of phosphorylcreatin – from glycogen ← phosphorylases a,b

Another sources – free fatty acids, acetoacetate acid, amino acids
FFA – the major substrates for muscle at rest

Cori cycle

muscle **Blood**

glucose

↓ ← ↑

glycogen glycogen

↓ ↑

lactic acid → liver

Muscle fatigue

Prolonged and strong contractioins - depletion of glycogen
- exhaustion of metabolic sources
- accumulation of metabolites

Neuromuscular junction – muscle – nerve
Central fatigue – synapses of motor area – protective effect
Orbelli effect – sympathetic and/or catecholamines – put off fatigue

Contracture:
- long-lasting contraction – if transport of Ca^{2+} into the reticulum is inhibited – a relaxation does not occur.

ATP is necessary for re-transport of Ca^{2+} - lack of ATP

Rigor mortis:
After death – complete depletion of ATP and phosphorylcreatine – accumulation of lactic acid – a decrease of pH – katabolic without anabolic processes.
The myosin heads attach to actin in fixed way.

Nysten law – in order:
heart (1-2 hours), skeletal musculature (3-6 hours):
diaphragm – head – neck – trunk – arms – hands – legs.

The relaxation in the same time order – after 1-5 days.
Proteolytic enzymes.

SMOOTH MUSCLE

– cca 3% of b.w.

Morphology
SM lacks visible striations – only „A“ substance – anisotropic.
Thin membrane, central localized nucleus, fibres 120-380/2-10 microns.
Poorly developed a sarcoplasmatic reticulum, a few of mitochondria.
Actin, myosin, tropomyosin – but without troponin

Types:

1) Visceral – syncytial smooth muscle – because of its interconnections among fibres. In the walls of most hollow viscera: the gut, the bile ducts, the ureters, the uterus, the bronchi, the bladders, the blood vessels ... (= single – unit-SM)

Control of visceral SM by humoral – non-nervous + nervous signals.

2) Multi-unit – each fibre operates independently of the others – is often innervated by a single nerve ending. Their control is exerted mainly by nerve signals. Like skeletal – but without voluntary control.

M. arectores pilorum, m. ciliaris.

Physiological properties of the smooth muscle

1) Plasticity – adaptation to volume – without the increase of the tone (e.g. receptive relaxation)

2) Electrical activity – in the resting state the membrane potential about -50 to –60 mV (less than in skeletal muscle). Unstable potential – changes in potential itself without an extrinsic stimuli.

Often associated with a basic slow-wave rhythm.

Spike potential – in single-unit SM (10-15 ms)

Action potential with plateau – onset – similar but repolarization is delayed for several hundred to several thousand ms - prolonged periods of contraction (the uterus, the vascular smooth muscle ...)

3) Excitability – high – labile. SM cells react to different stimuli: mechanical, humoral, temperature changes

4) Contractility – long latency, the prolonged periods of contraction. Slowness of onset of contraction and relaxation. Often rhythmic contractions. Smooth muscle fatigue – relaxation – no contracture.

4) Excitation – contraction coupling – slow process. Long latency –
- 50-100 ms after excitation – full contraction about ½ s latter. Smooth muscle does not contain troponoin - but another regulatory protein – calmodulin.

Sequence of events in contraction and relaxation of the smooth muscle.

1) Ca^{2+} ions come from the membrane
2) Ca^{2+} bind with calmodulin and activate myosin kinase – a phosphorylating enzyme
3) Myosin kinase phosphorylates one of the light chains of myosin head (regulatory chain) – head achieves the capability of binding with the actin filament.

Differences between skeletal and smooth muscles

Morphology	**Skeletal**	**Smooth**
- fibres	long	short
- nuclei	many	1
- sarcomere	+	-
- syncytium	-	+
- sarcoplasmatic reticulum	good developed	poor developed
- ATP-ase	many	a few
- the motor end - plate	+	-
- innervation	motoneurons	autonomic nerves
- distensibility	limited	high – plasticity
Function		
- pacemaker cells	-	+
- resting potential	stable	unstable
- action potential	uniforme (like nerve)	low amplitude with superpone spikes, plateau
- mechanisms of contraction	Ca^{+2}, troponic C,	Ca^{+2}, calmodulin
- sensitivity to humoral substances	low	high
- duration of contraction	short	long-lasting up to permanent

RENAL PHYSIOLOGY

Organs with excretory function: kidneys, lungs, liver, GIT, skin
Renal functions: 1) Excretory
2) Control of the concentrations of the body fluids
3)Endocrine
Physiological anatomy and histolog ofthe kidney
Nephron = functional unit
One kidney contains about 1 million nephrons, (2 millions together).
Basic anatomy of the nephron:
Glomerulus afferent arteriole, capillaries, efferent arteriole,
Bowman´s capsule
Proximal tubule – in cortex
Loop of Henle – descending limb - thick and thin segments
- ascending limb (in medulla)
Distal tubule – in renal cortex
Collecting duct – cortical
- medullary
Large collecting ducts (250), each transmits the urine from about 400 nephrons
The sum of the inner surfaces – total excretion and resorption surface = 5-7 m^2.
Renal calyces, renal pelvis, ureters, urinary bladder.

The glomerular filtration

Glomerular filter:
Glomerular membrane – 3 major layers:
1) Capillary endothelial layer
2) Basement membrane
3) Layer of epithelial cells

Permeability of the glomerular filter
- Capillary endothelial layer – fenestrae – 100 nm in diameter
- Basement membrane – meshwork of collagen and proteoglycans fibrilae
- Epithelial cells – podocytes with pseudopodia – filtration slits – 25 nm wide

The glomerular filter permits the free passage of substances to 4 (40 angstroms) nm in diameter, 4-8 nm – selectively, > 8 nm totally excludes.
Molecular weight: substances < 70 000 D – pass through GF
> 90 000 D – do not pass
70 – 90 000 – by the molecules shape

The plasma protein albumin molecule is only about 6 nm and it does not pass ← the basement membrane with a complex of proteoglycans has very strong negative electrical changes – like plasma proteins = electrostatic repulsion of the molecules.

Summary: 2 basic regulatory limitations for filtration:
1) The sizes of the pores in the membrane
2) Its negative electrical charge

Glomerular filtration (GF) – due to a work of heart – energy of cardiac systole –
also energy for GF
Filtration pressure (FP) = BP – ($P_{oncotic}$ + $P_{hydrostatic}$) = 60 – (25 + 15) = pribl.
20 mmHg – but only at the afferent end of the glomerular capilaries. Fluid leaves the plasma, oncotic pressure rises, FP decreases to zero → GF only in the beginning of the glomerular capillaries.

Regulation of GF = Regulation of the RBF

Changes in GF:
- In newborns – 20 % GF/100 g in comparison with adults
- Decrease inthe night, during sleep by 30 %
- Decrease in orthostasis, excessive physical effort
- Stop if BP will decrease under 40 mmHg

The glomerular filtration rate (GFR)

= quantity of glomerular filtrate formed each minute in both kidneys
= 120-125 ml/min in men
= 110 ml/min in women
The toal quantity per day = 180 l (over 99 % of the filtrate is reabsorbed)
The filtration fraction (FF) = the fraction of the renal plasma flow that becomes glomerular filtrate.
The normal plasma flow through kidneys = 650 ml/min, normal GFR = 125 ml/min = >
FF = 16-20 % (0.16 – 0.20)

Composition of the glomerular filtrate
Glomerular filtrate is the same as plasma, except that it has no significant amounts of proteins (0.03 %).

In increased glomerular permeability (e.g. nephrotic sy.)
- loss of plasma proteins into the urine

Renal circulation

Renal BF = 1300 ml/min = 20-25 % of CO = renal fraction of the CO
(400 ml/min/100 g)

Renal artery – small arteries – afferent arterioles – glomerular capillaries –
- efferent arterioles – peritubular capillary system – venules – veins – renal vein
Two cappillary beds
Pressures in the renal circulation:
High capillary pressure in glomerulus

Regulation of the renal blood flow

Autoregulation
– **myogenic** (Bayliss, l902) – the ability of organs to regulate their own BF. Intrinsic contractile response of smooth muscle to stretch. The increase intramural P → distention of the smooth muscle → depolarization of the muscle cells → contraction.

The wall tension is proportionate to the distending pressure times the radius of the vessel.

- metabolic – through vasodilator substance.
When BF increases → vasodil. substances are washed away → vasoconstriction; vice versa.
- tissue pressure hypothesis of autoregulation:
When BF increases the accumulation of interstitial fluid → compression
of the capillaries and venules.

Neural: sympathetic nerves ($Th_6 – L_3$) – vasoconstrictioin, only during orthostasis, physical effort, stress. The resting tone does not exist.
Humoral:
- catecholamines – vasoconstriction
- renin-angiotensin aldosterone system – vasoconstriction
- system kallikreins – bradykinin
- kalidin

Hageman f.
↓
Prekallikreins → *Kallikreins (glycoproteins – liver, kidneys)*

Kininogens → *kalidin + bradykinin* - *vasodilatation,*
(alpha$_2$ plasma proteins) ↓ *PVR,* ↑ *diuresis,*
natriuresis

- prostaglandins – PGE – vasodilatation,↓ PVR

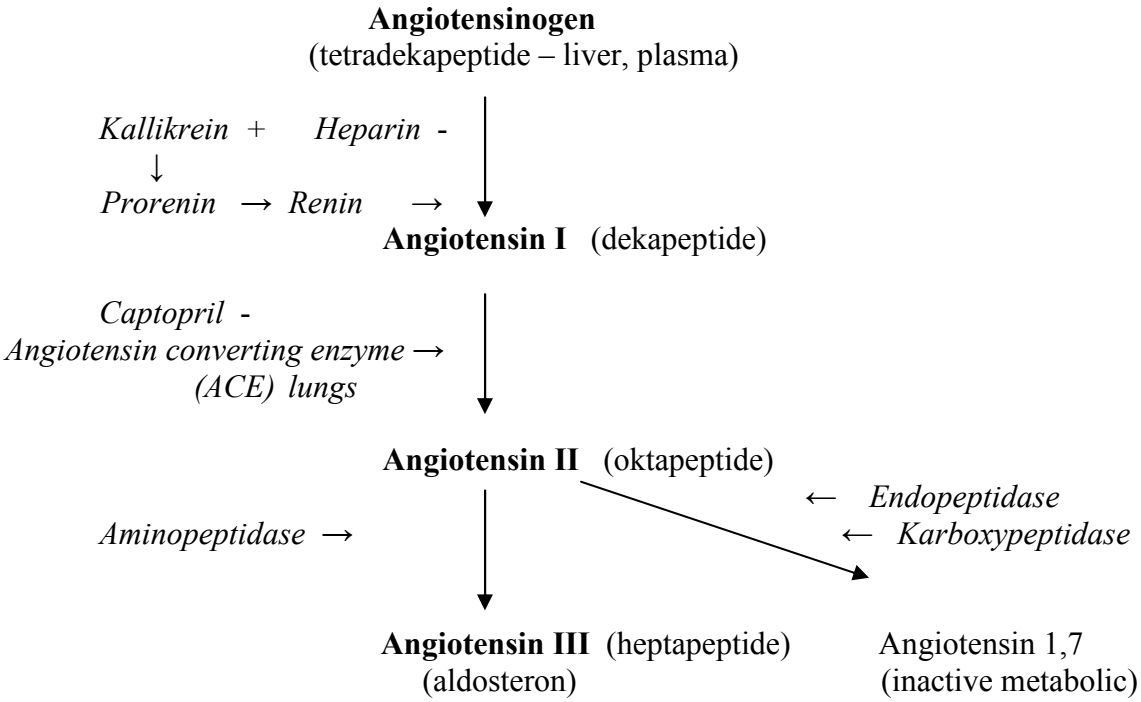
System kallikreins, prostaglandins = counterbalance to the RAA system

- Adenosine – ATP → AMP → adenosine → vasoconstriction in afferent arterioles → ↓ GF
- Bacterial pyrogens – vasodilatation
- Drugs – hydralazines, coffein etc. – vasodilatation
- Hypoxia – under 50% sat. O_2 – vasoconstriction

The Renin – Angiotensin – Aldosteron System (RAR)

Tigerstadt l898 – kidney extract ——— hypertension
The substance – renin
Renin – product of the granula – juxtaglomerular (JG) cells - synthetized and stored in an inactive form – prorenin.
Stimuli – intrinsic reaction – prorenin molecules are converted by tissue kallikrein – renin.

Renin = a proteolytic enzyme. 90 % in kidneys,
10 % brain, heart ...



Stimuli that increase renin secretion.
Sodium depletion, diuretics, hypotension, hemorrhage, upright posture, dehydration, constriction of renal artery or aorta, cardiac failure, cirrhosis, various psychological stimuli.
Hypotension, hypovolemia, hyponatremia

Actions of RAA system
1) **Vasoconstriction** – mainly in vasa efferens – increase in BP in glomerular capillaries and GF
Effect – direct/ indirect – through catecholamines (NA)
2) **Positive inotropic effect**
3) **Facilitation of the release** of – noradrenaline
- vasopressin
- ACTH
- aldosterone
4) **Dipsogenic effect** – through subfornical organ –
- increase in water intake

During hypotension and/or hypovolemia and/or hyponatremia:
1) Vasoconstriction and improvement in cardiac function
2) Sodium and water retention
3) Increase in water intake

Regulation of Renin Secretion

1) **Autonomic nervous system** – beta sympathetic + through beta 1 and cAMP
- alpha - " –
Inhibition of renin secretion by beta adrenergic blocking agents (propranolol)
2) **Baroreceptors** in vasa afferens – decreased afferent arteriol pressure →

stimulation of renin secretion

3) **Chemoreceptors** in the macula densa. Renin secretion is inversely proportionate to the rate of transport of Na^+, Cl^- to the distal tubules → increased renin secretion

4) **Humoral factors** – Prostaglandins stimulate renin secretion
- Catecholamines stimulate renin secretion
- Vasopressin inhibits - " -
- ACTH

5) **Negative feedback** – increase concentration of angiotensin II – inhibits renin secretion

Tubular Functions

The glomerular filtrate = 170-180 l/day – definitive urine = 1 – 1.5 l
Modifications of the volume and composition of the filtrate in the tubules.
The glomerular filtrate flows through:

1) the proximal tubule
2) the loop of Henle
3) the distal tubule
4) the cortical collecting duct
5) the collecting ducts

The tubules may a) remove some substances from the filtrate = reabsorption
b) add some substances to the filtrate = secretion/excretion
c) both actions

Functions of the Proximal Tubule

Reabsorption – passive absorption – water – 60-80 % = obligatory absorption
- active transport – glucose + Na^+ co-transport
- Na^+, K^+, AA, acetoacetate ions, vitamins

Active transport – limited – by the ability of the energy and transports = transport maximum
of the absorption (T_m). After exceeding of T_m – the transport mechanism is saturated and the substance occurs in the urine.

Glycosuria – in hyperglycemia > 10 mmol/l = renal threshold for glucose
T_mG in men = approx. 375 mg/min
in women = approx. 300 mg/min

Secretion – when the concentration of the substance is higher in the loops of Henle than in glomerular filtrate. Mostly – active:
- heterogenous substances – penicilin, phenol red and sulphonphtalein dyes, sulphonamides, PAH – exogenous

Functions of the Distal Tubules

Length cca 17 mm – 40 l of fluid/day comes to the tubules
Absorption of the water (about 5 – 15 %), Na^+ (regulated by aldosterone).

Functions of the Collecting Ducts

Changes in osmolarity and volume mainly by means of the countercurrent multiplication system:

Fig.
Two tubes separated by semipermeable membrane – with ability to transport molecules of a substance in one-way. If the tubes are fulfilled with a stationary fluid – the activity of the membrane increases the concentration of the substance in tube A. When the fluid flows – the mostly concentrated fluid will be accumulated at the beginning of the tube B.

After connection of the next tube C – separated from the tube B by a membrane permeable for water – the solution flowing in C will become gradually more concentrated by the osmotic forces acting between B-C.

Application of the countercurrent system in kidneys

- Descending limb of the Henle´s loop is permeable for water and Na^+
- The ascending limb of the loop is relatively impermeable to water and permeable to Na^+, Cl^-,
  urea. Accumulation of the solutes → hypertonicity of the interstitium.
- The collecting duct is relatively impermeable to urea but permeable to water (in the presence of
  vasopressin). Interstitial hypertonicity is supported also by active resorption of Na form the duct to the interstitium.

Efect: the absorption of water = concentration of urine.

The role of vasa recta = additional countercurrent exchanger.
Descending vasa penetrate to the hypertonic portion – there water diffuses out of the vessels – and in the hypotonic portion – water diffuses into the vessels. The way of the solutes is in opposite direction. Recirculation of the water and the solutes from and into vasa recta helps to maintain hypertonicity.

URINE

Volume:1000 - 1500 ml/24 hours **-** in adult
Vary with fluid intake and withfluid output form other routes - skin, lungs, gut.
(Volume reduced during sleep and muscular exercise).

Specific gravity: 1010-1035 kg/m^3. (Specific gravity greater on protein diet.)

Reaction: Usually slightly acid- pH 4.5-8 – average 6.0
(Varies with diet- acid on ordinary mixed diet, alkaline on vegetarian diet.)

Colour:
Yellow due to urochrome pigment –probably from destruction of tissue proteins.Concentrated and darker in early morning –less water excreted at night but unchanged amounts of urinary solids.

Odour: Aromatic when fresh → ammoniacal on standing due to bacterial decomposition of urea to ammonia.

COMPOSITION of the urine:

Water - - - - - 1000-1500 ml/24 h

Inorganic substances millimols excreted in 24 h

Sodium - - - 200
Chloride- - - 200
Calcium - - - - 5
Potassium - - - 50
Phosphates - - -25
Sulphates - - - 50

Organic substances

Urea - derived from breakdown of protein – therefore varies with protein in diet.
Uric Acid - comes from purine of food and body tissues.
Creatinine - from breakdown of body tissues; uninfluenced by amount of dietary protein.
Ammonia - formed in kidney from glutamine brought to it by blood stream;

*[In the **newborn,** volume and specific gravity are low and composition varies.]*

PHYSIOLOGY OF THE URETERS AND URINARY BLADDER

URETERS convey urine from kidneys to bladder: Long, narrow muscular tubes. Smooth muscle coats with outer fibrous tissue coat and inner mucous membrane.
Slow waves of contraction (every 10 seconds)propel urine along ureter. 1-5 small ´spurts´ enter bladder per minute.

URINARY BLADDER acts as reservoir for urine: Hollow muscular organ. (Size and position vary with amount of urine - stored (120-320 cc).
Smooth muscle coats –distend as urine collects: contract periodically to expel urine to urethra.
Smooth muscle of bladder wall runs down into urethra.
Internal shincter.
External sphincter.
Circular striated muscle (under voluntary control – CNS).

STORAGE AND EXPULSION OF URINE

Urine is formed continuously by the kidneys. It collects, drop by drop, in the urinary bladder which expands to hold approx. 300 ml. When the bladder is full the desire to void urine is experienced.

When bladder is empty and beginning to fill –

- inhibition of parasympathetic

- activation of sympathetic → Relaxation of bladder wall.

MICTURITION

= stretch reflex – carried out through centres in spinal cord. In older children and adults – reflex can be controlled and inhibited **voluntarily**.

Stimulus: Distension of the **receptors** in smooth muscle
When empty, pressure in bladder is zero.When 50 ml urine collect→pressure ↑ to 10 cm H_2O up to 300 or 400 ml → little increase in pressure.
(As bladder distends, walls of ureter are pressed together preventing regurgitation of urine.)

Afferent pathways to the higher centres through pons and midbrain. Sensations to consciousness

Micturition center: Parasympathetic $S_2 – S_4$
Sympathetic efferents L_{1-3} - inhibits ganglia

Efferent pathways: Impulses in parasympathetic nerves (pelvici)and in somatic nerves (pudendal).

Effectors: Smooth muscle in BLADDER WALL - contraction, sphincters smooth muscle – internal + striated muscle external -relaxation

Effect = Urination – micturition

PHYSIOLOGY OF THE NERVOUS SYSTEM

RETICULAR FORMATION, EEG, SLEEP

RETICULAR FORMATION

RF = reticular-diffuse connections of neurons, cells don't form obvious nuclei
- med. oblongata, pons Varoli, thalamus

→ **analyzer**
→ **integrator**
→ **„control“ of CNS**

→ concentration of various information from CNS and receptors to small number of neurons - general system for controlling the level of activity of the brain and the spinal cord

Functions of RF:
- regulator of ANS (heart rate, breathing rate, GIT)
- sleep, fatigue, control of consciousness
- modulation of pain
- motivation to perform any activities
- control of walk, eating, urination, defecation, sexual activity...

- control of some forms of behavior
- predisposing factor for personality: introvert/extrovert ...

→ **coordination of somatic and autonomic ff.**
→ **coordinator of efferent info → organism as a whole**

RF:
ascendent neurons → cerebral cortex → RAS
descendent neurons → spinal medulla
- facilitation
- inhibition

Ascendent system:
- activates cortex, hypothalamus, limbic sy

↓

reticular activation system (RAS)

↓

RAS + thalamus (non-specific nuclei)

↓

keep consciousness

- el. stimulation of RAS: → „*arousal*" *reaction* on EEG

- non-specific system

- activation influence on RF:
important for entrance of info into consciousness, formation of temporary connections
→ higher forms of behavior (learning, memory...)

- RAS acts on the level of concentration on sth.
- modulation of afferent information from receptors (vision, hearing, proprio)
- stimulation of RAS:
• epinephrine
• mild hypoxia
• hypercarbia
• impulses from proprioreceptors and nociceptors

- destruction of RAS („*cerveau isolé*") → deep sleep, miosis, Ø response to stimulation

Descendent system:
- via tr. reticulospinalis → spinal interneurons
- effect on motoric function:

tone and movement

↓

control of voluntary and involuntary movement

- descendent neurons act:
a. on α and γ spinal motoneurons
b. on Renshaw interneurons

Activity of Reshaw cells:
Spinal motoneurons give off a recurrent collateral - synapse with an inhibitory motoneuron (Renshaw) - terminates on the cell body of the same spinal neuron or other SN - inhibitory synapse with mediator (glycine) → inhibition of discharge of the SN

→ desc. system of RF acts on **motoneurons of extensors**
(control by cerebellum and cerebral cortex)

- *decerebration rigidity*: transsection at the level of lamina quadrigemina → elimination of inhibitory influence from CNS – predominance of facilitation - ↑ tone, spasticity of extensors (opistotonus)

Descendent system of RF:

Facilitation area	**Inhibitory area**
dorsolateral – MO, PV, mesencephalon, diecephalon	ventromedial - MO
bigger area – small cells	smaller area – big cells
mostly crossed fibres	mostly uncrossed fibres
Activation:	**Activation:**
statokinetic receptor vestibular cerebellum collaterals of specific sensor pathways cerebral cortex	spinal cerebellum basal ganglia cerebral cortex
Function:	**Function:**
↑ excitability of spinal centers of somatic reflexes acts on reflex tone antigravitation muscles ↓ tone of flexors	↓ spinal reflexes (especially tone of extensors) ↓ voluntary movement
Importance:	
keeping posture and position of the body	

Gama system and RF: 2 types of pathways to γ neurons

1.homogenous fascicles of thicker fibers with rapid conduction of excitation
→ coordinate fast movement and setting the tone
2. disperse thin fibers with small speed of conductivity
→ set muscular tone of large areas

RF:
- regulates muscular tone and motility
- influences autonomic ff. (body temperature, sexual ff., water metabolism...)
- continuous activity (10-20 excitations/s)
- control of vigility and sleep – hypotonia, depressed motility

ELECTROENCEPHALOGRAPHY (EEG):
= recording of electrical activity of the brain

→ **EEG (electroencephalography)** – recording from surface of the skull
→ **ECoG (elektrocorticografia)** – recording from surface of the brain

- changes of summation potential of huge number of neurons (depolarization: deviation ↑, hyperpolarization: deviation ↓)

- electrodes (10-20): unipolar, bipolar (longit., transvers., circul. arrangement)
- change in potential → *wave:* frequency and amplitude

Rhythm:
alpha (Berger rhythm): 8-13 Hz, ampl. 30-50 μV
→ **rhythm at rest, vigility with closed eyes**

beta: 14-30 Hz, ampl. 5-10 μV
→ **rhythm of activity**

Desynchronization: transition of alpha into beta rhythm
→ opening the eyes, sensoric stimulus, mental activity
arousal response: RAS, non-specific nuclei of thalamus

theta: 4-7 Hz, 50 μV
→ **vigility in children**
→ **emotional stress in adults**

delta: 1-3.75 Hz, 100-150 μV
→ **deep sleep**

Clinical importance of EEG:
- neurology (pathological conditions, hematoma, epilepsy)
- psychiatry (depressive disorders)
- depth of anesthesia, determination of biological death, research (in space)...

EEG investigation:
- rest rhythm + activation methods to change the rhythm, resp. to provoke pathological discharge in the brain (opening the eyes, hyperventilation, photostimulation...)

Investigation of evoked potencials:
- EP = potencials evoked by a stimulus (light, sound...)

1. Primary EP:
- potential from specific cortical structures
- highly specific by its localization – recorded over endings of sensoric pathways

2. Secondary EP:
- without specific localization

- related to RAS and non-specific thalamic system

→ ***functional neuronography***: maping of cortical areas according to the projection of individual receptor areas

Ontogenesis of EEG:
- newborn: delta 1-3/s, but with low ampl. (50 μV)
- in 2.-3. year: beginning of theta
- in 3.-4. year: beginning of alpha in occipit. leads
- after 10. year: well-formed alpha rhythm (delta-theta-alpha)
- after 60. year: less alpha, more theta (alpha-theta)

SLEEP:
Vigility:
= situation when organism dinamically and knowingly communicates with his environment

- role of RF:
→ afferent information from receptors
→ efferent impulses from cerebral cortex
→ influence on adrenal medulla

Sleep:
- unconsciousness from which the person can be aroused by sensory or other stimuli (compared to coma)

- sleep centers: hypothalamus
nuclei of thalamus
reticular formation
telencephalon

Hypotheses of sleep:
- ancient (Greece) – soul (consciousness) goes away from the body during sleep – Thanatos (God of death), Hypnos (God of sleep), Oneiros (God of dreams)
- circulatory hypothesis: ↓ blood flow in brain → sleep
- ↓ activity of RF (RAS) – non-specific thalamic nuclei (stereotypes to decrease activity of RAS)
- chemical hypothesis: hypnotoxines – DSIP (delta sleep inducing peptide), PG D2 ↑ sleep, PG E2 ↑ vigility
- humoral theory – serotonine ↑ sleep, noradrenaline ↑ vigility, fight or flight

A. Non-REM sleep: 4 stages
1.transition of vigility to snooze:
- muscle tone decreased, slower breathing
- EEG: waves with ↓ ampl. and ↑ frequency (beta)

2. snooze:
- relaxed position
- EEG: *sleep spindles* (similar to alpha rhythm, but RF not completely supressed), ampl. 50 μV, freq. 10-14/min.

3. light sleep:
- hypotonia of muscles
- EEG: ↑ ampl., ↓ freq.

4. deep (delta) sleep:
- slow breathing, ↓ heart rate, total regeneration, synchronization
- EEG: ↑ ampl., very low freq. (delta waves)

B. REM sleep:
= **paradoxical sleep**: originally depressed higher etages of CNS (areas of cortex) now active („watch points"), older parts inhibited
- characterized by dreams
- hypotonia of muscles
- rapid eye movements
- EEG: similar to vigility

Organization of sleep stages:
1. falling asleep
2. non-REM
3. REM

- non-REM and REM sleep (2. + 3.s.) repeat 4-6 x per night
- 1 period = 90-100 min.
- at the end of night ↓ 3. and 4. s. non-REM and ↑ REM
- REM is about 25 % of sleep – important for IQ (fixation of information in the memory)

→ sleep per day:
newborns 16-20 h.
adults 7-8 h.
older people 5-6 h.

Changes in sleep:
Non-REM sleep:
- predominancy of parasympathetic tone – predominant anabolic processes
- ↓ heart rate, f. of breathing and blood pressure
- ↓ metabolism
- ↓ excitability of nervous system
- release of gonadotropines and STH (growth)

REM sleep:
- improved blood flow in brain stem and hypothalamus
- ↑ local temperature and O2 consumption – ↑ brain metab.
- ↑ synthesis of RNA and proteins (wound healing)
- ↑ excitability of receptors
- ↑ heart rate and breathing – „guard of the organism"

THE AUTONOMIC NERVOUS SYSTEM (ANS)

autonomic" – involuntary (independent on a human will)
- the portion of the nervous system that controls the visceral functions of the body helping to maintain a dynamic and static conditions in the internal enviroment
↓
- homeostasis

ANS reflex:
Receptors:
chemoreceptors, baroreceptors, mechanoreceptors....
Afferent pathway:
Sensitive fibers
Centers:
In spinal cord, medulla oblongata, hypothalamus...
Efferent pathway:
Interrupted in autonomic ganglion → preganglionic and postganglionic neurons = two neuronal pathway
Effectors:
Visceral organs – heart, smooth muscles, glands

Efferent pathway of the ANS
- preganglion neurons:
the cell bodies are located in the intermediolateral gray column or the motor nuclei of the cranial nerves
- the **axons** – preganglionic fibers (myelinated slow-conducting B fibers)
- **postganglion neurons**
- **the axons** – postganglionic fibers (mostly unmyelinated C fibers)
- visceral **effectors**

- each preganglionic axon diverges to an average of 8-9 postganglionic neurons → autonomic output is diffused → principle of divergency

Reflexes

	SOMATIC	**AUTONOMIC**
Receptors:	proprio-, exteroreceptors	special rp.
Afferen.	In sensoric nerves	in all types: symp.,pasy...
Centers	spinal cord	spinal cord, medulla oblongata, pons, hypothalamus
Efferent.	one-neuronal	two-neuronal
Effector	skeletal muscles	heart, smooth muscles, glands
Reflex time	short	longer (neurotransmitter sec.)
Effect duration	short	longer
Purpose	control of posture locomotion	control of autonomic functions

The transmisson at the synaptic junctions in the ANS

- ✓ autonomic synaptic junctions**:**
  - ➢ pre - and postggl. neurons
  - ➢ postggl. neurons and effectors

- chemically mediated by transmitter agents:
  principal transmitter agents: acetylcholine (Ach), noradrenaline (NA)
  - ➢ cholinergic fibers - Ach
  - ➢ noradrenergic (adrenergic) fibers – NA (A)
  - ➢ nonadrenergic noncholinergic system (dopamine, VIP...)

Cholinergic neurons:
- ✓ **all preganglionic neurons (sy + pasy !)**
- ✓ the anatomically postganglionic parasympathetic neurons
- ✓ the anatomically sympathetic postganglionic neurons which innervate sweat glands and which end on blood vessels in skeletal muscles **(sympathetic cholinergic vasodilator system)**

Noradrenergic (adrenergic) neurons:
- the remaining postganglionic sym. neurons
- the adrenal medulla – sympathetic ganglion

The transmitter agents:
I. Acetylcholine
- synthesis: cholin+acetylCo A *(acetyltransferase)*

- inactivation: *acetylcholinesterase:* cholin+acetate
  Cholin – the uptake for the resynthesis Ach

very short effect duration

<u>Receptors for Ach</u>
- nicotinic (N) receptors
- in the synapses between the pre- and postganglionic neurons, in the neuromuscular junction

- muscarinic (M) receptors:
  postggl. PS neurons
  - ➢ M1 – Gp protein
  - ➢ M2 – Gi protein

Parasympathomimetic drugs: Ach, methacholine...
Parasympatholytic drugs: atropin, scopolamin...

II. Noradrenaline (Norepinephrine)
- transmitter of postggll. sympathetic endings
- CNS

Phenylalanine→Tyrosine→DOPA→Dopamine→Noradrenaline→ Adrenaline

The terminations of the NA effects:

1. diffusion to the blood (capillaries)

2. active reuptake mechanism (taken up to the noradrenergic neuron up to 70%)

3. Inactivation of NA:
   - by COMT (catechol-O-methyltransferase) - normetanephrine, and conjugates
   - by MAO (monoamine oxidase) – 3methoxy-4-hydroxymandelic acid (VMA) and glycol

the effect duration is longer than Ach

Receptors of sympathetic nervous system:

- α – α1, α2
- β – β1(cardiac rp.), β2 (bronchial)

The influence:

α : vasoconstriction, intestinal relaxation....

β : ↑HR, ↑ contractility, vasodilatation, lipolysis...

Sympathomimetic drugs: NA, A, phenylephrine....

Sympatholytic drugs: phentolamine, propranolol

Physiological anatomy of the sympathetic nervous system

- **thoracolumbal division** of the ANS
  truncus sympaticus + sympathetic ggl
- pregg. fibers – short
- postggl. fibers – long

Physiological anatomy of the parasympathetic nervous system

- **craniosacral division**:
- cranial outflow: III., VII., IX., X. (75-80%)
- sacral outflow: S2-S4
- preggl. fibers – long
- postggl. fibers – short (located on or near the visceral struc.)

Function of ANS subsystems

SYMPATHETIC NERVOUS SYSTEM:

- emergency situations, predominant in conscious state
- stress
- increase of energy release – catabolic reactions
- positive trophic effects on the heart, hypertensive reaction
- bronchodilatation
- inhibition of GIT activity
- mydriasis
- glycogenolysis, ↑ glucose blood,, lipolysis
- ....

PARASYMPATHETIC NERVOUS SYSTEM

- recovery processes
- decrease of energy consumption – at rest, sleep...
- anabolic reactions
- negative trophic effects on the heart
- hypotension
- bronchoconstriction
- Increase of GIT activity
- miosis....

Autonomic tone and excitability

Tone – there are discharges in autonomic nerves at rest

- reflex: (stimulation of baro-, chemoreceptors)
- central (hypothalamus)

- sympathetic (e.g. smooth muscles in vessels)
- parasympathetic (e.g. heart)

Excitability: - the ability to change the autonomic tone

Autonomic reflexes

I. Classification by localization of receptors and effectors:

1. viscero-visceral
2. viscero-cutaneous
3. cutaneous-visceral
4. viscero-motoric

II.Classification by organs and systems

1.Cardiovascular – control of the HR, BP, barorp. reflexes....
2. Respiratory – (e.g. H-B reflex...)
3. Gastrointestinal: (e.g. defecation)
4. Urogenital system: (e.g. micturition)
5. others.... (e.g. eyes r.)

Regulation of the ANS

- spinal cord: (micturition, defecation....)
- medulla oblongata (more complicated rr. – cardiovascular, respiratory, salivation...)
- midbrain - eyes rr. - accomodation, pupillary
- **HYPOTHALAMUS** – center of the ANS
- - "head ganglion of the ANS" (Sherrington)
- CAN - central autonomic network

medial prefrontal cortex, insula, gyrus cinguli....

HYPOTHALAMUS

Connections:

- with the posterior pituitary by neural fibers – **hypothalamo-hypophyseal tract**

- with the anterior pituitary by blood vessels – **portal hypophyseal vessels (system)**

- many aff. and eff. connections among hypothalamus and other parts of CNS

Functions of hypothalamus

- integration with autonomic nervous system („center")

sympathetic – in dorsal (lateral) region
parasympathetic – in anterior region

- temperature regulation (cutaneous cold receptors, temperature sensitive cells in hypothalamus; anterior h.- heat; posterior h. - cold
- endocrine control
- water balance and food intake
- thirst (osmoreceptors, lateral superior hypothalamus)
- hunger: „glucostat" cells sensitive to rate of glucose utilization
  ventromedial satiety center
  lateral hunger center
- emotional (behavioral) and sexual functions
- biological rhythms (lesion of the suprachiasmatic nuclei disrupt the circadian rhythm)

Examination methods of the ANS

I. Cardiovascular system

- the variability of cardiovascular parameters
- short-term, long-term

Ewing battery of cardiovascular tests

- deep breathing
- orthostatic test
- Valsalva manoeuvre
- hand-grip test

o**ther cardiovascular tests**

- oculocardiac test, diving reflex, mental and physical load...
- pharmacological tests...
- **baroreflex sensitivity:** simultanous continual recording of heart rate and blood pressure
- electrodermal activity (skin sympathetic response)
- MSNA (muscle sympathetic nervous activity) – microneurographic m.

Other systems:

- GIT: (e.g. evoked oesophageal potentials...)
- eye reflex...

The cardiac activity – extreme sensitive to modulation of the ANS!

Psychosomatic relationships

- cerebral cortex – the influence on the respiratory, cardiovascular, immune, autonomic and other systems

- relationships - cortex - organs

organs - cortex

- **efferent influences of the cerebral cortex:**

1. inducing - to provoke organ activity (e.g. cephalic influence of gastric secretion)
2. modulating - adjustment of the function (e.g. HR before work)

- **afferent impulses: from organs to the CNS**

- disturbance of visceral functions → disturbance of cerebral cortex function (pathological dominant) – nonadequate efferent impulses to the organs – circulum vitiosus

The principles of psychotherapy:

- the therapy of mental and physical disorders using psychological methods (dialogue, communication, relaxation...)

relaxation method:

- autogenic training (Schultz, 1932)
- relaxation and concentration method
- the state of internal mental concentration and maximal somatic relaxation → conditioned reflex
- autosuggestion

m**ental concentration → somatic relaxation**

- ✓ *music therapy, meditation, yoga, hypnosis...*

The physiological effects of relaxation methods

- the principle: to restore the balance between the activity of the sympathetic (F/F) and parasympathetic (rest and digest) branches of the ANS

- CVS: ↓HR, ↓BP (ECG, FINAPRES)
- respiratory system: ↓respiratory rate, slow and deep breathing (Respitrace)
- cerebral activity: alpha rhythm (EEG)
- muscle activity: ↓muscle tone (EMG)
- lower oxygen consumption
- improvement of self-control, self-confidence....

Biofeedback

- continual monitoring of several physiological parameters (HR, BP, breathing, muscle tone, EEG...)
- voluntary influence on the followed parameters
- biofeedback + relaxation therapy

THE SENSES

THE SENSE OF VISION

Vision: an ability to receive, process and interpret an information in the form of visible light to perceive the form, color, size, movement, and distance of objects

-eye: optic system - creation of an image on retina

-receptors and visual pathways - analysis of an image

A: OPTIC SYSTEM
1. Lens system: 4 refractive interfaces:
air / cornea / aqueous humor / crystalline lens / vitreous humor

ACCOMODATION:
= the process by which the eye increases optical power to maintain a clear image on the retina (for far and near objects)

Mechanisms: contraction of ciliary muscle (pasy, n.III) → relaxing of suspensory ligaments → convex lens with ↑curvature (elasticity) → higher refractive power (children: 20 → 34 D ..power of accomodation)

Presbyopia – in elderly people

Errors of refraction: - spherical (emmetropic, myopic, hyperopic eye)
- aspherical - astigmatism

2. Pupil:
- variable aperture system (1.5 – 8 mm)... miosis, mydriasis

Function: - to adapt the diameter of aperture to light conditions
- relation to depth of focus

B: RECEPTORS AND VISUAL PATHWAYS

1. Retina:
- light-sensitive portion of the eye, several layers

aa) Pigment layer (melanin prevention of reflection inside eyeball,
storage of vitamin A- exchange with outer segment of photoreceptors

a) rods and cones: real photoreceptors of an eye - in outer segment- photosensitive pigment (R: scotopsin, C: 3 types of photopsins I,II,III 30-300x less sensitive, differential spectral sensitivities)

Photochemistry of vision:
Rhodopsin (protein scotopsin + 11-cis retinal) light Reformation
trans-retinal scotopsin + el.changes
Retinal isomerase
cis-retinal
trans-retinol cis-retinol

Electrical changes: in conductance for Na+ and AP

- distribution of photoreceptors
- photopic and scotopic vision

Dark adaptation:
- biphasic time course: During the first phase, the light sensitivity threshold decreases sharply before stabilizing after a few minutes. This first phase represents the

adaptation of cones.
- After about 5 minutes, sensitivity increases again and stabilizes once more after about 20 minutes. This second phase represents the adaptation of rods.
- mydriasis, ↑synthesis of photosensitive pigments

Visual acuity: sharpness of vision
- Best developed in central fovea region (35.000 C, slender body, max.visual acuity- 25-60")
- outside the foveal area - ↓density of receptors, ↑convergence)

Testing of visual acuity - optotypes

b) bipolar cells

- depolarizing/hyperpolarizing on receptors stimulation

c) horizontal cells

-lateral inhibition of bipolar cells – enhancing and detection of visual contrast

d) amacrine cells

- many types, various means of stimulation

e) ganglion cells -transmission of signal to CNS – AP

-convergence (R: 60:1, C: 2:1)
-3 types: W (40%)- from R, broad fields, directional movements X (55%)- from C, small receptive fields, color vision; Y (5%)- broad fields, to rapid changes of image

2. Visual pathways:

Collaterals of optic tract:
Hypothalamus (circadian rhythm)
Pretectal nuclei (accomodation, pupillary light reflex)
Superior colliculus (eye movements)

Field of vision:
-visual area seen at given moment
- monocular, binocular
- blind spot (15 deg. lateral to central point of vision)

Abnormalities:
-scotomata
-hemianopsia bitemporal (longitudinal lession of chiasm)
homonymous (lession of optic tract)

Entoptic phenomena:
- visual effects whose source is within the eye itself

1. Floaters (muscae volitantes)
-slowly drifting transparent blobs of varying size and shape
-particularly noticeable when lying on the ground
looking up at the sky
-caused by imperfections in the fluid of the eye

2. Scheerer`s phenomenon = blue field phenomenon
-noticeable when viewed against a field of pure blue light
- tiny bright dots moving rapidly along squiggly lines in the visual field
-caused by leucocytes moving in the capillaries in front of retina

3. Phosphenes
-perception of light without light actually entering the eye
-caused by mechanical, electrical, magnetic stimulation of retina

THE SENSE OF HEARING

The importance of hearing:

- orientation
- warning against danger
- at communication
- speech self-control

Anatomical notes:

1. **External ear** – the pinna (helps to direct sounds), the external auditory meatus, auditory Canal – transmits sound waves to the tympanic membrane
2. **Middle ear** – separated from extrenal ear by tympanic membrane (called eardrum), chain of ossicles – the malleus, the incus, and the stapes. They connects the TM to the oval window (an opening into the inner ear). Striated muscles: m.stapedius, m.tensor tympani. Eustachian tube – connects middle ear to the pharynx and equilizes pressure differences between external and mid.ear (flying, diving)
3. **Inner ear** – bony and membraneous labyrinth (cochlea and vestibular apparartus), receptors for two sensory functions. Cochlea – spiral-shaped organ, divided by basal and Reissneri membranes to three parts – scala tympani and scala vestibuli – by perilymph (helicotrema), between – scala media – by endolymph). On basal membrane – organ og Corti with receptors – hair cells

Adequate stimulus for auditory receptors – **sound**

- sound is produced by waves of compression and decompression transmitted in air (or other media such as water), propagation in the air – 335 m/s
- sound composed of many unrelated frequencies - noise

- frequency (nm.of waves per time) – gives height of the tone
- amplitude of the sound vawe – gives colour of the tone
- intensity of the sound in decibels (dB) – over 100 dB can damage organ of Corti, over 120

dB can cause pain

- normal human ear is sensitive to pure tones with frequencies between 16 Hz and 20 kHz
- less than 16 Hz – infrasound, over 20 kHz – ultrasound
- highest sensitivity of human ear – at 1-3 kHz
- speech – at frequencies 250 – 3000 Hz (about 65 dB)

the phenomenon of masking
– the presence of one sound decreases the ability to hear other sound
- absolute and relative refractery period of auditory receptors and nerve fibres beiing stimulated before
- sound background – increases hearing threshold

Sound transduction – the functions of external and middle ear
- the ear transformates sound vawes of external environment to the action potencials of auditory nerves

1. transmission of souns through the ossicular system
- vawes cause the tympanic membrane to oscillate. The ossicles are connected to the TM by handle of the malleus, which is taughtly bound to the other bones. The vibrations are transferred by the ossicular system through the oval window on the structures of inner ear (by the vawe movement of perilymph)
- stimulation of the organ of Corti – causes action potencials in nerve fibres

function of mm.stapedius and tensor tympani: when loud sounds are transmitted to the CNS through the ossicular system $\Rightarrow$ reflex contraction of both muscles occures **– attenuation reflex** – protect cochlea from damaging vibrations caused by excessively loud sounds

2. transmission of sound through the bone

- vibrations are transmitted by the bones of the skull on the fluid of inner ear
- because the cochlea is embedded into the bony cavity
- (tuning fork or very loud sounds, especially the mastoid precess)

3. transmission of the sound by the air

- through the TM, the air in the middle ear, oscillations of the round window membrane
- of a little importance, mostly under pathological conditions

Function of inner ear

Organ of Corti – the neural apparatus responsible for transduction of sound
- receptors in two lines – outer and inner hair cells, at the apex of the cells – stereocilia, touching the tectorial membrane
- at the base of the hair cells terminate the nerve fibres of neurons from ganglion spirale

Stimulation of auditory receptors

- movement of the stapes causes waves in perilymph of scala vestibuli

Basilar membrane serves as frequency analyser – it distributes the stimulus along the organ of Corti so, that different hair cells will respond to different frequencies of the sound – place theory of hearing
- waves at high tones (high frequency sounds) activate the basilar membr. near the base of the cochlea
- waves at low tones (low frequency sounds) – max. of the amplitude – at the top of cochlea

- the sound causes deformation of basal membrane, deformation of the hairs and occurence of receptor (generator) potencial. If the RP is of a high intensity, it excites the cochlear afferent n.fibres $\Rightarrow$ elicits action potencials
- frequency of AP in the auditory nerve is related to the sound volume

Central auditory mechanisms

1st neuron in ganglion spirale – axons of these bipolar afferent neurons form the auditory part of n.statoacusticus (n.VIII), they end in ncl.cochlearis dorsalis et ventralis between pons and MO

2nd neuron – in cochlear nuclei, through crossed and non-crossed pathways to the sub-cortical centers – colliculi inferiores (for acustic-motor reflexes)
some neurons – to the different nuclei in pons, FR, cerebellum

3rd neuron – in corpus geniculatum mediale – to the projection neocortical field in gyri of Heschl in temporal lobe, in Brodmanns area 41
- connection with other auditory cortical centers in temporal lobes – for further processing of auditory information (auditory memory, understanding of the speech, …)

- importance of fasciculus olivocochlearis – efferent fibres, to hair cells, decreases the response to the auditory stimuli - damping effect

Deafness – the loss of the ability to hear

Two most important types:
1. conduction loss (external and middle ear, foreign body in canal, infection)
2. sensorineural loss (damage of organ of Corti, nerv – drugs ATB, tumor,…)

- if the cochlea and nerve are still intact but the ossicular system has been destroyed, sound waves can still be conducted into the cochlea by means of bone conduction
- tuning forks – Weber and Rinne tests

The Chemical Senses

- the senses of gustation (**taste**) and olfaction (**smell**) depend on chemical stimuli
- they contribute considerably to the quality of life (in animals – have survival value)

OLFACTION (SMELL)

Nasal mucosa:
- olfactory receptors – chemoreceptors in olfactory mucosa (regio olfactoria) (area of 3-5 cm^2), in humans around 10^7 recep., replaced every 60 days

- other cells: free nerve endings of trigeminal nerve – responsible for nonspesific afferent inform. (pain), or for reflex responses – coughing, sneezing, + basal and supporting cells (mucus)

Olfactory receptor: bipolar cell, on its apical surface – cilia (10-20) detecting odorants dissolved in overlying mucus layer. They are unmyelinated, 2 μm long, called olfactory sticks. Axons penetrate the base of the skull through openings in the cribriform plate of the ethmoid bone as olfactory nerve filaments (fila olfactoria) to olfactory bulb.

Stimulation of the olfactory cells
- olfactory receptors – telereceptors
- they response to the odorant substance (gas) in inhaled air dissolved in the mucus
- chemical interaction with the membrane of the cilia
- they evoke receptor (generator) potencial by changing permeability of membrane for Na^+
- fast adaptation
- in humans – ability to distinguish between 2 – 4000 different odors
- the olfactory cells – the highest degree of chemical discrimination

Intensity of the stimulus – depends on concentration of the odor substance (the number of stimulated receptors and the number of moleculs reaching the cell)

Quality of perception depends on concentration: at low c.– pleasant, at high c. – unpleasant
Threshold of the smell – very small amount of stimulating agent is necessary to evoke smell sensation
- depends on interindividual and sexual differences, hunger, diseases (e.g isufficiency of suprarenal cortex – decreases the threshold)

anosmia – inability to smell
hypoosmia – decreased ability to smell
odor „blindness" – inability to detect special odor (deficiency of appropriate receptor protein in olfactory cells for that substance

Sniffing – half-reflex response provoked by presence of a new odor
- increases the ventilation of the upper part of nasal cavity
- contraction of lower parts of nostrils towards the septum followed by series of fast and shallow inspirations and expirations

Central olfactory pathway

1st neuron – cells in regio olfactoria
2nd neuron – mitral and tufted cells in olfactory bulb forming synapses (called olfactory glomeruli) with first neurons. Axons – tractus olfactorius

Tractus olfactorius:
1. stria olfactoria medialis – axons of tufted cells, passing middle line in commisura anterior and entering contralateral olfactory bulb. They connect both bulbs, gyri parahypocampales and corpora amygdaloidea
2. stria o.intermedia – terminates in substantia perforata anterior, responsible for olfactory reflexes – to limbic system and hypotalamus

3. stria o.lateralis – axons of mitral cells – to the nc.amygdalae, to prepyriform and pyriform cortex and the cortical portion of the amygdaloid nuclei ⇒ **the primary cortical center for olfaction. Secondary center –** area enthorinalis

Of an importance are : conections to the limbic system, to the hypothalamic autonomic centers, reflex centers in RF and thalamus

The function of the CNS in olfaction:
1. for perception of odor modalities as information to consiciousness and memory
2. affective quality of smell (pleasant or unpleasant feelings)

- resulting in autonomic responses: 1) „fight or flihgt" responses
  2) reflexes of food intake (salivation, gastric juice secretion

e.g. vomiting – by central mechanisms due to unpleasant smell and taste stimuli

THE SENSE OF TASTE

- taste is a function of taste buds (9000) in oral cavity
- epiglotis, palate, pharynx and papillae circumvallatae et foliante
- in taste buds – receptor and supporting cells
- receptors are covered by unmyelinated endings of sensory nerves fibres
- fast adaptation

Taste stimuli
- substances dissolved in saliva and liquids
- 4 basic primary sensation of taste
- the tip of the tounge: **sweet** (sacharides, lead) and **salty** (anions of inorganic salts)
- two lateral sides: **sour** (high concentration of H^+)
- the root: **bitter** (heterogenous group of substances)

- sour and sweet – at the palate as well

Ability of different taste sensations: function of CNS
- combination of 4 primary taste sensations + smell sensation + temperature and composition of the food

ageusia – inability of taste sensations
hypogeusia – decreased ability of taste sensations
- for sweet and salt – damage of the tongue
- for bitter and sour e.g. prosthesis covering the palate

taste blindness – for certain substances

Central pathway of taste

- information from 2/3 of tounge – by sensory fibres of chorda tympani, from last third – with n. glossopharyngeus
- areas other than tongue - n.vagus

- the taste fibres form tractus solitarius

1st neuron – receptor cells – axons terminate in ncl.tr.solitarii (medulla oblongata), there is 2nd neuron – axons by tr. Solitario-thalamicus to the thalamus – there is 3rd neuron – and to the cortical taste center in gyrus postcentralis

The importance of CNS
1) perception - consiciousness and memory
2) affective evaluation
3) regulation of metabolism (after stress – increase in intake of sweet food
4) reflexes of food intake (salivation, swalloving, gastric juice secretion, defensive reflexes - vomiting)

HIGHER NERVOUS FUNCTIONS, CONDITIONED REFLEX, MEMORY, LEARNING

HIGHER NERVOUS FUNCTIONS

Thalamus: system of nuclei in diencephalon
→ integration of sensoric, motoric and autonomic activity
- together with limbic sy and hypothalamus regulates autonomic ff. in emotions (pale face in shock, red face in happiness...)

= „gate to consciousness"
– all info from the peripheral receptors into the cortex cross the thalamus

Neocortex:
- exceptional role in regulation – integration of most motoric and sensoric functions of CNS
- determines the human being
- possibility to live without neocortex, but human loses his identity

Functional classification of neocortex:

1) Sensoric areas:
- somestetic analyzer
- analyzer of vision
- analyzer of hearing
- analyzer of smell
- analyzer of taste

2) Effector areas:
- primary motoric area
- premotoric and secondary motoric area

3) Association areas:
- multiple connections with sensoric and effector areas of cortex and subcortical structures

a. prefrontal
- frontal pole of frontal lobe
- Brodman. area 8 a 9

- orbital area

- effer. pathways → into limb. sy, hypothalamus and mesencephalon
→ **important for behavior**
- destruction: hyperreactivity, disorders of behavior and intelect, disorder of personality

b. temporal areas:
- fronto-parietal
- fronto-temporal
- parieto-temporal
- parieto-occipital
- temporo-occipital

→ participate in **processes of learning and formation of memory traces**
→ temporal areas → important for development of ff. associated with the **speech**

Cortical structures determining speech:
Broca motoric centre od speech: – dorsal part of gyrus frontalis
Wernicke sensoric centre od speech: – between parietal and occipital lobe

Disorders:
- sensoric agnosia: = inability to distinguish subjects according to sensoric modalities (visual, auditive,...)
- apraxia: = inability of voluntary movement (in intact automatic movements and motoric innervation of muscles)
- aphasia: = disorder of speech functions (sensoric, motoric, conductive, sub-cortical, global)
- agraphia: = inability to write
- **alexia:** = inability to understand written text („word blindness, destruction of occip. lobe)
- acalculia = inability to count (destruction of gyrus angularis and marginalis)

LATERALITY OF HEMISPHERES:
Left hemisphere (causal):
→ speech ff.
→ reading, writing, arithmetic tasks...
→ control of voluntary movement
⇒ analytic gradual processing of information
- pathology: disorder of speech with intact emotional characteristics, problems with abstract thinking

Right hemisphere (intuitive):
→ other ff. than speech
→ complex processing of visual, auditive and other stimuli, space perception...
⇒ complex and simultaneous processing of information
- pathology: no disorder of speech ff., speech without intonation and emotions

sexual dimorphism:
= differences between genders in specific cognitive and motoric abilities and skills

Women:
- better verbal abilities (women more talkative)
- spacial remembering the subjects

- precise manual skills

Men:
- spacial tasks (rotation in the space)
- logic-mathematic tasks
- motoric tasks associated with spacial orientation

→ **women less lateralised than men**
- better connections between hemispheres
- testosterone stimulates predominantly development of the right hemisphere

SPEECH:
= verbal or written means of communication between people
- complex mechanism (prim.motor.cortex, thalamus)
- assoc.cortical areas allow the process of thinking
- ideas are transformed into sentences in gyrus front. inf. (Broca centre)

Components of speech:
1. sensoric:
- understanding of verbal and written speech
- intact auditive and visual sensoric organs
- transmission of info by affer. pathways into prim. cortical areas and to assoc. areas of cortex (gyrus temp. sup.)
- destruction of Wernicke's area ⇒ misunderstanding of heard or written speech;
perception (sensoric) aphasia (fluent speech, but without sense)

2. motoric:
– intact association areas allowing the process of thinking - gyrus front.inf. - Broca's area
- destruction: → ***Broca expressive (motoric) aphasia*** (agrammatic speech)

conductive aphasia: dysfunction of the pathway connecting Broca's and Wernicke's areas (fasciculus arcuatus) without dysfunction of centers

global aphasia: dysfunction of both centers of speech (dysfunction of perception and production of speech)

Primary motoric cortex:
→ commands for activation of articulation muscles
- time dependance, changes in intonation and sound → cooperation with cerebellum, basal ganglia and sensoric cortex

Thalamus:
→ assurance of cooperation of physiological processes associated with speech (breathing, articul.muscles, ...)
- dysfunction of subcortical structures (thalamus) → disturbed continuity of speech

INNATE MECHANISMS OF ASSOCIATIVE AND INTEGRATIVE FUNCTION OF CNS

UNCONDITIONED REFLEXES:
= innate reflexes with structural basis caused by action of adequate stimuli on specific receptor area (I.P.Pavlov)

- originated during development
= mechanisms for assurance of ability to survive and live

classification:
- apetitive
- protective
- orientation
- sexual

Innate mechanisms:
1. Simple unconditioned reflexes:
- somatic and autonomic – salivatory r., spinal r.)

2. Drive:
- processes which represent an immediate response to fundamental necessities of the body
- they force the human to fill the needs
- after filling the needs - antidrive

3. Emotions
4. Instincts:
- complex of motoric activity and complicated forms of behavior typical for any species (instincts of birds)
- requires the same order of actions
- supply the existence of species, make easier orientation in space, teritorial instincts, social instincts
→ hierarchic relationships (relationships between individuals), sexual (supplies next generation)

MECHANISMS OF COMPLEX AND INTEGRATIVE FUNCTION OF CNS

CONDITIONED REFLEX:
- acquired response to originally indifferent stimulus, which was repetitively combined with natural stimulus leading to this response
- elementary physiological mechanism of higher functions of CNS (formation of temporary connections)
- as basis for these reflexes: unconditioned reflexes and keeping activation of neocortex

Origin:
- conditioned stimulus: biologically indifferent stimulus (ringing bell) → goes before unconditioned stimulus (food)
- conditioned reflex: repetitive connection of conditioned and unconditioned stimulus

Conditioning:
- formation of temporary connection
- complex of biochemical, neurophysiological and ultrastructural changes in the brain
→ in neocortex and in subcortical structures (RF, limb. sy)

Conditioning:
a. classical (Pavlov) (dog, food and light/ringing bell)

b. operational (Skinner)

e.g. rat in new box with small lever
conditioned stimulus (CS) = pressing the lever
unconditioned stimulus (US) – food ⇒ if hungry, press the lever

c. discrimination conditioning:
testing of discrimination abilities of animals
CS: metronom sound with rate 120/min
US: painful stimulus, dog takes away the leg

conditioning – changing the rate of metronom: 60/min without painful stimulus – in changing of these two rates – taking the leg away just in rate of 120/min ⇒ **differenciation inhibition**

Central inhibition and excitation:
- active processes in CNS
- depolarization of postsynaptic membrane → **excitation**
- hyperpolarization → **inhibition**

Dynamic stereotype:
- DS is a temporary unchanged complex of conditioned and unconditioned reflexes originated on the basis of stereotypes of repeating activities

Formation of DS:
- precise and unchanged order of repeating stimuli
- requires unchanged quality and quantity of stimuli
- constant and unchanging intervals between the stimuli

Advantages of DS:
- automatization of nervous activity, more effective
- lower consumption of oxygen
- without voluntary effort

Disadvantages of DS:
- inertion of processes – neurons may react non-adequately, they don't accept changed conditions of environment (car drivers)
- possibility of in-built mistake – its elimination then complicated (in children)

TYPES OF HIGHER NERVOUS ACTIVITY:
HNA = complex of acquired reflex mechanisms (conditioned reflexes), which dynamically change under the influence of various relationships

Classical classification of people according their temperament:
Hippocrates, Galenos:
melancholic, phlegmatic,
sangvinic, choleric

Pavlov: suggested physiological typology of individuals according to 3 basic properties of excitation and suppression
1) strength = intensity of response to stimulation

2) balance between excitation and suppression
3) functional mobility – dynamics of alternation (change) of excitation and suppression

- melancholic - weak type
- phlegmatic - strong, balanced type with low mobility
- sangvinic - strong, balanced, mobile type
- choleric - strong, non-balanced, mobile type

MEMORY:
= ability of CNS to code, to store and to evoke information in the form of memory traces
- engrams - and their use in the process of learning and formation of temporary connections

- human uses just about 4-5 % of the memory capacity

Memory:
- according to time of storing information:
- ultra-short (immediate) → fractions of s.
- uhort-term → s. - min.
- intermediary (medium) → min. - hours
- long-term → months - years

- according to emotional and rational form of knowledge:
- sensoric – imagine, experience, shape ...
- symbolic – terms, words, numbers ...

- according to the process of memory formation:
- primary
- secondary
- terciary

Processes of memory:
1.Encoding of information:
- storing the sensory and other experience

→ RF: selection of info and concentration of attention
(*orientation reflex*)
→ talamus: *„gate to consciousness"*
→ limbic sy: emotions, motivation
→ sensoric-association areas of neocortex:
- lateral cortex – analysis and differenciation of info
- temporal lobe – storing and connection of info - *„key"*

→ hippocampus:
- transmission of info from short-term to long-term memory → *„index of space and time"*

2. Storing of encoded information
– biochemical, biophysical and electrophysiological processes

3. Reccurent evokation of information in case of need

Short-term memory:

→ transition of excitation via circuit of
reverberating neurons between cortex and thalamus
(1 circuit = 1 wave α on EEG)
→ spreading the impulses into neo- and paleocortex
↓
after entrance into hippocampus the impuls (perceived phenomenon) circulates in Papez circuit

→ during the circuit of info we realise the phenomenon and place it into the memory (fixation of impulses)
- space and time summation of stimuli
- conditions which block elec. activity of brain (el.shock, coma, anesthesia) erose this memory = ***retrograde amnesia***

Intermediary (medium) memory:

thalamo-cortical reverberation leads to production of other structure of RNA in several neurons of neo- and paleocortex (during non-REM sleep)
↓
changes on synapses of neurons
(change in shape, size, number of synapses, perforations)

- about 15 % plastic synapses in the brain, the rest is built-in in circuits

Long-term memory:
changed proteosynthesis on the basis of changed RNA (in interaction with intermediary memory)
↓
synthesis of specific and non-specific proteins
(protein S-100, scotophobine....)

- hippocampus – deposition of engrams into the long-term memory

Role of sleep:
- REM sleep:proteosynthesis and fixation of engrams → change of medium to long-term memory
- non-REM sleep: synthesis of RNA

- selection, elimination and abstraction of information
- drugs suppressing REM sleep reduce also memory (barbiturates) and vice versa
- organization of sleep in children – prognosis of intelligence of the child (↑ REM - ↑ IQ)

Relationship between memory, EEG and sleep:
EEG rhythm alpha – theta:
- first stages of formation of temporary connections in the process of learning (hippocampus, RF)
- manifestation of reverberation processes between cortex and sub-cortical structures (thalamo-cortical reverberation)

Ontogenesis of memory:
- fetus *in utero* (voice, music, languages)
- perinatally – *imprinting* (first percept after labour)
- childhood – great development of memory
- adulthood – well-balanced memory
- old age – predominance of engrams from the youth

LEARNING:
- ability to remember new information and its storing (formation of engrams and their fixation)

→ repetition of information
→ motivation

- elicitation of engrams from memory**:** U shape
(the best immediately after entrance of information and then 24 hours later)
- process of fixation – biochemical transcription in 30-60 min.

In process of learning – 4 integrated circuits:
1.specific senso-motoric areas of cortex:
→ analysis and differenciation of stimuli

2. non-specific sub-cortical system (RF):
→ keeps consciousness

- new stimulus → *orientation reflex* (*„arousal phenomenon"* on EEG) – concentration of attention to the stimulus, via RF suppressed realisation of other stimuli
but: repetition of the same stimuli → weaker OR → stimulus must contain *„new component"*

3. limbic system:
- emotions (positive stimuli – stronger trace, negative stimuli – weaker trace)
- motivation (positive motivation more effective)

4. temporal lobe:
→ deposition of information (traces) and their connections with already encoded information stored in the memory – function of *„key"*
- according to the similarity, ability to „un-lock" engrams stored in other areas of the brain

Forgetting:
- negative phenomenon with positive importance
- ability to remember important information
- speed of forgetting – highest in the first 2 days, then slower
- residuum: depending on the repetition (cca 25 %)

PHYSIOLOGY OF THE E N D O C R I N E SYSTEM

Regulation of functions: - neural
- hormonal (endocrine) – via chemical messengers - hormones

Hormone = substance produced by specialized cells, mediated via circulating blood to target cells (organs) to affect (control) their activity
Bayliss, Starling (1902)

History:

Prehistory: - 3000 (B.C.) – China – eating of sea-weed against a goiter
- 400 (B.C.) - India - eating of animal testes against impotency
- Castration of animals and men (eunuchism)

Modern history:1775 – De Bordeau: „testes produce not only ejaculate but also some substances to the blood...“
1849 – Berthold – castration of the cocks and transplantation of testes back (evaluation of effects by size of their crests)
1902 – Bayliss, Starling – secretin
1919 – thyroxin
1920 – insulin (Banting, Best, McLeod)
1930-40 – steroid hormones
1944 – GH
1979 – DeBold – ANH

Mechanisms of hormonal action

Hormones → hormone receptors on the membrane surface of the cells or inside the cells → cascade of reactions in the cell.

Hormone receptors = very large proteins. Each receptor is highly specific for a single hormone

Principal mechanisms:

1) Confirmational changes of the receptor – alter the membrane permeability to ions.
2) Increase transcription of selected mRNA.
3) Activating the cAMP system (the second messenger) which activates other enzymes.
4) Activating the genes of the cell – the formation on intracellular proteins that initiate specific cellular functions.

Properties of the hormone effects:

1) Target effect – hormone acts on target cells – organ (estrogen – uterus, mammary gland etc.)

2) Specificity – effect of the hormone is specific – it is irreplaceable by other hormone

3) High effectiveness – small quantities of a hormone are effective.

THE PITUITARY GLAND
(Hypophysis)

Morphology small gland - d = less than 1 cm, weight = 0.5 – 1 g.
It lies in the sella turrica at the base of brain and is connected with hypothalamus by the pituitary (hypophyseal) stalk.

The anterior, intermediate and posterior lobes

Histology: on the bais of the staining reactions:

In the anterior pars:
- chromophobe cell (50%)
- chromophile cells (50%)
  - acidophils (40%) – eosin –
  - basophils (10%) – haematoxylin

In the intermediate pars: basophils

In the posterior pars: neural fibrea, neuroglia

Hypophysis = mixture of more or less separate endocrine organs
that contain 14 or more hormonally active substances

Hormones of anterior lobe

1) Growth hormone
2) Hormones stimulating „target glands" (the thyroid, the adrenal cortex, the ovaries, the testicles, the mammary glands)

Growth hormone (GH)

- somatotropic h. – product of the acidophilic cells

Protein hormone: 191 AA in a single chain, two forms:

1) m.w.: 22000,
2) m.w.: 20000

– both active

The basal GH level in adults = in average less than 3 mg/ml, in the children about 5 mg/ml.

Pulsatile secretion of GH – in 3.5 hours intervals.
The half-life = 6-20 minutes

Diurnal rhythm – in NREM sleep – increase the GH level.

The increase during a physical effort, after stress.

Physiological functions of GH

1) Stimulation of cartilage and bone growth:

In young beings in which epiphyses have not yet fused to the long bones - growth is stimulated by GH.

GH does not have direct effect – but it acts indirectly by causing the liver to form small proteins = somatomedins.

GH → liver receptors → proteosynthesis →somatomedins A,C → cartilage, bone receptors → growth to the length

2) Metabolic effects of GH:

A) Effects on glucose metabolism
   a) Decreased glucose utilization – antiinsulin effect mainly in muscle.
   b) Enhancement of glycogen deposition – glucose is rapidly polymerized into glycogen and deposited (because of a.)
   c) Diminished uptake of glucose by the cells and increased blood glucose concentration. The cells become saturated (because of b.)

GH = diabetogenic effects

2) Effects on fat metabolism
GH releases fatty acids from adipose tissue and increases the FA concentration in the body fluids = *ketogenic effect*.
Fat is utilized for energy in preference to both – glucose and proteins under the influence of TH – a source of energy during fasting and stress.

GH → receptors of f. cells → cAMP → phosphorylation → lipolysis

3) Effects on proteins

Proteoanabolic effects – via:

a) Enhancement of AA transport through cell membranes – directly
b) - " - of protein synthesis by the direct effect of GH on ribosomes. Positive N_2 balance.
c) Increased quantities of RNA promotes protein synthesis
d) Decreased catabolism of protein and AAs. GH mobilizes FFA (2.) for supplying of the energy and by this effect acts as a „protein sparer".

Control of TH secretion

Hypothalamus → growth hormone – releasing hormone (GHRH)

→ - " - - inhibiting - " - (GHIH) = = somatostatin

Feedback control – GH increases circulating insulinlike growth factor (IGF-1 = somatomedin C) and IGF-1 inhibits secretion of GH and stimulates secretion of the somatostatin.

Stimuli affecting GH secretion: *Figure*

Abnormalities of GH secretion

1) Deficiency of GH effects during childhood results in dwarfism:

- with *deficient secretion* of GH
- with normal/hypersecretion of GH in order to *receptor deficiency*

2) Hyperfunction:

- in children → gigantism (giantism) – large quantities of GH are produced – symmetrical growth

- in adults → acromegaly – after the epiphyses of the long bones have fused with the shafts (diaphyses) – the person cannot grow taller, the bones and soft tissues can continue to grow in thickness
→ enlargement in the small bones (hands, cranium, nose, supraorbital ridges, jaw ...).

Thyroid-stimulating hormone (TSH, thyrotropin)

Glycoprotein hormone.

Effects:
TSH stimulates:
- thyroid secretion and growth of thyroid gland
- increases – uptake of iodide, synthesis of 3-Monoiodotyrozine (MIT)
- BF in thyroid gland

Whenever TSH stimulation is prolonge, the thyroid becomes enlarged = **goiter**

Adrenocorticotropic hormone (ACTH, corticotropin)

Polypeptide (39AAs).

Effect:
ACTH – stimulates: growth and function of adrenal cortex (mainly zona fasciculata and reticularis).

The effect - through cAMP: The increase in intracellular cAMP activates protein kinase A → stimulation of corticosteroids production.

Abnormalities of ACTH secretion:

Hypersecretion:
Hypersecretion of ACTH in adrenocortical insufficiency – *Addison´s disease* (by autoimmune disease or by desruction of the adrenal glands - tuberculosis, cancer).

Symptoms: Hyperglycemia (through) increased glucocorticoid activity), **negative nitrogene balance**, **fat infiltration** of the liver.
Hyperpigmentation (ACTH has MSH – melanocyte – stimulating hormone activity because of MSH is made up of AA residues of ACTH molecules).

Follicle – stimulating hormone (FSH

Glycoprotein hormone.
Before puberty only in small concentration – then it increases.
Without diurnal rhythm.

Effects:

FSH stimulates - in male: testicle growth and spermatogenesis
- in female: ovarian follicle growth, it controls secretion of estrogens from the follicles...

Luteinizing hormone (LH, ICSH)

Glycoprotein hormone
Effects:
LH stimulates - in male: growth of the interstitial cells of testicles, testosterone secretion
- in female: ovulation and luteinization of ovarian follicles

Prolactin (LTH – luteotropin)

Protein.
Basal level 1-20 mg/ml.
During gestation, progressive increasing of the level-- at he end – up 200 mg/ml.

Effects (three main):

1) Mammotrophic effect – development of the breasts at puberty

2) Luteotrophic effect – stimulation of the corpus luteum, stimulation of the progesteron secretion

3) Role in secretion of milk - producing effect.

Suckling stimulates prolactin secretion. In mothers who do not nurse their baby – a decrease in prolactin level to basal value in 2-3 weeks.

Prolactin and estrogen synergize in producing breast growth, but estrogen antagonizes the milk-producing effect of prolactin on the breast. Estrogens may be administered to stop lactation.

On the other side – prolactin inhibits GnRH secretion – the ovulation

during lactation is inhibited – 50% nursing mothers do not ovulated.

Beta – lipotropin (beta – LPH)

Polypeptide. 13 AAs the same as in MSH.
Effect: Lipolysis

Control of anterior pituitary secretion

1) Feedback control – hormone of the peripheral gland (adrenal cortex, thyroidea ...)inhibits in the adenohypophysis secretion of the trophic hormone

2) Control by hypothalamus – through hypophyseotrophic hormones - stimulating - releasing hormone
- inhibiting hormones

GH ← GH – releasing (GHRH),
GH – inhibiting hormones (GHIH) = somatostatins

TSH ← thyrotropin – releasing hormone (TRH)

ACTH ← corticotropin – releasing hormone (CRH)

LH + FSH = gonadotropins ← gonadotropin – releasing hormone (GnRH)

PL ← prolactin – releasing (PRH),
prolactin inhibiting hormones (PIH)

HORMONES OF INTERMEDIATE LOBE

Gamma-lipotropin (gamma LPH)

Polypeptide – *like beta LPH*.
Effect: Lipolysis.

γ – LPH arises from β – LPH ← proopiomelanocortin (POMC)

POMC is synthesized in the hypothalamus, lungs, GIT, placenta.
It is hydrolyzed to ACTH, beta-LPH, beta-endorphin, and MSH.

Melanocyte – stimulating hormones (MSHs)

alpha, beta, delta ...

MSHs are made up of AA residues of the ACTH molecules –
- *(also ACTH has MSH activity)*

Action on - melanophophores in the skin of fish ...

- melanocytes in mammals.

Melanocytes synthesize melanins –transfer to keratocytes in skin – for pigmentation of hair and skin – darkening in 24 hours.

HORMONES OF THE POSTERIOR LOBE

Hypothalamo – hypophyseal system
Peptidic hormones: Arginine - Vasopressin (ADH= antidiuretic h.)
Oxytocin

Biosynthesis – in the supraoptic and periventricular nuclei (bilaterally) in hypothalamus. In different cells.

Transport - intraneural – in the axons of neurons to their endings
- in the posterior lobe. Velocity = 0.25 mm/hour

Secretion – from the posterior lobe in pulses

Metabolism: - Vasopressin – half-time cca 18 min in humans.
Destruction in the liver and kidneys.

Effects of Vasopressin (ADH)

1) Regulation of hydration - of body water
Regulation of vasopressin secretion through osmoreceptors – mainly in hypothalamus – vesicular cells – in ncl.supraopticus and through volume-receptors - low – pressure baroreceptors in RA.

Diminishing of the circulating volume by 6-10 % and more — stimulation of LP and HP baroreceptors. Vasopressin through V_2 receptors in the nephrons – in the thick ascending limb of Henle and the collecting duct – increases cAMP and the permeability of the membrane to water, urea, solutes – absorption – antidiuretic effect.

2) Regulation of systemic (peripheral) vascular resistance (SVR)
Vasopressin increases BP by an action on the smooth muscle of the arterioles – increase in SVR – through V_1 receptors.

Vasoconstriction in splanchnic, renal, coronary, cutaneous and uterine circulation.

Hemorrhage = a potent stimulus to vasopressin secretion.

3) Effect on memory

Vasopressin – neurotransmitter- facilitation of the memory.

Effects of oxytocin

1) Contraction of the smooth muscle of the uterus.
The sensitivity of the uterus to oxytocin increases during gestation. It is inhibited by progesteron. During labor – descent of the fetus down → impulses in the af. nerves to hypothalamus → secretion of oxytocin → contraction of uterus.

During coitus – contraction of uterus facilitates sperm. transport.

2) Contraction of the myoepithelial cells in the ducts of breast –
- during lactation – milk ejection.

The milk – ejection reflex = neuroendocrine reflex.
Receptors = touch r. around the nipple in the breast.
Impulses → hypothalamus → secretion of oxytocin →
→ contraction of the ducts.

3) Effects on the memory – negative.

THE THYROID GLAND

Morphology: 2 lobes + thyroid isthmus in front of the larynx.
Histology: The thyroid is made up of follicles. Single layer of cells – filled with colloid

Production of thyroid hormones:
- thyroxine (T4),
- triiodthyronine (T3)

Biosynthesis:

Processes: 1/Iodination, 2/ condensation of tyrosine molecules
3/ binding in peptide linkage in thyroglobulin 4/secretion

1/ Iodination – Iodide – trapping mechanism (iodide pump) – active transport against a concentration and electrical gradient. Iodide is oxidized to iodine.

2/ Synthesis = condensation – Iodine is bound to the 3rd position of thyrosine molecules - by enzyme „thyroid peroxidase". T4 and T3 are synthetized in the colloid.

MIT – DIT
2 x DIT = T4 + alanine
MIT + DIT = T3 + alanine

3/ Thyroglobulin = the biggest protein molecula in human body.
m.w. = 660 000 (2 subunits) – synthesized in the thyroid cells

4/ Secretion of the hormones: During secretion – colloid is ingested by the thyroid cells, the peptide bonds are hydrolyzed by peptidases – free T3 and T4 are secreted to the capillaries.

In normal human thyroid - 23% MIT, 33% DIT, 35% T4, 7% T3,
traces rT3

Per day – T4 – 80 microgramms
T3 – 4(20) microgramms

Transport:
T4, T3 are bound to plasma proteins: - albumin
- prealbumin (TBPA)
- globulin (TBG)

99.98 % - of the T4 in plasma is bound – only 0.02 % - free T4
99.8 % - of the T3 - " - - 0.2 % - free T3

Latency and duration of action:
After injection of thyroxine – long latent period (2-3 days). Once activity does begin, it increases – maximum in 10-12 days.
Half-time – 15 days.
Some of the activity persists 6 weeks to 2 months.

Metabolism: Deiodination in the liver, the kidneys ...
T4 to T3 (up 33 % of T4) and to RT3 (45 %).

Enzymes: 5´ – deiodinase (T3), 5 – deiodinase (rT3), diiodothyronines

In the liver T4 and T3 – conjugation to sulfates, glucuronides → the bile → the intestine. Reabsorbtion/excretion. Stool, urine.

Effects of thyroid hormones

1) Effects on growth and development: General and specific effects.
Growth and differentiation of the tissues – proteosynthesis.

In cold-blooded animals – metamorphosis (tadpoles to frogs).

In mammals and humans– bone growth, maturation of CNS (synapses, myelination) and peripheral nervous system

(The reaction time of stretch reflexes – e.g. Achilles reflex).

2) Effects in adults:
a) Calorigenic action – increase in heat production.
Increase the O_2 consumption (exceptions: brain,testes, uterus, lymph nodes, spleen, anterior pituitry).
Effect lasts up to 6 days.

Metabolic effects:

- carbohydrates – increase of absorption from GIT,uptake of Co by the

cells, enhanced glycolysis
- proteins – T4 and T3 - in small doses – proteoanabolic effect
- in higher doses – proteokatabolic effect - fat – lipolysis, but a decrease in circulating cholesterol level. Loss of weight.

c) Effect on O_2 transport – thyroid hormones increase the dissociation of O_2 from Hb by increasing red cell 2,3-DPG

d) Effects on heart – th.h. increase the number and affinity of beta-Adrenergic receptors in the heart – they increase sensitivity of the heart to catecholamines. Increase in CO.

e) Different actions: - cutaneous vasodilatation – decrease in SVR
- hepatic conversion of carotene to vit. A (in hypothyroidism – carotenemia)
- stimulation of milk secretion
- normal menstrual cycles and fertility
- mentation, irritability of CNS
- effect on catecholamines
- respiration – increase the rate and depth of respiration
- GIT – increase appetite and food intake, secretion juices, motility – diarrhea

Regulation of Thyroid Secretion

I. Pituitary TSH – its specific effects are:

1) increased size, number and secretory activity of the thyroid cells
2) increased activity of the iodide pump
3) increased iodination of tyrosine and coupling
4) increased proteolysis of the thyroglobulin in the follicles –
- release of thyroid hormone into the blood

II. Feedback mechanisms through the hypothalamus and TSH

Hypothalamic hormone – thyrotropin releasing hormone (TRH) –
- direct effect on the secretion of TSH.
The negative feedback effect of thyroid hormones on TSH secretion – through hypophysis and also through hypothalamus.

Abnormalities in thyroid gland functions

Hyperthyroidism

Causes:
Thyreoidal: toxic adenoma, thyrotoxicosis, Graves´s Disease (autoimmune)solitary toxic adenoma,Toxic multimodular goiter, TSH-secreting pituitary tumor,thyroiditis, ektopic thyroid tissue

Extrathyroidal: Administration of T3 or T4 (iatrogenic hyperthyroidism)

Symptoms: - intolerance to heat
- weight loss (hyperphagia)
- diarrhea
- nervousness
- psychic disorders yet inability to sleep,
tremor of hands
- goiter
- exophtalmus (due to swelling of the retro-orbital tissues)
- sweating
- a warm, soft skin
- increased pulse pressure
- increased cardiac output
- tachycardia – thyrotoxic heart
- drop in SVR (cutaneous vasodilation)

Hypothyroidism

Causes:
Lack of iodine (endemic goiter), idiopathic nontoxic colloid goiter, goitrogenic substances in some foods (thiocyanotes in cabbage, turnips – Brassicacea family vegetables) – progoitrins –
- active antithyroid agents, secondary – hypothalamic hypothyroidism, pituitary hypothyroidism ...

Symptoms:
in infancy and childhood – cretenism – failure of growth
- mental retardation
- protruding tongues

in adults – goiter – endemic (lack of iodine – need 50 mg/day,iodized salt) – due to hyperproduction of TSH
- somnolence
- muscular and mental sluggishness
- bradycardia, decreased CO, blood volume
- increased weight
- constipation
- depressed growth of hair
- frog-like husky voice
- myxedema – edematous appearance the body

Hormone of the thyroid parafolllicular C - cells = Calcitonin

C-cells – 15-20 % of the thyroid gland volume – in the interstitium between the thyroid follicles.

Calcitonin – 32 AAs, m.w. 3500

Effects: Calcitonin – decreases blood calcium ion concentration
(in minutes after injection) by two ways:

- a decrease the absorptive activities of the osteoclasts (the immediate effect)
- a prevention of a formation of new osteoclasts (prolonged effect).

Mainly in children.
In adult only a weak effect.

Effects – exactly opposite that of parathyroid hormone.

Regulation – increase in plasmatic Ca++ causes an immediate increase in the rate of calcitonin secretion.

Therapeutic application – synthetic, human, salmonic – against osteoporosis.

The Parathyroid Glands

Morphology – 4 glands – located immediately behind the thyroid gland. Each 6 x 3 x 2 mm in adults.

Two types of cells: - chief cells – secrete parathyroid hormone
- oxyphill cells – unknown function

Parathyroid Hormone (PTH)

small protein – 84 AAs, m.w. 9500. Activity depends on the first 34 AAs.

The normal plasma level = 10-55 pg/ml. Half-time less than 20 minutes.

Effects:

In the bone - osteoklasts – bone destruction – absorption
- osteoblasts – bone deposition
- osteocytes – stabilization

PTH:
– in the bones: - stimulates osteoklasts – releases Ca++ from the bones = mobilization of the Ca++ → the increase to the plasma Ca++.

- in the kidneys: PTH – increases phosphate and decreases calcium excretion in the urine (increases reabsorption Ca++ in the distal tubules).

- in the GIT: PH increases Ca++ absorption from the intestine.

Regulation of PTH secretion

1) Decrease in Ca++ concentration in the extracellular fluid causes the increase in PTH secretion. Feedback – opposite effect – increase the Ca++ concentration — decreased activity of the parathyroid glands. E.g. – excess Ca++ or vit. D in the diet.

2) Increased plasma phosphate stimulates PTH secretion. Chemoreceptors – the secretion cells in parathyroid glands.

Abnormalities

PTH – essential for life.

Hypoparathyreoidism – after parathyreoidectomy – decrease in Ca++ plasma level – signs of neuromuscular hyperexcitability:

Hypocalcemic tetany:
Chvostek´s sign – contraction of facial muscles elicited by tapping over the facial nerve.

Trousseau´s´ sign – a spasm of the hand muscles by occluding the circulation.

Hyperparathyreoidism – Hypercalcemia. Renal stones.
If Ca++ more than 4 mmol/l – a danger of the calcium rigor of the heart.
Demineralization, osteoporosis, pathological fractures.
M. Recklinghausen.

Calcium Metabolism

Ca++ - in the human body about 1100 g – 99 % in skeleton

The plasma Ca++ - 2.25 – 2.75 mmol/l – partly bound to protein and partly free – ionized Ca++ (1.25 – 1.5 mmol/l).

Absorption – from the GIT
Mobilization and deposition – in the bones
Excretion – urine, stool, sweat

Roles of the hormones in the Ca++ homeostasis with action on: - GIT
- bones
- kidneys

Summarization:

1) Calcitonin - inhibition of osteoklasts – hypocalcemic effect
- inhibition of the renal resorption of Ca++
- inhibition of GIT activity

2) Parathyroid hormone – stimulation of osteoklasts – hypercalcemic effect
- inhibition of the Ca++ renal excretion
- stimulation of Ca++ resorption in the GIT

3) Hormone – vitamin D

Vitamin D

= group of sterols produced by the action of UV light on provitamins.

Vit. D3 (cholecalciferol) is produced in the skin from 7- dehydrocholesterol by sunlight.

It causes formation of a calcium binding protein in the intestinal epithelialcells = prolonged effect on calcium absorption - plays a role in promoting calcium absorption by the formation of a Ca++ - stimulated ATP-ase and by formation of an alkaline phosphatase in the epithelial cells.

Negative feedback control – Ca++ - vit. D.

The Adrenocortical Hormones

Morphology: Two adrenal glands.Weight (1): 3-7 grams.
Size: 4 x 2.5 x 0.5 cm

Histology: Two parts – two separate organs:
- the adrenal medulla
- the adrenal cortex

The adrenal cortex: - Zone glomerulosa:
Product: mineralocorticoids

- Zone fasciculata:
Product: glucocorticoids

- Zone reticularis –
Product:androgenic hormones

Hormones - steroids

A) Glucocorticoids:
Cortisol (hydrocortisone) and cortisterone
Prednisone (synthetic, 4x as potent as cortisol),
Dexamethasone (30 x)

Effects on:

Carbohydrate Metabolism:
1) Decreased glucose utilization by the cells

2) Stimulation of gluconeogenesis (formation of glucose from proteins and other substances). Mobilization of AAs from the extrahepatic tissues.

→ Elevated blood glucose concentration (50% and more above normal) - (adrenal diabetes)

Protein Metabolism

1) Reduction in cellular protein stores (except those of the liver)

Increased catabolism of protein. Cortisol depresses the formation of RNA in tissues (including lymphoid tissue)

2) Increased blood amino acids and enhanced transport into hepatic cells — expanded utilization of AAs by liver; increased protein synthesis in the liver including plasma proteins, increased conversion of AAs to glucose (gluconeogenesis)

Fat Metabolism

1) Mobilization of fatty acids – from adipose tissue.
Increased FFA concentration in the plasma. Shift the metabolism from the utilization of glucose to FFA in starvation, stress.

Other Effects of Glucocorticoids

1) Antiinflammatory effect - stabilization of the intracellular lysosomal membranes and inhibition of lymphoid tissue.
2) Function in stress
3) Increased SVR, BP.

B) Mineralocorticoids – aldosterone (95% of all m. activity)

1) Renal effects:
Transport of Na^+, K^+ and H^+ through the renal tubular walls.

Aldosterone increases - absorption of Na^+ (and H_2O)
- excretion of K^+ (H^+)
in the distal tubule, collecting tubule and duct.

2) Circulatory effects:
Maintaining of extracellular fluid volume.

In the absence of aldosterone secretion – a decrease in EFV –
- *circulatory shock*

In the hypersecretion of aldosterone – an increase in EFV and CO.

C) Adrenal androgens and estrogens (dehydroepiandrosterone, testosterone...)
Androgens - masculinizing effects
- promoting protein anabolism, growth

Estrogens - converted from androgens in the circulation

Source of estrogens in men and postmenopausal women.

Regulation of adrenal cortex hormones secretion
Glucocorticoids + androgens:
Hypotalamus: corticotropin – releasing factor ∧ ACTH

in hypophysis∧ blood ∧ adrenal cortex.
Cortisol – direct negative feedback effects on:
1) hypothalamus
2) anterior pituitary gland

Mineralocorticoids

Stimuli:
1) Increased K^+ concentration increases secretion
2) Decreased Na^+ - " - - " -
3) Activation of RAA system - " -
4) ACTH

Abnormalities of adrenocortical secretion
Hypoadrenalism – **Addison´s disease**
(autoimmunity, tuberculosis, cancer, haemorrhage)
Signs and symptoms: Hypoglycemia, hypotension, weakness, hyperpigmentation (ACTH)
Substitution th.

Hyperadrenalism
Hypersecretion of cortisol = **Cushing´s disease** – motilization of fat from lower part of the body, with deposition of fat in the thoracic region, edematou face, hyperglycemia, (androgens – acne, hirsutism), osteoporosis, **supressed immune system – death of infection**

Hypersecretion of aldosterone = **Conn´s syndrome** – depletion of K^+, increase in blood volume, hypertension.
Muscular weakness, even paralysis caused by the hypokalemia.

Adrenal virilism – excess growth of facial hair, in women – men´s type of figure, muscles.
Hypoplastic uterus – female pseudohermaphroditism.
In boys before a puberty – precocious pseudopuberty

STRESS

H. Selye
Stress = complex of reactions to external or internal changes which disturbe normal action of the organism or threat its existence
= stimuli (stressors) which cause increase in ACTH level

Stress: - eustress - positive
- distress - negative

Stressors:
1) Intensive mental activity
2) Emotions
3) Physical – intense heat or cold, noise, vibration

4) Chemical – inflammation, burn, thirst, hunger
5) Exercise, effort
6) Immobilzation
7) Trauma, surgery
8) Infection, diseases

Function of adrenal cortex in stress
Selye: After stress – enlargement of adrenal cortex, hypertrophy of cortex, involutioin of lymphoid tissue, ulcerations in GIT – from the
hyperproduction of adrenocortical hormones.

Almost any type of stress (physical or neurogenic), causes an immediate and marked increase in ACTH and cortisol.

Activation of the axe: Hypothalamus – hypophysis – adrenal glands.

Effects:
Rapid mobilization of AAs, FFA - energy
Maintaining of blood volume and BP.

At the beginning of stress:mobilization of glucose by catecholamines,
glucagone

Latter – mobilization of AAs, FFA, by glycocorticoids
Lipolysis – glycerol and FAs – main source of energy for muscles and liver in stress
Positive inotropic effect
Hyperreactivity of vessels
Analgetic effect

PANCREAS – ENDOCRINE FUNCTION

Pancreas - exocrine (pancreatic juice)
- endocrine

Endocrine – hormones

Cells – producers – in anatomic islets – 1-2% of the mass of pancreas (1-2 million islets)

Islets composed of A-cells - 25% (glucagon)
B-cells 60 - 75% (insulin)
D–cells (somatostatin)
PP (F) - cells (pancreatic polypeptide)

Secretion to pancreatic veins – portal vein (higher concentration of insulin in liver 2-10x higher than in the peripheral circulation)

INSULIN

Peptide m.w. 6000 – 2 chains of AAs - linked by disulfide bridges

Connecting peptide = C-peptide
Secretory granules contain insulin, C peptide, zinc (to join 6 insulin molecules into hexamers)
Secretion by exocytosis via contraction of microfilaments (myosin+actin) through microtubules and plasma membrane – equimolar amounts of insulin and C-peptide.

Regulation of secretion
The most important stimulator of insulin secretion = GLUCOSE (phosphorylated - by glucokinase).
Feedback relationship – the lower is glycemia – the lower is insulinemia.

Action of GIT hormones:
Stimulatory: GIP, gastrin, secretin, CCK-PZ and glucagon-like polypeptide from intestinal cells
AAs – stimulate

EFFECTS OF INSULIN

Anabolic hormone
The major sites of insulin actions: liver, muscle, adipose tissue
Result of insulin action – decreases the plasma concentrations of

- glucose
- free fatty acids
- ketoacids
- essential AAs (leucine, isoleucine, valine)

Carbohydrate metabolism

Insulin stimulates:

- the transport of glucose from the plasma, across the cell membrane to cytoplasm for rapid phosphorylation (hypoglycemic effect of insulin)
- glycogen formation from glucose-6-phosphate (muscle,liver)
- glycolysis and oxidation (less)
- production of alpha-glycerol phosphate – used to esterify FFA, thus storing them as triglycerides (in adipose tissue)

Effect of insulin – the main hormone enabling metabolism glucose in cells

Fat metabolism
Insulin

- facilitates transfer of circulating fat into the adipose cell in adipose tissue
- inhibits lipolysis of stored triglyceride – FFA releas is suppressed
- stimulates synthesis of cholesterol from acetyl CoA
- stimulates de novo synthesis of FFA

Effect of insulin – an increase the fat content of the liver

Protein metabolism

Insulin

- stimulates the transport of Aasfrom plasma, across the cell membrane into cytoplasm
- increases overall synthesis of proteins – anabolic effects
- anticatabolic effect – inhibition of the enzymes of proteolysis

Effect of insulin – important contributor to growth, the tissue regeneration, bone remodelling.

The key metabolic role of insulin means that its absence causes distortion of homeostasis. Plasma levels of glucose, FFA and ketoacids rise to extreme heights. Plasma pH and bicarbonate fall.Extreme loss of adipose mass and lean body mass occurs.

Insulin deficiency – diabetes mellitus

Insulin excess – hypoglycemia – convulsion, coma.
Without insulin replacement – death.

Insulin substitution – beef, pork, human insulin (recombinant technology).
Application – subcutaneous way – intensified therapy – simulated physiological secretion.
Insulin pumps.

GLUCAGON

Important regulator of intrahepatic glucose and FFA metabolism
Catabolic hormone
A-cells - single chain peptide m.w. 3500
Preproglucagon – proglucagon – glucagon

Regulation of secretion

In contrast to insulin – glucagon synthesis is inhibited by high glycemia and stimulated by low glucose level (2-4-fold
increase – from basal level of about 100 pg/ml).

Insulin directly inhibits glucagon secretion – paracrine action of islets
The major energy substrate (FFA) also suppresses glucagon release
A protein meal and AAs – substrates for glucose production stimulate glucagone secretion.
Prolonged fasting and exercise, stressful condition etc. – requiring glucose mobilization – increase glucagon secretion – through sympathetic (alpha receptors) nervous system.

Glucagon is extracted by the liver – short half-life.
As with insulin, glucagon is dewgraded in the kidney and liver

Effects of glucagon

Opposite to those of insulin:
Glucagon promotes mobilization of fuels – mainly of glucose
Hyperglycemic effect
Profound glycogenolytic effect – activation of glycogen phosphorylase and inhibition of glycogen synthase
Stimulation of gluconeogenesis

Glucagon actions on adipose tissue or musles – non significant

Glucagon deficiency - hypoglycemia
Glucagon excess – makes diabetes worse

INSULIN/GLUCAGON RATIO
The usual molar ratio in plasma I/G = 2.0

In circumstances that require mobilization and utilization of substrates – I/G = 0.5 and less (in fasting, prolonged exercise) due to a decrease in I and increase in G.

Conversely, in circumstances in which substrate storege is advantageous – after a carbohydrate meal – I/G rises to 10 and more (I)

SOMATOSTATIN

Neuropeptide (hypothalamus)
D-cells - preprohormone – 2 somatostatin peptides 28 and 14 AAs.

Regulation of secretion
Stimulated by G, AAs, FFA, glucagone, CCK-PZ, VIP, mixed mealk.
Inhibited by insulin.

Effects of pancreatic somatostatin
A decrease the rate of digestion and absorption of nutrients from GIT and utilization:
Inhibition of GIT motility, secretion of juices and GIT hormones (gastrin, secretin)

Inhibition of the absorption of glucose and triglycerides across the intestinal mucosa.
Inhibition of insulin and glucagon secretion

Feedback regulation – entrance of food into GIT stimulates the release of the GIT hormones and actions – somatostatin – prevent rapid nutrient overload

Pancreatic somatostatin excess – hyperglycemia and other manifestations of diabetes.

THE GONADS

The male reproductive system

Morphology:
Testes – pair organ. 1 testis volume = 20-30 ml, weight 10-16 g
Scrotum – temperature about 32 ˚C. Regulation of T by contraction / relaxations of m. cremaster.

Histology:
- interstitial cells of Leydig (5% of V, 450 millions)
- Sertoli cells
- seminiferous tubules

Hormones of the testes

The principal hormone - testosterone – steroid
- dihydrotestosterone (DHT)

Producer: Leydig cells
Synthesis: from cholesterol (adrenal cortex 5%, testes 95%)
Secretion: 7 mg/day in normal adult males in pulses
Diurnal rhythm – highest concentration between 4 – 8 a.m.
Transport - free form – 2% (in puberty more)
- binding form – SHBG (sex hormone binding globulin)
Degradation – liver
Elimination – kidneys – urine

Regulation:

Hypothalamus (GnRH) ∧ hypophysis (LH – ICSH) ∧ testes

Effects of the testosterone:

Fetal period – responsible for development of the male type of gonads
Childhood - behaviour – more agressive play in boys
Puberty – growth and development of the primary and secondary sex characteristics: - gonads
- anabolic effects, hair growth (beard, pubic and axillar hair, enlargement of the larynx – voice becomes deeper, sebaceous thick secretion – acne)
Adulthood - maintaining of the sex characteristics
- stimulation of the erythropoeisis
- directly and indirectly through erythropoetin
- anabolic effects
- behaviour

Another hormones of testes

Sertoli cells – producers of: inhibins – (alpha ...)
effects: inhibition f the FSH

actins – stimulation of the FSH

Abnormalities of testicular function

Male hypogonadism in

- embryonic period – malformation of the gonads
- praepubertal – eunuchoidism –
epiphyses remain open – tal stature, undeveloped musculature, voice high-pitched, pubic and axillary hair - normal (adrenal cortex androgens)
- postpubertal - regression of the sex characteristics
- sterility
- voice remains deep
- loss, or declination of libido
- ability to copulate persists longer

Male hypergonadism in
- praepubertal – pubertas praecox (precocious puberty)
- postpubertal – rare – androgen secreting tumors – Leydig cells tumors

Endocrine functions of the ovary

Hormones of the ovary - steroids
- non-steroids

Steroid hormones: - estrogens – secreted in follicular and luteal phase
- progesterone – in luteal phase

Non-steroid hormones: - inhibins – inhibition of the FSH
- activins – activation - " -
- relaxin

Transport - estrogens – 2% free form, 38% SHBG, 60% albumin
- progesterone – 2% free form, 18% CBG, 80% albumin
Degradation – liver
Elimination – kidneys (urine), liver (bile)

Regulation

Hypothalamus (GnRH) ∧ hypophysis (FSH – estrogens, LH – progesterone) ∧ ovary
Ovarian hormones – effects

Estrogens - growth and maintaining of the primary and secondary sex characteristics
- metabolism of Ca^{++} – antagonistic effect to PTH
- responsibility for prolipherative phase
- sexual behaviour – libido (with testosterone)

Progesterone - responsibility for secretory phase
- growth and differentiation of the mammary glands
- rise in body temperature
- natriuretic effect (antagonistic to aldosterone)

The ovarian cycle

Cyclic changes in ovary for ovulation
In the ovary at puberty 300 000 ova – in the course of a reproductive life only about 300 – 500 will maturate.

Phases: 1) Follicular phase – formation of an ovum – growth of the follicles – production of estrogens

2) 14th day – distended dominant follicle ruptures – ovum is extended – ovulation

3) Luteal phase – production of the estrogens and
progesterone by corpus luteum.

Corpus luteum - corpus luteum graviditatis
- corpus albicans

The menstrual cycle
Cyclic changes of the uterine mucosa

- In follicular phase – maturation of the follicles – estrogens – increase in the endometrium thickness – proliferative phase

- After ovulation – in luteal phase – under the influence of estrogens and progesterone – uterine glands begin to secrete fluid – secretory phase

- Regression of the corpus luteum – decrease of the progesterone secretion and local ischemia by PGF_{2alpha} – endometrial necrosis – bleeding - menstruation.

Loss of 50 – 80 ml – art. blood (75%), venous (25%).

Abnormalities of the endocrine ovarian functions

Fermale hypogonadism in
- childhood – sex characteristics undeveloped - late puberty – pubertas tarda - sexual infantilism
- adulthood - amenorrhea – absence of the menstruation
- regression of the female sex characteristics
- osteoporosis

Female hypergonadism in
- childhood – pubertas praecox
- adulthood – abnormalities in cycle, amenorrhea, menorrhagia, metrorrhagia.

PINEAL HORMONE – MELATONIN

The pineal – epiphysis – between 3rd ventricle – cerebellum
Neuroglia, parenchymal cells, highly fenestrated capillaries
Inervation: cervical ggl. superior, sympathetic nerves – beta receptors
Product – hormone: **Melatonin**
Biosynthesis: Tryptophan – serotonin – melatonin

Lynch et al. (1975): melatonin is secreted in humans at night (dark) in 10-40 times higher amounts than at mid – day.

Exposition to a permanent light – suppression of the melatonin production
Activation of the synthesis during the dark period – night

Light information (dark/light)→ retina → tr.retinohypothalamicus →

hypothalamus → thoracic spinal cord → sympathetic nerves → cervical ggl. superior → postggl. sympathetic neurons → pineal → beta - adrenergic receptors → cAMP → N-acetyltranferase activity → **melatonin** (from serotonin)

Diurnal rhythm – night – stimulation of the synthesis and secretion
- daylight hours - inhibition

Effects

Amphibian – contraction of melanophores – melanin pigments – it lightens the skin (e.g. in tadpoles)
Mammals and humans
Synchronization of circadian rhytmicity:
- inducing effect on sleep
- induction of seasonal responses to changes in day length
- cyclic fluctuations of the awake/sleep states

Effects on reproducibility – gonads:
Inhibition / facilitation
Seasonal breeding animals - responding differently to the changes in day-length.
In rats/hamsters etc. – with a short duration of gravidity – activation of gonads in the spring
In animals with longer gravidity – (e.g. a doe – hind/ deer) – activation gonads in the automn (shortening of the day-lights hours).

Effects on immune processes – immunomodulatory role:
- Stimulatory effect on the processes and lymphoid cells, thymus, spleen
- Antioxidative effect – scavenger of some reactive forms of oxygene. The most effective lipophilic antioxidant.
- Oncostatic effect

Therapeutical use - treatment of:
- jet lag syndrome – circadian clock – hypothalamus – superchiasmatic ncl. Jet lag – from moving to a different time zone (W-E – shortens, E-W – lengthens day. The coordination of the biological clock – melatonin
- sleep-disorders – sleep promoting effect
- some types of depression – seasonal affective disorder
- imunomodulans/prevention. (Trials – treatment of malignancies and AIDS).

NATRIURETIC PEPTIDES

1956 - granular cells in atria
1981 – de Bold (Canada) extract from the atria (rats) – an increase of natriuresis and diuresis (30 x) – atrial natriuretic peptide ANP

Atriocytes → pre-pro-hormone ANP (149-153 AA) →
→ pro ANP (126 AA) → ANP (28 AA)

Half-time: 1-5 min
Rapid distribution and action
Elimination – endopeptidases – splitting

Stimulus: Distension of the atria – the right (klinostasis, volume -expansion – hypervolemia, failure of the right ventricle...)

Physiological effects of the ANP:

Regulation of the intravascular volume and of natremia

- Increase of natriuresis and diuresis – through an increase in perfusion and glomerular filtration
- Inhibition of the natrium reabsorption in collecting ducts
- Decrease in blood pressure through:
  - diminishing of the blood volume and cardiac output
  - vasodilation
  - inhibition of secretion: aldosterone, vasopressin, catecholamines
- Enhancement of capillary permeability – peripheral edema

Neurotransmitter in CNS – in the nuclei for regulation of blood pressure and volume

Clinical aspects:

Hypertension – expected a decrease in ANP concentration – results of the studies: opposite findings – in hypertonics ussually hypersecretion of the ANP – compensatory changes

Congenital heart failure – increase in ANP level – indicator of the severity

Another natriuretic peptides:

Natriuretic peptide type B = BNP

Secretion in cardiomyocytes of the ventricles

Stimulus – pressure in the ventricle wall (hypertrophy of the left ventricle)

Half-time 20 min

Effects: Natriuresis, diuresis, vasodilation, inhibition of renin and aldosterone secretion

BNP – indicator of:
- the ventricles failure – correlation with ejection fraction of the LV
- LV hypertrophy

Natriuretic peptide C = CNP

Synthesis in the brain (cerebrospinal fluid) and in endothel

Autokrine/parakrine regulation in the brain/vessels

Inhibition of the smooth musculature of vessels – protective effect against hypertrophy (in hypertension)

Therapeutic application of the natriuretic peptides:
Indications: hypervolemic overloading of the heart, pulmonary edema, hypertension...
Apllication: isolated ANP and/or apllication of an inhibitor of the endopetidases

Effects: natriuresis, diuresis, vasodilation, a decrease of aldosterone level ....

PREGNANCY

Fertilization – of the ovum – in the uterine tube
Physiological functions of pregnant woman:
Endocrine changes:
Corpus luteum graviditatis – estrogens, progesterone, relaxin
Decline in function after 2 months of pregnancy

Placenta: – human chorionic gonadotropin (hCG) - luteinizing and luteotropic activity

Indicator of pregnancy - in blood (RIA) – 6th day
- in urine – after 14 days

- human chorionic somatomammotropin (hCS) – maternal growth hormone - positive N_2 balance, retention of Ca^{2+}

- relaxin – relaxation of pelvic ligaments

- beta – endorphins – unknown function (a change of behavior)

- prorenin

- inhibin, placentar GnRH – paracrine regulation of placentar hormonal activity

PHYSIOLOGICAL FUNCTIONS IN PREGNANT WOMAN

TBW – increase by 4-6 l (mainly in ECF compartment)

BLOOD

Blood volume: a rise from 4 up to 5.5 l
Plasma volume – an increase up by 1.2 l. Maximum in 34th gest. week
Plasma proteins – a decrease (from 70 to 60 g/l) – in particular albumins. Fibrinogen concentration rises.

Erythrocytes and haemoglobin concentration – a decrease
Htk – a decrease (from 0.44 to 0.33)

Viscocity – a decrease from 4.6 to 3.8
Leukocytes – leukocytosis – neutrophilia
Thrombocytosis
ESR – FW acceleration (fibrinogen, less ery)
Coagulation ability – an increase

CARDIOVASCULAR SYSTEM

Heart
- HR + by 15/min
- SV from 80 to 95 ml
- CO from 4.5 to 6 l/min

Blood pressure
- arterial BP syst. slight increase
- arterial BP diast. in pregnancy lower
- venous – depending on location – in upper part – unchanged, in lower parts increased

Blood flow – rise through kidneys, liver, skin

RESPIRATORY SYSTEM

Volumes and capacities
– rise in V_T by 40%
– decrease in VC and FRC (by 20-30%)

Ventilation – increase from 7 to 8 l/min
Increase in oxygen consumption
Hypokapnia

RENAL PHYSIOLOGY

Renal blood flow, filtration fraction, glomerular filtration - rise
Increased diuresis

GASTROINTESTINAL TRACT

Increase in food intake
Slowing of GIT motility, peristalsis (mainly gastric), obstipation, a decrease of the digestive juices secretion

Parturition - labor

Duration of pregnancy – 40 ± 2 lunar weeks (270 ± 14 days from fertilization)
During pregnancy – increasing in number of oxytocin receptors in the myometrium and the decidua (influence of estrogens and distension of uterus)
In early labor – uterus starts to react yet to normal concentration of oxytocin
Dilation of the cervix, mechanical stimulation by fetus – increase in oxytocin secretion.
Role of prostaglandins – evidence – prolongation of parturition after PG inhibitors.
Role of spinal reflexes and voluntary contractions of abdominal muscles.

PHYSIOLOGICAL FUNCTIONS IN NEWBORNS AND CHILDREN

Total body water (TBW) – increase – mainly ECF

Blood

Blood volume – increase
Plasma - relative hypervolemia
- plasma proteins – decrease – from 60-70 g/l, mainly albumin. Rise in fibrinogen level.

Red blood cells count - in newborns up 7.7 x 1012/l
- in suckling – lowest

Haemoglobin – (HbE), HbF, HbA (2,3 DPG)
Leukocytes – lymphocytosis in childhood
Blood groups - antigens – weaker activity
- aglutinins – absent

Platelets, clotting – without abnormalities

Cardiovascular System

FETAL CIRCULATION

Placenta - 1 umbilical vein (oxygenated blood - 80% O_2)
d.venosus -V.C.inf.+ blood from systemic arteries (70%)
RA + V.C.sup. (sat.30%) -
RV + through foramen ovale -LA -LV(sat.62%) -
upper extremities and head (brain)- V.C.sup.

RA- RV - PA - d.a.Botalli (sat. 52%) - descendent aorta -
abdominal organs,lower extremities
- 2 a.a.umbilicales - placenta
- V.C.inf.

First breath - start of breathing

Occlusion of umbil.cord – musculature:
circular - sensitive to oxygen increase
longitudinal - mechanical stretching
spiral - decrease in temperature

Stimuli initiating breathing after birth:

Hypoxia -hyperkapnia-acidosis - stop of the oxygen supply,
elimination of carbon dioxide,resp.-metabolic acidosis.
PO_2 decreases with rate 10 mmHg/min –stimulation:
- *peripheral chemoreceptors (aortal)*
- central - pH decrease.

Another stimuli:

- Cooling of the newborns body
- Tactile and pain stimuli
- Stimulation of proprioceptors
- Reflexes of airways and lungs
  Diving
  Hering-Breuer deflation reflex
  Visual.acoustic,vestibular receptors
- Humoral effects -catecholamines

AERATION OF THE LUNGS

Lung fluid elimination

Lung fluid - during fetal life volume 30-35 ml/kg - the same like total lung volume in postnatal life

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Delivery - compression of the chest - 80-90 mmHg - 40 ml of the fluid
is squeezed out from the upper airways.
The first breath - strong negative pressure up - 75 mmHg - to overcome the resistance of the airways and viscosity of the lung fluid.
The first expirium - positive - a cry - pushes the fluid to alveolocapillary membrane - resorption.
Repetitive respiratory actions.

Elimination of the pulmonary fluid - 2 ways:

- resorption to lung capillaries blood (2/3)
- lymphatic vessels (1/3)

TRANSITORY CIRCULATION

Closure of the foramen ovale
Elimination of the inflow through v.umbilicalis

- venous return decreases, including BP in RA,RV,PA
- systemic circulation becomes shorter - BP rises
- BP in LA exceeds BP in RA -FO closes - functionally

possibility of a reopening

Closure of the ductus venosus
Passive - reason - blood flow is stopped
Active - contraction of a smooth muscle sphincter

Closure of the ductus arteriosus
Diameter 0.5-0.6 cm length 1.25 cm - like aorta,PA

Factors for closure:
- The increase in PaO_2 - functional constriction
- Vasoactive substances
  - Vasoconstrictors : serotonin,NA,angiotensin
  - Vasodilators :Prostaglandins - PGE_2

During intrauterine life - balance between vasoconstrictors and vasodilators - after birth - placenta as a source of the PG production is eliminated - predominancy of the vasoconstrictors
Definitive closure up in 3rd month.

Clinical aplication : duct.art.apertus (open) - application of a cyxclooxygenase - PG blockers:
- aspirine - acetylosalicylic acid
- Indomethacine

Changes in pulmonary circulation
Fetal life - only 3 - 10% of the CO.After birth the pulmonary bed must be adaptade to capacity 100 % of the CO RV.

Vasodilation:
- Oxygen - an increase in satur.O_2 - vasodilation
- Substances - acetylcholine,bradykinin,PG
- Mechanical changes - aeration of the lungs
- Morphological changes - involution of the smooth musle layer in the vessels of the pulmonary bed

Changes in cardiac output
Existence of the 2 pumps in series - shunts are closed functionally - possibility of the reopening = transitory circulation

Consumption of the oxygen 2x higher than in adults = higher CO up 200 - 300 ml/min/kg

Heart rate
in newborns - mature - 110-130/min
premature - 120-140/min

Blood pressure in newborns

Methods for measurement of BP

- Invasive -catheterization
- Noninvasive - ultrasound tonometer
  -infrasound tonometer

Normal values of BP in newborns: mature - 90/60 mm Hg
premature - depending on gestation age
lowest 40/20 mmHg

Physiological changes of BP in newborns:
Cardiovascular reflexes - functioning:

- baroreflexes
- oculocardiac reflex
- Cushing reflex
- Cold reflex
- Kratschmer,diving reflexes
- ....

Diurnal rhythm - day-night fluctuations in BP
Crying - increase in BP by 30-40%
Food intake - increase in BP by 30%

Respiration

Respiratory muscles – lower tone, fatigue
Thorax – less mineralized, compliant
Airways – small diameter
Alveoli (size: d – only 20-50 μm, in adults up 300 μm)
Count: 20 millions versus 300 millions
Compliance – in absolute values low, specific the same
Resistance – up 10 x higher

Regulation of breathing - chemical – biphasic response to hypoxia
- neural – HB reflex well developed.

Gastrointestinal Physiology

Intrauterine nutrition:

- histotrophic
- haemotrophic

Postnatal nutrition:

- lactotrophic
- mixed

Existence of a special reflex – suckling reflex (non-conditioned, inborn, however unstable)
Salivation: low volume and a weak alpha-amylase activity in saliva
Swalowing – deglutition – well developed

Stomach:

- Volume: in newborns 5-10 ml, 1st year 250 – 300 ml
- Secretion: less HCl, higher pH (3-4)
  chymosin
  fetal pepsin (higher pH optimum)
  intrinsic factor – gradual increase in postnatal life
  (together with pH decrease)
- Motoric activities: lower, emptying of stomach in 2-3 hours

Small intestine:

- thinner muscular layer
- ability of the bigger molecules absorption, penetration of potential antigens

Colon: well developed functions, more frequent defecations

Liver

In fetal life – important function – condition for optimal development

Formation and storage of different nutrients – for immediate utilization after birth

Formation of plasma proteins, synthesis and excretion of the cholic acids, enterohepatic circulation – in utero

Conjugation and detoxification functions – active – relative insufficiency after birth – in early postnatal life – for detoxification and elimination of the great pool of bilirubin.

Low capacity of the oxidative metabolism in newborns

Gradual maturation after birth

Metabolism

BMR/kg increased in newborns (up 3x)

Predominancy of proteoanabolic processes

Metabolic pathways the same, immaturity of enzyme systems

The main source of energy – glucose and free fatty acids

Protein minimum in the 1st year up 2.5 g/kg (vs. 0.6 in adults)

Renal Physiology

Fetal period: Excretory organ – placenta
Formation of urine and micturition influence a composition of amniotic fluid

Newborns: Glomeruli size: smaller, less permeable (cubic epithelium)
Shorter proximal tubules
Longer Henle´s loops (relatively)

Decreased renal perfusion - lower BP.

Renal fraction 5-6% (in adults 20%)

Low sensitivity to ADH, decreased ability to concentrate urine – bigger diuresis for elimination of the metabolite pools.

Endocrine System

Fetal period:

Axis: Hypothalamus – adenohypophysis – target glands – in functions

Parathormone – secreted by fetus – however maternal parathyreoidea – the main source of the PTH

Thyreoidal hormones

Adrenal cortex hormones – predominancy of the sexual hormones – androgens

Pancreas – fetal insulin – important for keeping normoglycemia

Early postnatal period:

Thyreoidal hormones – necessary for physiological development of the nervous system – brain

Adrenal medulla – firstly predominancy of NA, latter of A

Nervous system

Metabolism: Ability of the anaerobic metabolism

Hematoencephalic barreer: Development after birth: Increased permeability in the early phases of postnatal life – penetration of different substances to the brain tissue (bilirubin – kernicterus)

Development of the movements:
Fetal period: since 6^{th} - 7^{th} gestatuional week
Postnatal period – phases:

- holokinetic – generalized movements

- monokinetic – from the end of the 2nd month – movement by one extremity
- dromokinetic - from 5th month – targetted movement
- kratikinetic – after the 1st year – voluntary/involuntary movements

Developments of the dynamic stereotypes
Conditioned reflexes/learning/memory/speech
Ability of the memory formation – since intrauterine life.
Development of the speech – best from the end of the 2nd year.

Thermoregulation

Fetal

The temperature of the fetus is approximately +0.5 ºC due to fetal metabolic activity.
Heat generated by fetal metabolism is dissipated by the amniotic fluid or the placenta to maternal blood in the intervillous spaces.
Mother – fetal temperature gradient.
Newborns – heat losses are greater, more rapid and can easily exceed heat production.
Because of the newborn´s larger surface area – to body mass ratio, decreased insulating subcutaneous fat, increased skin permeability to water.

After birth – transitional events:
The newborn losses heat rapidly after birth, especially through evaporative losses.
The newborn´s skin temperature (at T = 25 ºC in delivery room) decreases with the rate 0.3 ºC/min – central T – 0.1 ºC/min.
The infant´s T may fall 2 to 3 ºC after birth. In 6-12 hours – restoration of the temperature.

Consequences of the temperature change:
- Positive: - the initiation of the breathing
  - peripheral vasoconstriction – closing of the foramen ovale
  - stimulation of the thyroid gland

- Negative: The increase in oxygen consumption.

Heat production in newborns
Physical methods:
- Shivering – not important in the newborns
- Muscular activity – crying, restlessness

Chemical methods:
- Metabolic processes – the greatest amount of metabolic energy is produced by the brain, heart and liver.

- Special method of heat production in newborns = nonshivering thermogenesis – brown adipose tissue (BAT) metabolism.
In the term newborns BAT accounts for 2 to 7 % of the infant weight.
In the midscapular region, around the neck, under the clavicles, in the mediastinum, around the trachea, esophagus, heart, lungs, liver, kidneys, adrenal glands.

PHYSIOLOGY OF EMOTIONS

DEFINITION

- ☐ Strong urgent condition of the instinctive feeling related to the certain target activity.
- ☐ Emotions are demonstrated by
  - appetitive or
  - aversion behaviour

Apetitive behaviour

Physiological needs
Looking for pleasant sensoric experiences (taste, visual, acoustic), new positive stimuli, sport etc.

Psychic needs
Looking for social contacts, self – application and social social acknowledgments.
Looking for situations reinforcing self-esteem and self-respect.
Looking for sympathy, mutual understanding, love etc.

Aversion behaviour

Physiological needs
Avoidance of the hunger, thirst, pain, fatigue, too hot/cold environment...

Psychic needs
Avoidance of the social isolation, abortion, non-success, loss of social status, loss of self-esteem, etc.

Regarding to behaviour:

Emotions = affective component of interaction between important stimulus and the response
⇒ determinant of the behaviour of the individual

Components of the behaviour:

- ☐ cognitive – cortex
- ☐ **emotive** – affective - subcortical + cortical
- ☐ conations – cortical + subcortical - motion

Components of emotions

- ☐ psychic (fear, anger, sadness)
- ☐ autonomic (sweating, CVS, pale/reddish face)
- ☐ somatic (increase/decrease in muscle tone, body position, movements,...)

Regulation of emotions

- ☐ **Limbic system** (phylogen.oldest)
  amygdala
  hippocampus
  gyrus cinguli (limbic cortex)

talamus

Hypotalamus – reactions through ANS

Cortex – mainly prefrontal.....

Emotions are not product of 1-2 CNS structures – they are result of coordinated activities of many of them.

Recently – very important structures: **prefrontal cortex** and **amygdala**

- **Prefrontal cortex** belongs to the places controlling emotions – mainly positive emotions – happiness, pleasure...

- **Amygdaloid ncl.** are responsible for anger, fear, sadness and other negative emotions

Amygdala

Temporal lobe
Corticomedial part – direct relation to autonomic functions and to smell
Basolateral – to cognitive activity – to frontal and temporal lobe

Afferent pathways
bulbus olfactorius....see Fig.

Efferent pathways
Reciprocal to afferents (see Fig.)
- hypothalamus
- thalamus- prefrontal cortex - cognitive emotional experiences
- hipocampus
- subst. grisea – brain stem, RF and parasympathet. nuclei – important for autonomic and somatic expressions of emotions and on emotions based behaviour.

Amygdala Functions

- Evaluation of information on emotional basis – using of memory – to positive/negative stimuli
- Key role in behaviour control (autonomic and motor reactions) – as response to emotions
- Role in development of memory traces – engrams – with emotional component - load, learning on the basis awarding/punishment

Role of amygdala in conditioned fear reactions:
Rats – dominant reaction - „freezing“ (passive avoidance).
Humans – sudden threat - „freezing“ – latter motoric activity (fight/flight) or continuation in immobility („freezing)

Stimulation of amygdala
In humans during operations of temporal lobe
- Fear with relevant ANS reactions
- Hallucination of the type „déja vue“

Destruction of amygdala
(experimental or by cancer process)

- Loss of the fear
- Loss of agressivity
- Reduction of emotional expressions
- Loss of facilitation of engrams production with emotional load
- Loss of effort for social communication (self – isolation)
- Hypersexuality

Limbic system

1) Weak influence of cortex on emotions (affective component and autonomic changes). Only few connections to cerebral cortex

„It is easier to play than to mask emotions"

2) Inertia of emotions: firing from the neurons of the limbic system are present longer after stimulus (emotions „live" longer than stimuli)

Role of the emotions

Physiological view: they help to survive to individuum / human (animal) kind

Personality view: they make life rich to positive/negative experiences – life fullness

Types of emotions – related to:

- Self-defense
- Nutrition
- Reproduction...

1. **Emotions related to self-defence**

- **fear** (passive defence - avoidance) – stimulation of hypothalamus and amygdala; mydriasis, sweating, postural changes, ...
- **agressivity** (active defence - avoidance);
- **placidity** (peacefullness) – contrary to agressivity

Regulation of the emotions related to the fear:

- amygdala responsible for balance between extreme emotions (agressivity/placidity)
- hypothalamus integration center for autonomic and somatic responses during defecnsive behaviour
- hormonal – testosterone increases agressivity (castration), estrogens - placidity

2.Emotions related to nutrition

Stimuli: **hunger, thirst** regulated by hypothalamus (hunger and satiety centers) as

- affective component – emotions - controlled by limbic system (and hypothalamus)
- $\Rightarrow$ nutritional behaviour (food search) – conation component

Other stimulus: **apetite** (strong cortical influence)

Physiological consequences: ↑ BP and splanchnic circulation, stronger peristaltics, decrease in skeletal muscles blood flow

3.Emotions related to reproductive activities

Determinants of:

- **sexual behaviour**
- **parental behaviour** (maternal and paternal)

Regulation of sexual behaviour

- neural: neocortex, amygdala, hypothalamus, limbic cortex
- hormonal: testosterone, estrogens

Emotional inteligency (EQ)

- ability to control individual´s own emotional status (and of other peole) and to use this information in relationships

- 5 components

1. self-consciousness (to understant internal feelings)
2. to control emotions
3. motivation (aimed to the target)
4. empathy
5. management of the social relationsips

HYPOTHALAMUS

Connections:

- with the pituitary gland , with the posterior lobe (neurohypophysis) by neural fibres – tr. hypothalamo – hypophyseus.
- with anterior lobe (adenohypophysis) by blood vessels (hypothalamic - hypophyseal portal system).
- many afferent and efferent connections between hypothalamus and other parts of CNS – mainly by limbic system, thalamus, midbrain, hippocampus and others.

Functions of hypothalamus

Regulation of the autonomic functions – control of organs through ANS. Integration of the somatic with autonomic nervous system „centers“

Regulations of the autonomic functions:

- Spinal cord (e.g. sacral) – regulation of defecation, micturition

- Medulla oblongata – more complex functions: cardiovascular, respiratory, salivation, vomiting, secretion of GIT juices…

- Middle brain – acomodation, pupillary reflexes (eye)

- **Hypotalamus = organ for integrative regulation**

1) Control of the cardiovascular system:
So-called neurogenic effects on heart rate and blood pressure
Stimulation:
- posterior and lateral region: sympathetic responses – tachycardia, hypertensive reaction, mydriasis...
- anterior – area preoptica: parasympathetic responses Reactions are modulated and transmitted through pons and medulla.

2) **Thermoregulation**
Hypothalamus anterior – monitoring of body temperature:
Central thermoreceptors – in area preoptica (2/3 for higher temperature, 1/3 for a decrease of BT – „cold")

Peripheral thermoreceptors – spinothalamic tracts, thalamus, collaterals to hypothalamus. In skin - periphery 10x more of the cold receptors than for hot environment.
Humoral signals – mediators (pyrogens) – transport through organum vasculosum laminae terminalis (OVLT) – the region non-protected by blood - brain barrier.
Changes of hypothalamic perfusion by vasoconstriction/ vasodilation of OVLT – influence on basal hypothalamic temperature – set of the set point for central BT.

Hypothalamus posterior – thermoregulatory center (area hypoth. posterior) – processing of information from area anterior and the periphery. Activation of effectors for thermoregulation.

3) **Regulation of hydratation and food intake**

Regulation of hydratation:

Regulation of water intake:
Centre for thirst in lateral hypothalamus
Information from:
Hypothalamus itself - osmoreceptors
Periphery – volumoreceptors, mouth, pharynx..

Regulation of fluid output (through kidneys):
Ncl. supraopticus **-** ADH (arginín – vazopresín = AVP)

Regulation of apetite:

lateral centre = **apetite** – dominant active
Ventromedial centre = **satiety** – after food intake – temporary inhibis the „feeding centre"
Corpus mamillare **=** coordinatio of the reflexes – movements of a tongue, chewing, deglutition, swalowing…

Information from:
Glucoreceptors – glucostats in the centre of satiety
Periphery

4. **Endocrine control**

Production of:

- *ADH(AVP)*
- *Oxytocine*
- *Hypothalamic neurohormons – regulation of adenohypophysis*

5. **Sexual functions**

- Regulation of gonads development, sexual cycles through *adenohypophysis.*
Control of sexual behavior: Activity of lateral regions of hypothalamus – stimulation of sexual behavior
Coordination of autonomic functions in erection, ejaculations in males.

6. **Behavioral responses associated with emotions**

Lateral hypothalamus – stimulation - hunger, thirst,activity and agressivity

Ventromedial hypothalamus – stimulation - subjective feeling of satiety, complacence, calmness, inactivity

Periventricular zone – near of the 3rd ventricle – stimulation – fear, aversion

7. **Sleep-wake patterns**

„Sleep centres", „wakefullness centre" – recently –only non-specific effects

Efects of hypothalamic lesions

Bilateral lesion of the lateral hypothalamus:

- a decrease of the food intake (anorexia)
- a decrease of the water intake
- passivity

Bilateral lesions of the ventromedial hypothalamic region:

- excessive food intake (hyperfagia)
- excessive fluid intake
- hyperactivity
- brutality
- expressions of anger - passion