# DIGESTION AND ABSORPTION

1. The richest sources of vitamin-$B_{12}$ are
   a) Goat's liver and *spirulina* b) Chocolate and green gram
   c) Rice and hen's egg d) Carrot and chicken's breast
2. The contraction of gall bladder is due to
   a) Gastrin b) Cholecystokinin c) Secretin d) Kinase
3. In infant, the process of defecation occurs by
   a) Reflex action without voluntary control
   b) Reflex action with voluntary control
   c) Voluntary relaxation of external an sphincter
   d) Involuntary relaxation of internal and sphincter
4. Deficiency of tocopherol in the human body causes which condition?
   a) Beri-beri b) Pellagra c) Infertikity d) Scurvy
5. Brunner's glands are located in
   a) Oesophagus b) Intestine c) Stomach d) Duodenum
6. Which is the correct chronological order for food processing in human beings?
   a) Ingestion of food → Digestion → Absorption → Assimilation → Egestion (Undigested)
   b) Ingestion → Assimilation → Digestion → Absorption → Egestion
   c) Ingestion → Digestion → Absorption → Egestion → Assimilation
   d) Digestion → Ingestion → Assimilation → Absorption → Egestion
7. Riboflavin is
   a) Vitamin-$B_{12}$ b) Vitamin-$B_2$ c) Vitamin-C d) Vitamin-D
8. The stored food in animals is called
   a) Cellulose b) Starch c) Glucose d) Glycogen
9. Consider the following statements.
   I. The anti-pellagra vitamin is nicotinamide present in milk, yeast, meat and leafy vegetables.
   II. Crypts of Leiberkuhn are present in the liver.
   III. Steapsin is the pancreatic amylase.
   a) I and II correct b) II and III correct c) I and III incorrect d) II and III incorrect
10. Which of the following vitamins is water soluble as well as an antioxidant?
    a) Vitamin-$B_1$ b) Vitamin-A c) Vitamin-D d) Vitamin-C
11. Hydrochloic acid (HCl) is secreted by which of the following cells of stomach?
    a) Chief cells b) Parietal cells (oxyntic cells)
    c) Peptic cells d) Goblet cells
12. What are the narrow extensions of the pulp cavity?
    a) Pulp b) Dentine c) Root canals d) Periodontal ligament
13. Read thoroughly the following statements concerning with the assimilation of food. Identify true and false statements and choose the correct option from the given codes
    I. Conversion of amino acid into glucose and then into fat is irreversible reaction
    II. During the conversion of amino acids into glucose, amino group of amino acids is removed
    III. Excess of amino acids are converted into glucose and fats and thus are stored
    IV. Excess of simple sugars are stored in the liver and muscle cells. The process is known as glycogenolysis

V. Process of gluconeogenesis occurs in the kidney and striped muscles

a) I, II, IV and V true while III is false
b) I, II, III and V are true while IV is false
c) I, II, III and IV are false while V is true
d) I, II and III are false while IV and V are true

14. Why the eyes of the patients turns yellow during jaundice?
a) Due to the deposition of bile pigments
b) Due to the ejection of stomach content through mouth
c) Due to the stomach malfunctioning
d) Due to the excessive vomiting

15. Which one of the following is a fat-soluble vitamin and its related deficiency disease?
a) Ascorbic acid - Scurvy
b) Retional - Xerophthalmia
c) Cobalamin - Beri-beri
d) Calciferol - Pellagra

16. Secretin and cholecystokinin are secreted by
a) Brunner's gland found in duodenum
b) Paneth cells present in duodenum
c) Goblet cells present through out the epithelium of the stomach
d) Oxyntic cells present on the side walls of the gastric glands

17. Deficiency of Vitamin-$B_{12}$ causes
a) Cheilosis
b) Thalassemia
c) Beri-beri
d) Pernicious anaemia

18. In human beings, digestion of carbohydrates starts from the mouth. How much percentage of it is digested in the mouth?
a) 10-20%
b) 25-30%
c) 60%-75%
d) About 85%

19. Which one is a fat soluble vitamin?
a) Vitamin-H
b) Vitamin-C
c) Vitamin-B
d) Vitamin-D

20. Bacteria *E, coli* are found in which part of the alimentary canal?
a) Caecum
b) Rectum
c) Colon
d) All of these

21. During starvation, what will be sequence of ending of food stuffs?
a) Carbohydrate-fat-protein
b) Carbohydrate-protein-fat
c) Fat-protein-carbohydrate
d) Fat-carbohydrate-protein

22. The islets of Langerhans are found in
a) Pancreas
b) Stomach
c) Liver
d) Alimentary canal

23. Which is the hardest material of the human body?
a) Dentine
b) Enamel
c) Teeth
d) Bone

24. Characteristic of mammalian liver is
a) Kupffer's cells and leucocytes
b) Leucocytes and canaliculae
c) Glisson's capsules and Kupffer's cells
d) Glisson's capsule and leucocytes

25. Least peristalsis occurs in
a) Rectum
b) Stomach
c) Oesophagus
d) Duodenum

26. Digestive enzymes are
a) Hydrolases
b) Oxidoreductases
c) Transferases
d) Lyases

27. Scurvy is caused due to deficiency of vitamin
a) B
b) A
c) E
d) C

28. Duodenum has characteristic Brunner's gland, which secrete two hormones called
a) Kinase, oestrogen
b) Secretin, cholecystokinin
c) Prolactin, parathormone
d) Oestradiol, progesterone

29. The lacteals are found in
a) Salivary glands
b) Villi
c) Spleen
d) Mammary glands

30. The pH value at which pepsin becomes inactive is
a) Below pH 2
b) Below pH 5
c) Above pH 3
d) Above pH 5

31. Intestional lymphangiectasia is characterised by
a) Dilated intestinal lacteals
b) Contracted intestinal lacteals
c) Descreased number of peneth cells
d) Increased number of peneth cells

32. Deficiency of cyanocobalamine causes
a) Pernicious anaemia b) Pellagra c) Ketomalacia d) Ariboflavinosis

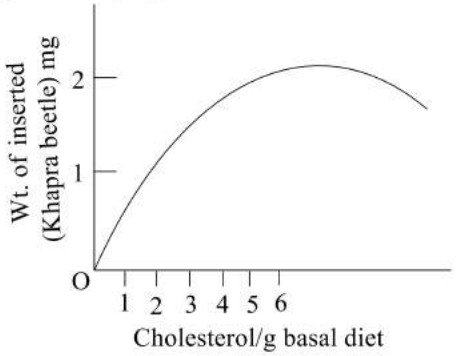
33. Which combination is responsible to increase the cholesterol level of the blood?
a) Saturated fats and proteins
b) Unsaturated fats and proteins
c) Both saturated and unsaturated fats
d) Saturates fats and polyunsaturated fatty acids

34. FAD is a coenzyme derived from
a) Riboflavin b) Vitamin-$B_{12}$ c) Thiamine d) Niacin

35. What name would you suggest for a thoroughly mixed food the with gastric juices by the churning movements of muscular stomach wall?
a) Bolus
b) Chyme
c) Either bolus or chyme
d) None of these

36. Which of the following is the constituent of pancreatic juices?
a) Sodium bicarbonate and three proenzymes
b) Potassium bicarbonate and three proenzymes
c) Sodium bicarbonate and five proenzymes
d) Potassium bicarbonate and five proenzymes

37. In an experiment, freshly hatched larvae of an insect (Khapra beetle) were reared on a basal diet (complete diet without cholesterol) with increasing amounts of cholesterol. Results obtained are shown in given the graph.




The graph indicates
a) Cholesterol is an essential dietary requirement of Khapra beetle
b) Growth of Khapra beetle is directly proportional to cholesterol concentration
c) Cholesterol concentration of 2 µg/g diet is the optimum level
d) Growth of Khapra beetle is inhibited when cholesterol concentration exceeds 2µg/g diet

38. Which one serves as a passage for both food and air?
a) Larynx b) Pharynx c) Gullet d) Glottis

39. Which of the following animal exhibits diphyodont dentition?
a) Snakes b) Crocodiles c) Horse d) Elephant

40. Choose an incorrect statement regarding the functions of large intestine
a) Large intestine absorbs the products of bacterial digestion
b) Absorption of electrolytes, water and some amino acids occur mainly in the stomach
c) Mucous lubricates faecal matter
d) Feces are temporarily stored in the rectum

41. Generally, new born babies shows a symptoms of a mild form of jaundice which is known as
a) Prehepatic jaundice
b) Hepatic jaundice
c) Neonatal jaundice
d) Physiological jaundice

42. Which one of the following combination of vitamins are synthesised by bacteria?
a) Vitamin-$B_{12}$ and K b) Vitamin-$B_1$ and B c) Vitamin-B and $B_{12}$ d) Vitamin-K and D

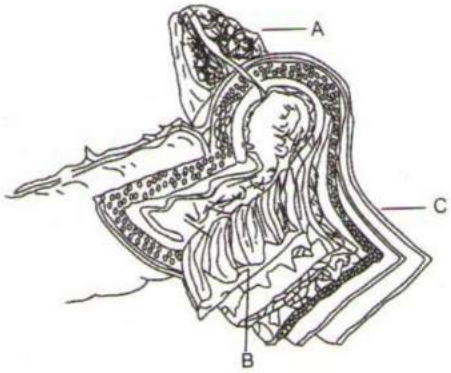
43. The best source of vitamin-$B_1$ is
a) Whole Wheat bread
b) Cod liver oil

c) Egg d) Curd

44. Which one of the following statements is/are correct?
I. Frenulum is the fold by which tongue is attached to the floor of mouth or oral cavity
II. Lower surface of the tongue has little projection which bears taste buds
III. Pharynx is the common passage for food and air
IV. Sphincter of oddi guards and regulates the opening of stomach into duodenum
V. Colon has 3 parts an ascending, a transverse and a descending part and the later opens into the rectum
a) I, II and III are correct b) IV and V are correct c) I, II, III, IV and V d) I, III and V are correct

45. Wisdom teeth in human is
a) 3rd molar and 4 in number b) 3rd molar and 2 in number
c) 2nd molar and 4 in number d) 2nd molar and 2 in number

46. Which one of the correct option for labels A, B and C in the given diagram?




a) A-Liver, B-Mucosa, C-Peritoneum b) A-Liver, B-Circular muscle layer, C-Serosa
c) A-Pancreas, B-Mucosa, C- Peritoneum d) A-Pancreas B- Submucosa, C- Serosa

47. What is the medium of human saliva?
a) Acidic b) Basic c) Neutral d) Highly acidic

48. Small projections found on the upper surface of tongue are called
a) Frenulus b) Taste buds c) Sulcus terminals d) Papillae

49. The Digestive enzyme that is not found in human pancreatic juice is
a) Nucleotidase b) Nuclease c) Trypsin d) Lipase

50. Which one of the following enzymetic reaction is incorrect?
a) Nucleic acids $\xrightarrow{\text{Nucleotidase}}$ Nitrogen bases + Pentose sugar
b) Fat (Emulsified) $\xrightarrow[\text{Pancreatic}]{\text{Lipase}}$ Fatty acids + Diglycerids
c) Starch $\xrightarrow[\text{Pancreatic}]{\alpha \text{ amylase}}$ Maltose + Isomaltose + α-dextrias
d) Proteins $\xrightarrow{\text{Pepsin}}$ Peptones + Proteose

51. Bile salts act as activator of which enzyme?
a) Pepsinogen b) Trypsinogen c) Lipase d) Pancreatic amylase

52. Sphincter of Oddi guards
a) Hepato-pancreatic duct b) Common bile duct
c) Pancreatic duct d) Cystic duct

53. Stomach located on the upper left portion of abdominal cavity has three parts, a ...A... portion into which the oesophagus open, a ...B... region and a ...C... portion, which opens into small intestine.
Identify A, B and C to complete the given NCERT statement and choose the correct option accordingly
a) A-cardiac, B-fundic, C-pyloric b) A-fundic, B-cardiac, C-pyloric
c) A-pyloric, B-cardiac, C-fundic d) A-pyloric, B-fundic, C-cardiac

54. The opening of the common bile duct is guarded by sphincter?
a) Pyloric b) Ileo-caecal c) Oddi d) Muscularis mucosa

55. Which part of small intestine opens into large intestine?
a) Colon b) Jejunum c) Ileum d) Duodenum

56. Which one of the following pairs is not correctly matched?
a) Vitamin-$B_{12}$- Pernicious anaemia
b) Vitamin-$B_6$- Loss of appetite
c) Vitamin-$B_1$- Beri-beri
d) Vitamin-$B_2$- Pellagra

57. In human teeth, which helps in cutting?
a) Canine
b) Incisor
c) Molar
d) Premolar

58. Medium, in which pepsin is active?
a) Neutral
b) Alkaline
c) Acidic
d) Isotonic

59. Glisson's capsules are found, in which organ of mammals?
a) Stomach
b) Kidney
c) Testis
d) Liver

60. What is the process of food passage from buccal cavity to the site of water and mineral absorption
a) Mouth → Buccal cavity → Pharynx → Oesophagus → Duodenum → Stomach → lleum → Large intestine
b) Mouth → Buccal cavity → Pharynx → Oesophagus → Stomach → Duodenum → lleum → Caecum → Rectun
c) Mouth → Buccal cavity → Pharynx → Larynx → Stomach → Small intestine → Large intestine
d) Mouth to buccal cavity → Pharynx → Food pipe → Stomach → Large intestine → Small intestine

61. Examination of blood of a person suspected of having anaemia, shows large, immature, nucleated erythrocytes without haemoglobin. Supplementing his diet with which of the following is likely to alleviate his symptoms?
a) Thiamine
b) Folic acid and cobalamin
c) Riboflavin
d) Iron compounds

62. What do you mean by dental formula?
a) An arrangement of teeth in mouth in the order of I, C, PM, M
b) An arrangement of teeth in each half of the upper and lower jaw in the order of I, C, PM, M
c) An arrangement of teeth in upper jaw in the order to I, C, PM, M
d) An arrangement of teeth in the lower jaw in the order to I, C, PM, M

63. Improper balance diet may cause
a) Self-poisoning
b) Scarcity of moisture in eyes
c) Feeble muscles
d) All of the above

64. Which of the following metals is present in vitamin-$B_{12}$?
a) Cobalt
b) Copper
c) Zinc
d) Magnesium

65. If pancreas is removed, the compound, which remains undigested is
a) Carbohydrates
b) Fats
c) Proteins
d) All of these

66. Cattle fed with spoilt hay to sweet clover, which contains dicumarol
a) Are healthier due to a good diet
b) Catch infections easily
c) May suffer vitamin-K deficiency and prolonged bleeding
d) May suffer from beri-beri due to deficiency of vitamin–B

67. Crypts of Leiberkuhn are involved in
a) Secretion of succus entericus
b) Secretion of rennin
c) Secretion of ptyalin
d) Digestion of food

68. Ptyalin is inactivated by a component of gastric juice known as
a) Pepsin
b) Mucus
c) Rennin
d) HCl

69. Which combination is not correctly matched?
a) Vitamin-K – Faulty in blood clotting
b) Vitamin-C – Pyorrhoea, crack on mouth corner
c) Vitamin-$B_2$ – Beri-beri
d) Vitamin-A – Night blindness

70. How many deciduous teeth are present in human?
a) 22
b) 24
c) 20
d) 18

71. Crypts of Leiberkuhn are present in
a) Small intestine
b) Liver
c) Stomach
d) Colon

72. Study thoroughly the following statement and identify which of the following is/are correct and incorrect?
I. Bile salt present in bile is responsible to emulsify the fats in small intestine

II. Bicarbonates of sodium, potassium, glycocholate and faurocholate of sodium are bile salts
III. The pH of hepatic bile is 8.6, while pH of gall bladder is 7.6 or 7.5
IV. The flow of bile from liver takes place through hepatic duct, common bile duct, -hepatopancreatic ampulla and finally to the first part of small intestine
V. Gall bladder in rat and horse does not store bile
Choose the correct option
a) I, III and IV are incorrect, while II and V are correct
b) Al statement are correct
c) Statement II and V are incorrect while, I, III and IV are correct
d) All statement are incorrect

73. Read the following statements thoroughly and identify wheather they are true and false. Choose the right option accordingly
I. Bile is produced and stored in the liver and gall bladder, respectively
II. Common bile duct is the fusion of all the right and left hepatic ducts
III. Hepato-pancreatic duct opens into the proximal part of the small intestine
IV. Pancreas consists of two parts, exocrine and endocrine, which secretes insulin and glucagon hormone and pancreatic juices containing enzymes, respectively
V. Pepsinogen, a secretion of chief cells is activated by hydrochloric acid
VI. Peptides are converted into dipeptides with the action of carboxypeptidase
a) All statements are true
b) All statement are false
c) Statement I, III, IV and V are true while II and VI are false
d) Statement I, III, V and VI are true while III and IV are false

74. The digestion of starch by amylase is completed in the
a) Mouth b) Oesophagus c) Stomach d) Duodenum

75. Which of the following fatty acids is not synthesized in the human body?
a) Glycerol b) Cholesterol c) Linoleic acid d) Both (a) and (b)

76. In horses, rabbits, hares, the cellulose gets digested in the
a) Caecum b) Stomach c) Appendix d) Rumen

77. Pepsinogen (inactive form) is converted into active form of enzyme pepsin with the help of which of the following compound?
a) Proenzyme b) Hydrochloric acid c) Electrolyte d) Bicarbonates

78. Poison glands of snake are modified
a) Sebaceous glands b) Ceruminous glands c) Salivary glands d) Endocrine glands

79. In the Absence of enterokinase, the digestion of ..... would be affected in our intestine.
a) Maltose b) Amino acid c) Albumin d) Starch

80. Vitamin-$B_1$, responsible for normal working of human being, can be best obtained from
a) Green vegetables and fruits b) Meat and lentils
c) Whole wheat flour and its derivatives d) All of the above

81. Small finger-like projection, which produce numerous microscopic projections are supplied with a network of
a) Blood capillaries and lacteal b) Blood capillaries only
c) Lacteal only d) A large lymphoid vessel and valves

82. Vitamin –K deficiency causes
a) Scurvy b) Xerophthalmia c) Bleeding d) Osteomalacia

83. The largest variety of digestive enzymes is found in
a) Carnivores b) Herbivores c) Omnivores d) Parasites

84. Pylorus is present between
a) Small and large intestine b) Pancreas and small intestine
c) Oesophagus and stomach d) Stomach and duodenum

85. Identify the type of gastrointestinal hormone based on the functions given below
I. Stimulates the crypts of Lieberkuhn
II. Inhibits the secretion of glucagon by alpha cells
III. Stimulates Brunner's glands to release mucus
Chooses the correct option accordingly

| a) I-Gastrin | b) I-Duocrinin | c) II-Duocrinin | d) I-Enterokinin |
|---|---|---|---|
| II-Duocrinin | II-Cholecystokinin | II-Cholecystokinin | II-Somatostatin |
| III-Enterokinin | III-Enterokinin | III-Villikinin | III-Duocrinin |

86. Go through the following statements regarding *Oryctolagus* and select the correct option
I. Denition is heterodont
II. Canines are absent
III. Herbivorous and diastema is present
IV. Incisors are chisel like and poorly developed
V. The dental formula is 2033/1023
a) I, II and III are true, while IV and V are false
b) III and II and V are true while I and IV are false
c) I, III and V are true while II and IV are false
d) All the above are correct

87. Acetylcholinesterase enzyme splits acetylcholine into
a) Acetone and choline
b) Acetic acid and choline
c) Aspartic acid and acetylcholine
d) Amino acid and choline

88. Emulsification of fat will not occur in absence of
a) Lipase
b) Bile pigments
c) Bile salts
d) Pancreatic juice

89. Which of the following animals eats its prey?
a) Leech
b) Starfish
c) *Sepia*
d) Both (b) and (c)

90. Aggregates of lymphoid tissue present in the distal portion of the small intestine are known as
a) Villi
b) Peyer's patches
c) Rugae
d) Choroid plexux

91. In the wall of alimentary canal, what is the actual sequence from outer to inner?
a) Serosa, longitudinal muscle, mucosa, submucosa
b) Mucosa, serosa, longitudinal muscle
c) Serosa, longitudinal muscle, circular muscle, submucosa, mucosa
d) Serosa, longitudinal muscle, submucosa, mucosa

92. Diastema refers to
a) Gap between the teeth
b) Gap between tongue and teeth
c) Ciliary cells on alimentary wall
d) Cell lining along pharynx

93. Which of the following is regarded as the source of instant energy?
a) Fats
b) Carbohydrates and fats
c) Carbohydrates only
d) Minerals and vitamins

94. Enterokinase converts
a) Trypsinogen to trypsin
b) Pepsinogen to pepsin
c) Chymotrypsin to pepsinogen
d) Pepsin to chymotrypsin

95. Which of the following are required in minimum amount by human?
a) Iron, iodine, carbon, manganese, copper, oxygen
b) Iron, iodine, manganese, copper, zinc, fluorine
c) Iron, iodine, manganese, zinc, hydrogen
d) Nitrogen, oxygen, zinc, fluorine

96. Which one of the following is vestigial organ of human?
a) Hair
b) Intestine
c) Wisdom teeth
d) Muscle of glottis

97. Lysozyme, one of the constituent of the saliva of human being acts like
a) Antibacterial agent
b) Zymogen
c) Amylase
d) Lipase

98. Which teeth of human are shovel-shaped and used for nibbling, cutting and tearing?
a) Canines
b) Premolars
c) Molars
d) Incisors

99. Success entericus is

a) Intestinal juice b) Gastric juice c) Bile juice d) Salivary juice

100. During prolonged hunger strike, what is the correct chronological sequence of ending the food stuff?
a) Protein-fat-carbohydrate b) Carbohydrate-protein-fat
c) Fat-proteins-carbohydrate d) Carbohydrate-fat-proteins

101. Which one of the following pair of simple sugar absorption occurs most rapidly in the jejunum and stomach?
a) Glucose and fructose b) Glucose and galactose
c) Fructose and galactose d) All of the above

102. Succus entericus is secreted by
a) Goblets cells b) Crypt of Lieberkuhn c) Islets of lengerhans d) Paneth cells

103. Consider the following statement regarding digestion and absorption in mammals. Identify wheather they are true or false and select the correct option accordingly
I. Both Kuffer's cells and glisson's capsule are the characteristic of mammalian liver
II. IN dentition, thecodont means that teeth are embedded in the socket of jaw bones
III. There are three pair of salivary glands in human beings, out of them parotid, situated beneath the tongue are the smallest salivary gland
IV. Zymogen (inactive form of enzymes) are not the secretions of peptic cells
a) All statement are true b) All statement are false
c) I and II are true while III and IV are false d) III and IV are true while I and II are false

104. Digestion and distribution of nutrients both functions are performed by
a) Blastocoels
b) Coelom
c) Spongocoel
d)

105. Camel in its hump, stores
a) Water for emergency b) Fat for emergency
c) Both fat and water for emergency d) Fat and proteins as reserve food for emergency

106. What is the pH of human saliva?
a) 7.0 b) 7.5 c) 6.8 d) 6.0

107. Bile is composed of bile salts and bile pigments which are
a) Sodium glycocholate taurocholate and bilirubin, biliverdin, respectively
b) Bilirubin, biliverdin and sodium glycocholate taurocholate, respectively
c) Sodium glycocholate, taurocholate and bilirubin, respectively
d) Sodium glycocholate, taurocholate and biliverdin, respectively

108. Which one of the following four secretions is correctly matched with its source, target and nature of action?

a)

| Secretion | Source | Target |
|---|---|---|
| Gastrin | Stomach lining | Oxyntic cells | Production of HCl |

b)

| Action | | | |
|---|---|---|---|
| Inhibin | Sertoli cells | Hypothalamus | Inhibition of secretion of gonadotrop-in releasing hormone |

c)

| | | | |
|---|---|---|---|
| Enterokinase | Duodenum | Gall bladder | Release of bile juice |

d)

| | | | |
|---|---|---|---|
| Atrial Natriuretic Factor | Sinu Atrial Node M-cells of atria | Juxtaglomeru-lar apparatus | Inhibition of release of renin |

109. Pellagra is caused due to deficiency of

a) Niacin b) Pantothenic acid c) Tocopherol d) Cyanocobalamin

110. Osteomalacia is due to deficiency of
a) Vitamin-A b) Vitamin-C c) Vitamin-E d) Vitamin-D

111. What is the dental formula of human being?
a) $\frac{2123}{2123}$ b) $\frac{2123}{2213}$ c) $\frac{2114}{2114}$ d) $\frac{2122}{2122}$

112. Lactose intolerance in adults is related to
a) Wheat indigestion
b) Mushroom indigestion
c) Milk indigestion
d) Barley indigestion

113. Secretion of pancreatic juice is stimulated by
a) Gastrin b) Secretin c) Enterogasterone d) Enterokinase

114. Which one is correct regarding the number of teeth and dental formula with reference to a child of age between 4 to 6 years?
a) $\frac{212}{212} \times 2 = 20$ b) $\frac{212}{213} \times 2 = 24$ c) $\frac{2103}{2103} \times 2 = 24$ d) $\frac{2103}{2003} \times 2 = 22$

115. Which of the following represent bile salts?
a) Haemoglobin and biliverdin
b) Bilirubin and biliverdin
c) Bilirubin and haemoglobin
d) Sodium glycocholate and taurocholate

116. Which is not a disorder of the digestive system?
a) Jaundice b) Diarrhea c) Emphysema d) Constipation

117. What is the composition of bile?
a) Bile pigments and bile salts
b) Bile pigments and cholesterol
c) Cholesterol and phospholipids
d) All of the above

118. Which one of the following is antioxidant vitamin?
a) C, E and A b) $B_1$ and $B_4$ c) A, D and E d) $B_3$ and $B_5$

119. Maximum percentage of lipoprotein is in
a) Chylomicron b) HDL c) Arthritis d) None of these

120. Enzyme sucrose hydrolyses sucrose into
a) Glucose and galactose
b) Glucose and fructose
c) Two molecule of glucose
d) Two molecule of fructose

121. Which part of digestive system is affected in celiac disease?
a) Large intestine b) Small intestine c) Stomach d) Duodenum

122. Which of the following cells produce HCl?
a) β–cells b) α-cells c) Oxyntic cells d) Chief cells

123. What is the another name of gastro-oesophageal sphincter?
a) Pyloric sphincter
b) Gastro-duodenal sphincter
c) Cardiac sphincter
d) Sphincter of oddi

124. Deficiency of which essential amino acid leads to deregulation of blood sugar?
a) Isoleucine b) Valine c) Threonine d) Phenylalanine

125. The essential vitamin for blood coagulation is
a) Vitamin-$B_6$ b) Vitamin-A c) Vitamin-K d) Vitamin-E

126. What is the main site of amino acids absorption in human's small intestine?
a) Duodenum b) Jejunum c) Ileum d) Both (a) and (b)

127. Which of the following represents all proteolytic enzymes?
a) Erepsin, trypsin, pepsin
b) Cholecystokinin, pepsin, gastrin
c) Lipase, ducrinin, trypsin
d) Enterocrinin, gastrin, erepsin

128. Which of the following is a protein-energy malnutrition related disorder?
a) Kwashiorkor b) Marasmus c) Both (a) and (b) d) Xerophthalmia

129. Identify, wheather the given nutrients are absorbed by the active transport, simple diffusion or facilitated transport

I. Glucose
II. Fructose
III. Vitamin-K
IV. Amino acids
Choose the correct option accordingly
a) I-Active transport
II-Active transport
III- Facilited
IV-Simple diffusion
b) I- Facilited transport
II-Simple diffusion
III-Active transport
IV-Active transport
c) I-Active transport
II- Facilited transport
III-Simple diffusion
II-Active transport
d) I-Simple transport
II-Simple transport
III-Facilited transport
IV-Active transport

130. Crypts of Leiberkuhn are example for
a) Simple tubular gland
b) Coiled tubular gland
c) Compound alveolar gland
d) Compound tubular gland

131. Carnassial teeth are modified for
a) Crushing
b) Tearing
c) Grinding
d) Cutting

132. Hardest part in animal body is
a) Bone
b) Hair
c) Dentine
d) Enamel

133. By which process, glucose and amino acids are absorbed in the small intestine?
a) Active transport
b) Passive transport
c) Osmosis
d) Selective absorption

134. The true stomach in ruminants, Where most of digestion takes place is
a) Rumen
b) Omasum
c) Reticulum
d) Abomasum

135. The layer of cells that secretes enamel of tooth is
a) Dentoblast
b) Ameloblast
c) Osteoblast
d) Odontoblast

136. Which one of the following elements is essential for the life of animal and not for plants?
a) Calcium
b) Iodine
c) Phosphorus
d) Potassium

137. The amount of bile released is proportional to the amount of
a) Fat in meal
b) Protein in meal
c) Carbohydrate in meal
d) All of these

138. Pancreatic secretion and gall bladder contraction are stimulated by
a) Gastrin
b) Enterocrinin
c) Enterogasterone
d) Cholecystokinin

139. What are the trace components of our food?
a) Fatty acids
b) Minerals and vitamins
c) Monosaccharides
d) Amino acids

140. The beri-beri is a paralytic disease caused by the deficiency of vitamin-$B_1$ (thiamine). It was discovered by
a) Funk
b) G E Foxon
c) Eijkman
d) Stanley

141. Which of the following is not a source of Vitamin-A?
a) Carrot
b) Mango
c) Apple
d) Yeast

142. 'Digestion' word means
a) Burning of food
b) Oxidation of food
c) Hydrolysis of food
d) Breakdown of food

143. What is the major site for the conversion of proteins into free amino acids?

a) Spleen b) Liver c) Intestine d) Kidney

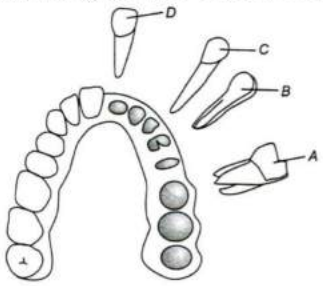
144. Digestion of protein is completed in
a) Stomach b) Duodenum c) Ileum d) Both (b) and (c)

145. What do you mean by the process of digestion?
a) Conversion of complex substances into simpler form
b) Absorption of monomers by the body
c) Conversion of monomers into polymers
d) Absorption of water and food

146. The pH of the digestive juices within the human small intestine is between 7.5 and 8.5. This environment is slightly
a) Basic b) Acidic c) Neutral d) None of these

147. Which one of the following statements is true regarding digestion and absorption of food in humans?
a) Oxyntic cells in our stomach secrete the proenzyme pepsinogen
b) Fructose and amino acids are absorbed through intestinal mucosa with the help of carrier ions like $Na^+$
c) Chylomicrons are small lipoprotein particles that are transported from intestine into blood capillaries
d) About 60% of starch is hydrolysed by salivary amylase in our mouth

148. The given schematic diagram diepicts heterodont teeth and its thecodont arrangement. Find the correct labelling for *A-D* from the options given below




a) A-Incisor, B-Canine, C-Premolar, D-Molar
b) A-Molar, B-Premolar, C-Canine, D-Incisor
c) A-Incisors, B-Premolar, C-Canine, D-Molar
d) A-Molar, B-Premolar, C-Incisor, D-Canine

149. Which of the following is not a function of liver?
a) Production of bile
b) Production of insulin
c) Glycogen storage
d) Detoxification

150. Choose the incorrect statement regarding human digestive system with reference to a normal person
a) Human saliva is slightly acidic
b) In human being, four pair of salivary gland secretes saliva
c) The quantity of saliva in adult man may be-1 to 1.5 L day
d) Enzyme amylase present in saliva is responsible for the break down of starch into simple sugar

151. What type of teeths are absent in rabbit?
a) Molars b) Premolars c) Canines d) Incisors

152. Which one is correctly matched?
a) Vitamin-E - Thiamine
b) Vitamin-D - Riboflavin
c) Vitamin-$B_1$ - Tocopherol
d) Vitamin $-B_{12}$- Cyanocobalamin

153. Nutritional disorder, keratomalacia is caused by the deficiency of vitamin
a) Calciferol b) Retinol c) Nicotinamide d) Biotin

154. How many human teeth appear twice during the life span of an individual?
a) 16 b) 32 c) 22 d) 20

155. What is the correct dental formula of rat?
a) $I\frac{2}{2}C\frac{1}{1}PM\frac{2}{2}M\frac{3}{3}$ b) $I\frac{2}{1}C\frac{1}{1}PM\frac{2}{2}M\frac{3}{3}$ c) $I\frac{1}{2}C\frac{2}{1}PM\frac{2}{2}M\frac{3}{3}$ d) $I\frac{1}{1}, C\frac{0}{0}, PM\frac{0}{0}, M\frac{3}{3}$

156. Secretin and cholecystokinin are digestive hormones. They are secreted in

a) Oesophagus b) Ileum c) Duodenum d) Pyloric

157. The cells, which destroy worn out white and red blood cells, bacteria and micro-organisms passing from the liver are
a) β-cells b) T- cells c) Kupffer's cells d) Oxytocin cells

158. Go through the following statements regarding starch digestion. Separate true and false statements and select the correct option accordingly
I. Digestion of starch starts from the mouth
II. Around 30% of the starch is digested in the stomach
III. Digestion of food requires the action of pancreatic juices
IV. Digestion of food is completed in the longest part of the alimentary canal
a) All are true
b) I, III and IV are true while II is false
c) II and III are false while III and I are true
d) II and, IV are false while III and I are true

159. Which of the following secretions gets mixed with the food (hydrolysed) in the small intestine?
a) Bile, pancreatic juices and intestinal juices
b) Pancreatic juices, intestinal juices and gastric juices
c) Gastric juices, intestinal juices and biles
d) Bile, gastric juices and salivary uices

160. The absorption of glycerol, fatty acids and monoglycerides takes place by the
a) Lymph vessels within the villi
b) Wall of the stomach
c) Colon
d) Capillaries within the villi

161. Reserve flow of food in the stomach of rabbit is prevented by
a) Pyloric sphincter b) Ileo-caecal valve c) Cardiac sphincter d) Uvula

162. Graveyard for RBCs is
a) Liver b) Spleen c) Kidney d) Lymph glands

163. Go through the following statement regarding the physiology of digestion and identify wheather they are true or false
Choose an appropriate option from the codes given below
I. Largest variety of hydrolases are present in omnivores, while the herbivores, generally lack digestive enzymes
II. Digestive enzymes are of four types namely, amylase, proteinases, lipases and nucleases
III. Proteinases are also known as proteases which are released in the active form because the proteins, either cellular or extracellular, all are hydrolysed by them in the absence of food
IV. Hydrolases and cholecystokinin are secreted by the exocrine part of pancreas
a) All statement are true
b) All statement are false
c) Statements III and IV are true while I and II are false
d) Statements I and II are true while III and IV are false

164. Pellagra is caused by deficiency of
a) Pyridoxine b) Niacin c) Folic acid d) Biotin

165. Drowsiness after a heavy meal occurs due to
a) Increased blood pressure in the brain
b) Decreased pulse rate
c) Reduced blood pressure in the brain
d) Increased pulse rate

166. The mucosal layer in the stomach form irregular folds known as
a) Villi
b) Lumen
c) Rugae
d) Crypts of Lieberkuhn

167. Where the liver is located in human body?
a) In abdominal cavity just above diaphragm
b) In thoracic cavity
c) Above the thoracic cavity
d) In abdominal cavity, just below the diaphragm

168. Enterogasterone is
a) Hormone secreted by gastric mucosa
b) Enzyme secreted by mucosa

c) Hormone secreted by duodenal mucosa d) Secreted by endocrine gland related to digestion

169. Bile salts help in
a) Emulsification b) Mastication c) Absorption d) Alkalination

170. Which vitamin is the most important one digestive health?
a) Vitamin-A b) Vitamin-D c) Vitamin-E d) Vitamin-B

171. Facilated transport, facilitates the absorption of
a) Fructose b) Amino acid c) Glucose d) Both (a) and (b)

172. Maximum absorption of water occurs in
a) Colon b) Rectum c) Large intestine d) Small intestine

173. Which one of the following disorders and characteristic is correctly matched?
a) Cystic fibrosis – Production of thick mucus that clogs airways
b) Sickle cell anaemia - Brain deterioration beginning at months of age
c) Achondroplasia - Extra fingers or toes
d) Huntington's disease - Skeletal, eye and cardiovascular defects

174. Which of the following has the highest pH?
a) Gastric juice
b) Bile
c) Pancreatic juice
d) Secretions of the intestinal glands

175. The following statements are based on the digestion and absorption of food. Select the correct and incorrect statements and choose an option accordingly from the codes given below
I. Active absorption of monosaccharides in the stomach and jejunum is carried out by facilitated transport
II. Most of the amino acids (above 95%) are absorbed in the duodenum and jejunum parts of the small intestine
III. Food is digested completely before absorption and is used by the body tissues
IV. Absorption of water from the small intestine is concerned with the absorption of salts and digested food in order to maintain an osmotic balance with the blood
a) I, II, IV and V are correct, while III is incorrect
b) I, II, III are correct, while IV and V are incorrect
c) III, IV and V are correct, while I, II are incorrect
d) IV and V are correctly, while I, II, III are incorrect

176. The gastric juice contains
a) Trypsin, pepsin, lipase b) Pepsin, lipase, rennin
c) Pepsin, amylase, trypsin d) Trypsin, pepsin, rennin

177. Compound saccular glands are
a) Intestinal glands b) Salivary glands c) Gastric glands d) Endocrine glands

178. Alcohol is present, in which of the following?
a) Vitamin-D b) Vitamin-$B_2$ c) Vitamin-$B_5$ d) Vitamin –C

179. Which of the following enzyme is not a component of human saliva?
a) $\alpha$-amylase b) Lysozyme c) Lipase d) None of the above

180. Which enzyme is present in human saliva?
a) Ptylin b) Pepsin c) Enterokinase d) Maltase

181. Which of the following scales are similar to mammalian teeth?
a) Cycloid b) Placoid c) Ganoid d) Cninoid

182. Read the statement A and B.
A. In human, small intestine is the longest protein of the alimentary canal.
B. Absorption of digested food requires a very large surface area.

Identify the correct choice on the two statements.

a) Statement A is correct, B is wrong
b) Statement A and B are both correct
c) Both the statements are wrong
d) Statement B is correct, A is wrong

183. Among mammals, a significant role in the digestion of milk is played by
a) Rennin b) Invertase c) Amylase d) Intestinal bacteria

184. Fats are emulsified by the bile juice because it contains
a) Enzyme b) Esterase c) Bile salt d) Bile pigment

185. Note the following
I. Dentition is heterodont.
II. Canines are poorly developed.
III. Incisors are chisel-like poorly developed.
IV. Herbivorous and diastema is present.
V. The dental formula is I 2/1, C 0/0, Pm 3/2, M 3/3
Which of the above are true for *Oryctolagus*?
a) I, II and IV b) I, IV and V c) I, II, IV and V d) III, IV and V

186. Which of the following is not a cause of indigestion?
a) Over eating b) Anxiety c) Over sleeping d) Food poisioning

187. Which one of the following is the correct matching of the site of action on the given substrate enzyme action upon it and the end-product?
a) Duodenum – Triglycerides $\xrightarrow[\text{Monoglycerides}]{\text{Trypsin}}$
b) Small intestine – Starch $\xrightarrow[\text{Disaccharide(maltose)}]{\alpha-\text{Amylase}}$
c) Small intestine – Proteins $\xrightarrow[\text{Amino acids}]{\text{Pepsin}}$
d) Stomach – Fats $\xrightarrow{\text{Lipase}}$ Micelles

188. During intake of food, what prevents the entry of food into the glottis (opening of wind pipe)?
a) Glottis itself prevents into the entry of food glottis
b) Food entry is prevented by air present in wind pipe
c) Food entry into glottis is prevented by annular rings of pharynx
d) Food entry is prevented by epiglottis into the glottis

189. Which one of the following sugar is most rapidly absorbed in the human gut?
a) Glucose b) Fructose c) Galactose d) Sucrose

190. Which is a symbiont inside human intestine?
a) *Streptococcus pneumo* b) *Neisseria meningitis* c) *E. coli* d) *Treponema pallidum*

191. Which is the inactive form of enzyme, pepsin?
a) Pepsinogen b) Protease c) Trypsin d) Peptones

192. The deficiency of a vitamin, which causes keratomalacia is
a) Vitamin-K b) Vitamin-D c) Vitamin-A d) Vitamin-E

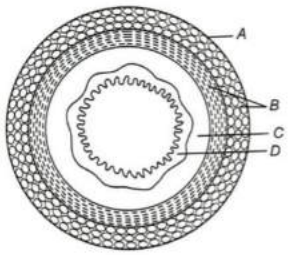
193. Animals consuming only plant materials are referred as
a) Herbivorous b) Carnivorous c) Omnivorous d) Insectivorous

194. Substrate for the enzyme amylase is
a) Nucleic acids b) Protein c) Starch d) Fat

195. Vitamin-D is synthesized in skin by the action of sunlight on
a) Cholesterol b) 7-hydroxy cholesterol
c) Cephalin cholesterol d) All of the above

196. Common bile duct is formed by the fusion of
a) Pancreatic duct and cystic duct b) Pancreatic duct and hepatic duct
c) Pancreatic duct, hepatic duct and cystic duct d) Hepatic duct and cystic duct

197. Given below the diagram of the transverse section of alimentary canal. Label it correctly and choose the correct option accordingly




a) A-Muscularis; B-Serosa; C-Submucosa; D-Mucosa
b) A-Muscularis; B-Serosa; C-Mucosa; D-Submucosa
c) A-Serosa; B-Muscularis; C-Mucosa; D-Submucosa
d) A-Serosa; B-Muscularis; C-Submucosa; D-Mucosa

198. Vitamin necessary for normal functioning of liver, clotting of blood and preventing haemorrhage is
a) Tocopherol b) Phylloquinone c) Cyanocobalamin d) Riboflavin

199. Absorption of fat occurs through the process of
a) Active transport b) Passive transport c) Osmosis d) Simple diffusion

200. Which is not used up in human body?
a) Calcium b) Phosphorus c) Zinc d) Barium

201. The inflammation of intestinal tract is due to the infection of which microorganism?
a) Bacteria b) Virus c) Fungus d) Both (a) and (b)

202. Which of the following enzymes digests protein in stomach?
a) Trypsin b) Pepsin c) Erepsin d) None of these

203. A young infant may be feeding entirely on mother's milk, which is white in colour but the stools, which the infant passes out is quite yellowish. This yellow colour is due to
a) Intestinal juice b) Bile pigments passed through bile juice
c) Undigested milk protein casein d) Pancreatic juice poured into duodenum

204. Go through the following statements regarding digestion and absorption is humans. Identify the incorrect statements and choose a correct option accordingly
a) If breast feeding is replaced by less nutritive food lacking protein and calories, the infant (below 14 eqn) are likely to suffer from marasmus and kwashiorkor
b) Bile salts of bile juice activates enzyme lipase
c) Lipase present in the pancreatic juices is the principal enzyme for digestion of fat
d) Medulla oblongata of hind brain control reflex action of vomiting

205. What are the various type of secretions that are mixed with the food to facilitate the digestion of food in the intestine?
a) Bile salts, bile pigment and gastric juices
b) Bile, pancreatic juices and intestinal juices
c) Bile, chymotrypsinogen and trypsinogen
d) Bile salts, bile pigments and succus enterics

206. Trypsinogen is converted into active trypsin by the action of
a) Cholecystokinin b) Enterocrinin c) Enterokinase d) Secretin

207. Which of the following does not match?
a) Pancreas- Glisson's capsule b) Antigen- Antibody
c) Thyroid- Goitre d) Enzyme- Substrate

208. Which of the following is involved in the catalysis of link reaction during aerobic respiration?
a) Vitamin-A b) Vitamin-$B_1$ c) Vitamin-$B_6$ d) Vitamin-K

209. In human, teeth are
a) Homodont and polyphyodont b) Heterodont and polyphyodont
c) Homodont and diphyodont d) Heterodont and diphyodont

210. FAD, coenzyme is derived from
a) Vitamin-$B_1$ b) Vitamin-$B_3$ c) Vitamin-$B_2$ d) Cyanocobalamin

211. Which of the following is/are the major components of food?
a) Proteins
b) Cereals
c) Fats and it derivatives
d) All of these

212. The pH of the digestive juices varies in human intestine. What does it means?
a) Medium is slightly acidic
b) Medium is slightly basic
c) Medium varies from acidic to basic
d) Neither basic nor acidic

213. In human body, the role of bile salts in digestion is to
a) Act as coenzymes during the digestion of carbohydrates
b) Emulsify fats and facilitate their absorption
c) Aid in the break-up of proteins into amino acids and their absorption
d) Stimulate the pancreas to release its enzymes

214. When breast feeding is replaced by less nutritive food low in proteins and calories; the infants below the age of one year are likely to suffer from
a) Marasmus
b) Rickets
c) Kwashiorkor
d) Pellagra

215. Read the following statements regarding the digestive system and select the correct statement
a) Oesophagus passes through neck, thorax and diaphragm and open into stomach
b) Stomach is located in the upper right portion of the abdominal cavity
c) Stomach, a J-shaped organ is the longest organ of alimentary canal
d) Caecum, a small blind sac is a part of small intestine and host symbiotic bacteria

216. Which part of the small intestine absorb iron, calcium and amino acids?
a) Duodenum
b) Jejunum
c) Ileum
d) Both (a) and (b)

217. Which of the following is called as a detritivore?
a) An animal feeding on decaying organic matter
b) An animal feeding on a plant
c) A plant feeding on an animal
d) An animal feeding on another animal

218. Bile salts help in
a) Digestion of fat
b) Digestion and absorption of fat
c) Digestion of protein
d) Digestion of protein and fat

219. Go through the following statements regarding the absorption of nutrients. Identify wheather they are true or false then choose the correct option accordingly
I. Absorption of monosaccharides, alcohol, some water and medicines like asprin occurs in the stomach
II. Fatty acids cannot be absorbed directly
III. Glycerol can reach into the blood and lymph directly
IV. Maximum absorption of water (90%) takes place in the small intestine
V. Large intestine and mouth are not the site of absorption
a) I, II and IV are true while III and V are false
b) I, II, III are true while IV and V are false
c) II, III and IV are false while I and V are true
d) I and II are false while III, IV and V are true

220. Inadequate protein intake leads to kwashiorkor. The subsequent oedema is most closely related to inadequate synthesis of which protein?
a) Gamma globulin
b) Glucagon
c) Insulin
d) Albumin

221. What will happen if the secretion of parietal cells of gastric glands is blocked with an inhibitor?
a) Gastric juice will be deficient in chymosin
b) Gastric juice will be deficient in pepsinogen
c) In the absence of HCl secretion, inactive pepsinogen is not converted into the active enzyme pepsin
d) Enterokinase will not be released from the duodenal mucosa and so trypsinogen is not converted to trypsin

222. The intestinal tract infections are not caused by which of the following organism?
a) Tapeworm
b) Roundworm
c) Lactobacilli
d) Hookworm

223. In the process of digestion and absorption, the peristalsis movement in alimentary canal from oesophagus to rectum is produced by

a) Unstriped muscle of muscular coat
b) Visceral peritoneum
c) Meissner's plexus of submucosa
d) Epithelium layer of mucosa

224. Which combination is mismatched?
a) Vitamin- D-Rickets
b) Thiamine- Beri-beri
c) Vitamin-K-Sterility
d) Niacin-Pellagra

225. Curdling of milk in small intestine takes place due to
a) Trypsin
b) Rennin
c) Ptyalin
d) Chymotrypsin

226. Pepsinogen is secreted by
a) Chief cells
b) Oxyntic cells
c) Mast cells
d) Parietal cells

227. Kupffer's cells are present in
a) Liver
b) Small intestine
c) Pancreas
d) Thyroid gland

228. Why the stool of a breast feeding baby is quite yellowish in colour?
a) Due to undigested milk proteins
b) Due to pouring of pancreatic juices into the duodenum
c) Due to the bile pigment of bile juices
d) Due to the enzymes present in saccus entricus

229. Food is masticated with the help of which part of teeth?
a) Enamel
b) Root
c) Dentine
d) None of these

230. Maltose gives rise to two molecules of
a) Fructose
b) Lactose
c) Glucose
d) Sucrose

231. Lipids, Which can be found in oil based salad dressings and ice cream, during digestion are splitted into
a) Fatty acids and glycerol
b) Glycerol and amino acids
c) Glucose and fatty acids
d) Glucose and amino acids

232. Human dental formula is
a) $I\frac{2}{2}\ C\frac{1}{1}\ Pm\frac{2}{2}\ M\frac{3}{3}$
b) $I\frac{2}{1}\ C\frac{1}{2}\ Pm\frac{2}{2}\ M\frac{3}{3}$
c) $I\frac{1}{2}\ C\frac{2}{1}\ Pm\frac{2}{2}\ M\frac{3}{3}$
d) $I\frac{1}{1}\ C\frac{2}{2}\ Pm\frac{2}{2}\ M\frac{3}{3}$

233. Chief cells of gastric glands are
a) Simple tubular
b) Coiled tubular
c) Branched tubular
d) Compound tubular

234. Which one of the following vitamin is water soluble as well as have antioxidant property?
a) Vitamin-C
b) Vitamin $B_1$
c) Vitamin-P
d) Vitamin-$B_9$

235. Thiamine ($B_1$) deficiency results in
a) Wernicke's syndrome
b) Korsakoff's syndrome
c) Osteonecrosis
d) Tunnel vision

236. Which is the correct sequence of 4 layers of alimentary canal from periphery to centre?
a) Muscularis → Serosa → Mucosa → Submucosa
b) Serosa → Mucosa → Muscularis → Submucosa
c) Serosa → Muscularis → Submucosa → Mucosa
d) Serosa → Mucosa → Submucosa → Muscularis

237. Which part of our body secretes the hormone secretin?
a) Ileum
b) Stomach
c) Duodenum
d) Oesophagus

238. Which of the following does not play a role in blood coagulation?
a) Vitamin-K
b) Vitamin-D
c) Calcium ions
d) Fibrinogen

239. Which of the following is an organic molecule needed by the body in small amounts?
a) Protein
b) Zinc
c) Vitamin-C
d) Monosaccharide

240. In human beings, digestion of proteins, fats and carbohydrates starts from which of the following parts of the alimentary canal?
a) Stomach, intestine and mouth, respectively
b) Only from stomach
c) Intestine, stomach and mouth, respectively
d) Only from intestine

241. Continuous bleeding from an injured part of body is due to deficiency of
a) Vitamin-A
b) Vitamin-B
c) Vitamin-K
d) Vitamin-E

242. Which one of the following pairs of food components in humans reaches the stomach totally undigested?

a) Protein and starch b) Starch and fat c) Fat and cellulose d) Starch and cellulose

243. Which enzymes are responsible to convert the end product of partially hydrolysed food into simple absorbable forms?
a) Enzymes of succus entericus
b) Proteolytic enzyme of pancreatic juice
c) Enzyme of gastric juice
d) All of the above

244. The process of digestion starts from
a) Stomach b) Oesophagus c) Mouth d) Intestine

245. The process by which absorbed food are utilised by the tissues in the living being for energy, growth and maintenance is termed as
a) Absorption
b) Assimilation
c) Catabolism
d) Digestion and absorption

246. Opening of oesophagus into 'J'-shaped, bag-like structure is regulated by
a) Pyloric sphincter
b) Sphincter of oddi
c) Ileocaceal sphincter
d) Gastro oesophageal sphincter

247. Which of the following part in cow's stomach is specialized for microbial digestion of plant material?
a) Rumen b) Reticulum c) Abomasum d) Both (a ) and ( b)

248. Which of the following processes will be affected by the absence of enterokinase?
a) Lipid → Fatty acid + Glycerol
b) Dipeptides → Amino acid
c) Proteases → Dipeptide
d) Amylase → Maltose

249. A large lymph vessel present in the villus of small intestine is called
a) Crypts b) Lacteal c) Peyer's patches d) Valve of kerkring

250. Most abundant mineral of animal body is
a) Iron b) Sodium c) Potassium d) Calcium

251. Taste buds are present on
a) Small projection found on the upper surface of tongue
b) Small projection found on the lower surface of tongue
c) On both the surface of tongue
d) Behind the tongue

252. The malnutrition disease in man is
a) Cri-du-chat syndrome
b) Klinefelter's syndrome
c) Potbelly syndrome
d) Edward's syndrome

253. As you know that HCl is highly acidic (1.5 to 2.0 pH) in the stomach, however, the epithelium of the mucosa remains unaffected/undissolved. Why?
a) Mucous continues to lubricate the inner lining
b) Bicarbonates present in the gastric juices protect the linings
c) Both (a) and (b)
d) None of the above

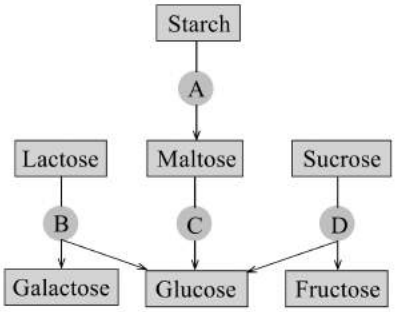
254. Digestion of starch starts from the mouth, whereas ...A... is the size of digestion mainly for ...B..... Choose the correct combination of options to complete the given statement
a) A-stomach; B-protein
b) A-stomach; B-starch
c) A-small intestine; B-protein
d) A-small intestine; B-starch

255. The fat soluble vitamin is
a) B b) C c) K d) H

256. The main function of lacteals in the human small intestine is the absorption of
a) Glucose and vitamins
b) Amino acids and glucose
c) Water and vitamins
d) Fatty acids and glycerol

257. What is frenulum?
a) It is the fold by which tongue is attached to the floor of oral cavity
b) It is an adenoid which is present on pharyngeal wall
c) It is a tonsil like structure on the lateral wall of palate
d) It is a V-shaped furrow which divides the surface of tongue

258. The following is a scheme showing the fate of carbohydrates during digestion in the human alimentary canal. Identify the enzymes acting at stages indicated as A, B, C and D. Choose the correct option from those given.

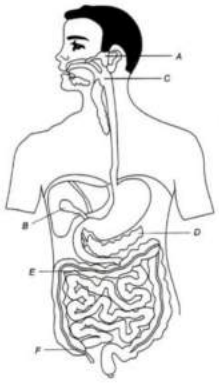



a) A-Amylase, B-Maltase, C- Lactase, D-Invertase
b) A-Amylase, B- Maltase, C-Invertase, D-Latcase
c) A-Amylase, B-Invertase, C-Maltase, D-Lactase
d) A-Amylase, B-Lactase , C- Maltase , D- Invertase

259. Deamination occurs in
a) Kidney b) Liver c) Nephron d) Both (a) and (b)

260. Vitamin-D is produced in human body in
a) Muscles b) Nerves c) Skin d) Bone-marrow

261. The diagram given below depicts the digestive system in humans. Label it from A to F and choose the correct option accordingly



a) A-Parotid gland, B-Liver, C-Larynx, D-Pancreas, E-Transverse colon, F-Caecum
b) A-Parotid gland, B-Gall bladder, C-Pharynx, D-Pancreas, E-Transverse colon, F-Caecum
c) A-Parotid gland, B-Liver, C-Pharynx, D-Pancreas, E-Ascending colon, F-Caecum
d) A-Parotid gland, B-Gall bladder, C-Thymus, D-Pancreas, E-Ascending colon, F-Caecum

262. Chymotrypsin is produced by
a) Liver b) Pancreas c) Stomach d) Duodenum

263. Dental formula of rabbit is
a) $I\frac{2}{1}\ C\frac{0}{0}\ Pm\frac{3}{2}\ M\frac{3}{3}$ b) $I\frac{1}{2}\ C\frac{0}{2}\ Pm\frac{2}{0}\ M\frac{3}{3}$ c) $I\frac{1}{2}\ C\frac{0}{2}\ Pm\frac{3}{0}\ Pm\frac{3}{3}$ d) $I\frac{2}{2}\ C\frac{1}{1}\ Pm\frac{2}{2}\ M\frac{3}{3}$

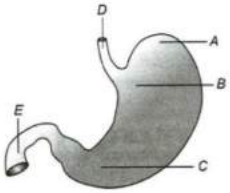
264. Vitamin-$B_{12}$ is available to ruminants by
a) Plants b) Microorganisms in caecum
c) Animals d) All of the above

265. Which of the following enzymes carries out the initial step in the digestion of milk in humans?
a) Rennin b) Lipase c) Trypsin d) Pepsin

266. Process of absorption of nutrients is carried out by
a) Passive transport b) Facilitated transport c) Active transport d) All of the above

267. Part of bile juice useful in digestion is
a) Bile salt b) Bile pigment c) Bile matrix d) All of these

268. Bile helps in the digestion of fat through
a) Emulsification b) Alkalinity c) Forming micelles d) All of these
269. Which hormone is also known as Gastric Inhibitory Peptide (GIP)
a) Enterokinase b) Enterogastrone
c) Cholecystokinin d) Vasoactive intestinal Peptide (VIP)
270. Salivary amylase is also known as
a) Ptyalin b) Gastrin c) Glyoxylase d) Pepsin
271. Choose true and false statements regarding the digestive glands of humans
I. It is a compound gland as it posseses both exocrine and endocrine parts
II. Exocrine parts secretes alkaline pancreatic juices
III. Endocrine part secretes hormones like insulin and glucagon
IV. They are surrounded by glisson's capsule
V. Secretion of these gland's forms gastric juices
Pick the correct option accordingly
a) I, II, III are true while IV and V are false b) I, II, III are false while IV and V are true
c) All statement are true d) All statement are false
272. The deficiency of this vitamin is known to cause abortion in early pregnancy of rat?
a) Retinol b) Calciferol c) Tocopherol d) Naphthoquinone
273. Starch is converted to maltose by the action of
a) Invertase b) Amylase c) Sucrose d) Maltase
274. What is the correct labelling of diagram given below? Choose the correct option accordingly




a) A-Fundic portion, B-Cardiac region, C-Pyloric region, D-Food pipe, E-Wind pipe
b) A-Fundus, B-Pyloric region, C-Cardiac region, D-Oesophagus, E-Duodenum
c) A-Fundic region, B-Cardiac region, C-Pyloric region, D-Oesophagus, E-Duodenum
d) A-Cardiac region, B-Pyloric region, C-Fundic region, D-Oesophagus, E-Duodenum
275. Go through the following statements regarding the disorders of the digestive system. Choose the correct statements and select appropriate option from the codes given below
I. Indigestion is caused by the poor supply of digestive enzyme, overeating, anxiety and a lot of junk food
II. Constipation, an irregular movement of bowl is caused due to poor habits, fiberless diet, emotional stress and certain drugs
III. Indigestion can be caused by milk of magnesia
IV. Ejection of stomach content is controlled by hypothalamus of prosencephalon
a) All statements are correct b) All statements are incorrect
c) I and II statements are correct d) III and IV statements are correct
276. Which of the following is a correct dental formula for the child falling under age group 5 to 6 yr?
a) I 2/2, C 1/1, Pm 2/2, M 0/0 b) I 2/2, C 1/1, Pm 2/2, M 3/3
c) I 1/1, C 2/2, Pm 2/2, M 3/3 d) I 2/2, C 2/2, Pm 1/1, M 3/3
277. Kupffer's cells are
a) Phagocytic b) Non-phagocytic c) Myosin d) Fibrin
278. In which of the following secretions, the enzymes, like maltase, isomaltase, sucrase, lactase, enterokinase, aminopeptidase, dipeptidase, nucleosidases, nucleotidases and α-dextrinase are present?
a) Pancreatic juices b) Intestinal juices c) Gastric juices d) Both (a) and (b)
279. Liver of man is
a) Bilobed b) Three-lobed c) Four-lobed d) Five-lobed
280. By which process, the end products of milk sugar in small intestine are absorbed?

a) Passive transport b) Active transport c) Facilitated transport d) Osmosis

281. Success entericus is secreted by
a) Crypts of Leiberkuhn b) Brunner's glands c) Both (a) and (b) d) None of these

282. The gastrointestinal functions like, secretion and motility is controlled by which system?
a) Intrinsic neural system b) Extrinsic neural system
c) Both (a) and (b) d) None of the above

283. Complete the equation.
Nucleic acids $\xrightarrow{\text{Nucleases}}$ Nucleotides $\rightarrow \cdots \ldots \ldots$
a) Monoglycerides b) Diglycerides c) Disaccharides d) Nucleosides

284. Pulp cavity of teeth is lined by
a) Odontoblast b) Chondroblast c) Osteoblast d) Amyloblast

285. What is gastroporesis?
a) Inflammation of the lining of the stomach
b) Stomach content flows back up into the oesophagus
c) Delayed movement of food from the stomach to the small intestine
d) Bleeding in the digestive tract

286. The gastric juices contain
a) Trypsin, rennin, pepsin b) Pepsin, trypsin, amylase
c) Pepsin, rennin, carbohydrates d) Pepsin, lipase, rennin

287. The sphincter of Oddi found in man, guards the
a) Pancreatic duct b) Hepatopancreatic duct
c) Bile duct d) Cystic duct

288. Which of the following is the largest gland in an adult man?
a) Thymus b) Liver c) Thyriod d) Pancreas

289. Go through the following statements regarding the absorption of fats. Find correct and incorrect statements and choose an option accordingly from the codes given below.
I. Micelles and chylomicron are concerned with the absorption of fats
II. Chylomicrons are water soluble dropelets of fat which contains triglycerides, sterol and phospholipids
III. Micelles are water soluble droplets of fatty acids and glycerols which are formed by the action of bile pigments on fats and glycerol
IV. Chylomicron, protein coated small vesicles are released from the intestinal cells into the blood stream by lacteals
a) II and IV are correct while I and III are incorrect b) I, III and IV are correct, while II is incorrect
c) I, II and IV are correct while III is incorrect d) IV and I are correct while II and III are incorrect

290. Wilson's disease is associated with the abnormal metabolism of
a) Iron b) Potassium c) Iodine d) Copper

291. Rennin is secreted in which part of alimentary canal?
a) Stomach b) Kidney c) Duodenum d) Small intestine

292. Cud chewing animals are known as
a) Frugivorous b) Sanguivorous c) Ruminants d) Cannibals

293. Which component of gastric juices inactivates salivary amylase?
a) Mucous b) Rennin c) CCl d) Pepsin

294. The abnormal frequent movement of the bowl and increased liquidity of the faeces is called
a) Vomiting b) Indigestion c) Constipation d) Diarrhoea

295. Gastrointestinal hormones secretion and cholecystokinin secreted by duodenum is responsible for the stimulation and contraction of
a) Pancreas and gall bladder b) Liver, gall bladder and pancreas
c) Gall bladder and cells of gastric glands d) Salivary glands and gall bladder

296. Which combination of vitamin and respective disease is not correct?
a) Vitamin $B_2$ – Pellagra b) Vitamin $B_{12}$ – Pernecious anaemia

c) Vitamin $B_5$ – Dermatitis
d) Vitamin-E – Infertility

297. Which of the following can be absorbed by hepatic caeca?
a) Glucose and amino acid
b) Glucose and lipid
c) Lipid
d) Glucose

298. The process of resynthesis of food materials from simpler food molecules is called
a) Biosynthesis
b) Catabolism
c) Absorption
d) Assimilation

299. The accumulation of faeces in the rectum and distension of the rectal wall initiates the feeling of defecation due to
a) Defecation reflex
b) Deamination
c) Irregular movement of bowl
d) None of the above

300. Pepsin is inactivated at pH
a) Below 3
b) Below 2
c) Above 5
d) Above 3

301. Which form of fats is absorbed into the intestinal cells?
a) Micelles
b) Chylomicrons
c) Fatty acids
d) Both (a) and (b)

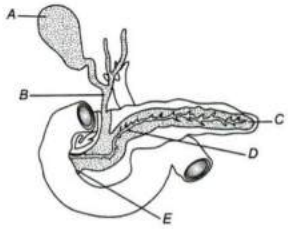
302. The type of dentition found in human being is
a) Polyphyodont, thecodont
b) Diphyodont and thecodont
c) Diphyodont and acrodont
d) Diphyodont and homodont

303. Which one of the following equation match correctly with the action of enzymes on the given substrate and regarding the end product of the reaction?
a) Stomach $\longrightarrow$ Fats $\xrightarrow{\text{Lipase}}$ Micelles
b) Small intestine $\longrightarrow$ Protein $\xrightarrow{\text{Pepsin}}$ Amino acid
c) Small intestine $\longrightarrow$ Starch $\xrightarrow{\text{amylase}}$ Disaccharides
d) Duodenum $\longrightarrow$ Triglycerides $\xrightarrow{\text{Trypsin}}$ Monoglycerides

304. Bile juice is stored in which organ of human body?
a) Gall bladder
b) Liver
c) Kidney
d) Pancreas

305. Secretin hormone is secreted from
a) Stomach and stimulates gastric gland
b) Duodenum and stimulates liver
c) Thyroid and stimulates thyroid gland
d) Duodenum and stimulates pancreas

306. The given below diagram represents a duct system of pancreas, liver and gall bladder. Label the diagram from A to C




a) A-Gall bladder, B-Common bile duct, C-Hepato pancreatic duct, D-Pancreas, E-Pancreatic duct
b) A-Gall bladder, B-Bile duct, C-Hepato pancreatic duct, D-Pancreatic duct, E-Pancreas
c) A-Gall bladder, B-Bile duct, C-Pancreatic duct, D-Pancreas, E-Hepato pancreatic duct
d) A-Gall bladder, B-Common bile duct, C-Pancreas, D-Pancreatic duct, E-Hepato pancreatic duct

307. Hydrolysis of milk sugar gives rise to
a) Two molecules of lactose
b) Two molecules of glucose
c) One molecule of glucose and one molecule of fructose
d) One molecule of glucose and one molecule of galactose

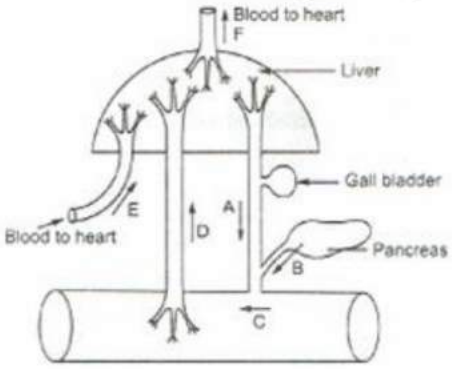
308. Proportion of which of the following should be increased in diet improve strength and growth of bones?
a) Vitamin-D, $Ca^{2+}$ and vitamin-K
b) Vitamin-D, $Ca^{2+}$ and iodine
c) Vitamin-D, $Ca^{2+}$ and vitamin-A
d) Vitamin-A, $Ca^{2+}$ and $Zn^{2+}$

309. The juice containing sodium glycocholate is released under the influence of
a) Secretin
b) Cholecystokinin
c) Enterogasterone
d) Enterocrinin

310. Which is the largest gland of human body?
a) Gastric gland b) Pancreas c) Liver d) Salivary gland

311. Seggregate the following statements into true and false category. Choose the right answer from the codes given below
I. Mucosal epithelium has goblet cells which secrete mucous and helps in lubrication
II. Mucosa forms gastric glands in the stomach and crypts in between the bases of villi in intestine
III. Cells lining the villi has brush border or microvilli
IV. All the four basic layers in the wall of gut never shows modification in different parts of the alimentary canal
a) All the statements are correct
b) I, II and III are true while IV is false
c) I, II and III are false while IV is true
d) I, IV and false, while II and III are true

312. The diagram below shows how things get to and from the liver. They are labeled as A, B, C, D, E and F. Which one of the following labellings is the correct one?




a) A is the hepatic portal vein and E is the hepatic vein
b) C is the intestine and F is the hepatic portal vein
c) D is the hepatic portal vein and F is hepatic vein
d) B is the pancreatic artery and E is the hepatic artery

313. Which of the following is/are essential fatty acids for man?
a) Arachidonic acid b) Linolenic acid c) Linoleic acid d) All of these

314. Chloragen cells help in
a) Respiration b) Reproduction c) Circulation d) Nutrition

315. What is the function of buccal cavity?
a) Mastication of food b) Digestion of fats c) Both (a) and (b) d) None of the above

316. Carboxypeptidase is an enzyme secreted by
a) Salivary gland b) Stomach c) Gall bladder d) Pancreas

317. In which of the following organ, putrefying bacteria are present?
a) Intestine b) Colon c) Stomach d) Liver

318. For how much duration, food is stored in the stomach?
a) 3-4 hours
b) 2-4 hours
c) 4-5 hours
d) More than 5 hours but less than 6 hours

319. If for some reason our goblet cells are non-functional, this will adversely affect
a) Production of somatostatin
b) Secretion of sebum from the sebaceous glands
c) Maturation of sperms
d) Smooth movement of food downwards the intestine

320. Wisdom teeth are
a) Last molars b) Last premolars c) Incisors d) Canines

321. By which process, absorption of galactose, electrolytes, like $Na^+$ and $K^+$ and some amino acids takes place?
a) Active process b) Passive process c) Simple diffusions d) Osmosis

322. Angiotensinogen is a protein produced and secreted by

a) Macula densa cells
b) Endothelial cells (cells lining the blood vessels)
c) Liver cells
d) Juxtaglomerular (JG) cells

323. Both the crown and root of a tooth is covered by a layer of bony hard substance called
a) Enamel
b) Dentine
c) Bony socket
d) Cement

324. A balanced diet lacks
a) Nucleic acid and enzyme
b) Fats and carbohydrates
c) Proteins and vitamins
d) Minerals and electrolytes

325. Brown colour of the stool is due to the presence of stercobilinogen and stercobilin, which are the derivatives of
a) Bilirubin
b) Biliverdin
c) Bile salt
d) Bile pigment

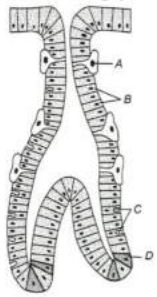
326. These absorption of water, alcohol and monosaccharides occur in
a) Gastric mucosa
b) Mucosa of ileum
c) Intestinal mucosa
d) Through out epithelium of stomach

327. The form, in which the synthesised fats are liberated from the intestinal wall into the lymph present in the lymphatic capillaries is
a) Micelles
b) Chylomicrons
c) Fatty acids
d) Both (a) and (b)

328. Which one of the following inhibits the coagulation of blood in the human circulatory system?
a) Silver affinity cells of gastric epithelium
b) Liver, situated in the upper right side of abdominal cavity
c) Delta ($\delta$) cells of endocrine part of the pancreas
d) Brunner' gland, present in the duodenum of intestine

329. Sphincter of oddi found in human being guards
a) Opening of ampula into duodenum
b) Opening of hepatic ducts before joining the cystic duct
c) Opening of stomach into duodenum
d) Opening of cystic duct into pancreatic duct

330. The given below diagram represents the gastric glands. Label it from A to D and choose the correct option accordingly

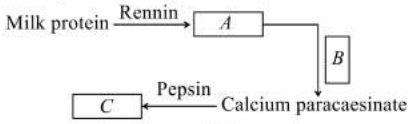



a) A-Oxyntic cell, B-Chief cell, C-Mucous cell, D-Argentaffin cell
b) A-Argentaffin cell, B-Oxyntic cell, C-Mucous cell, D-Chief cell
c) A-G cell, B-Chief cell, C-Mucous cell, D-Argentaffin cell
d) A-Oxyntic cell, B-G cell, C-Mucous cell, D-Chief cell

331. The innermost layer of human alimentary canal forms numerous finger-like projections in the small intestine which are known as
a) Villi
b) Rugae
c) Peyer's patches
d) Both (a) and (b)

332. The major site of protein breakdown to form free amino acids is in the environment of
a) Kidney
b) Spleen
c) Liver
d) Bone-marrow

333. Complete the given equation and choose the correct option accordingly




a) A-Caesin, B-$Ca^{2+}$, C-Peptones
b) A-$Ca^{2+}$, B-Peptones, C-Caesin

c) A-Paracaesin, B-$Ca^{2+}$, C-Peptones
d) A-$Ca^{2+}$, B-Paracaesin, C-Peptones

334. In the homeostatic control of blood sugar level, which organs function respectively as modulator and effector?
a) Liver and islets of Langerhans
b) Hypothalamus and liver
c) Hypothalamus and islets of Langerhans
d) Islets of Langerhans and hypothalamus

335. Symbiotic bacteria present in the colon of large intestine produce
a) Cyanocobalamin
b) Riboflavin
c) Thiamine
d) All of these

336. Major site of absorption of nutrients in human beings is
a) Stomach
b) Small intestine
c) Large intestine
d) Both (a) and (b)

337. Bile secretion is proportional to the concentration of
a) Protein
b) Fat
c) Carbohydrate
d) None of these

338. In which part of the small intestine, starch is digested
a) Duodenum
b) Jejunum
c) Ileum
d) All of these

339. Find out the correctly matched pair.
a) Pepsinogen - Zymogenic cells
b) HCl - Goblet cells
c) Mucus - Oxyntic cells
d) Pancreatic juice - Salivary glands

340. In which layer of the wall of alimentary canal, secretory glands are present?
a) Serosa
b) Mucosa
c) Muscularis
d) Submucosa

341. Consider the following statements regarding the digestion and absorption of food in human and identify the correct and incorrect statement
I. Antipellagra vitamin is nicotinamide which is present in milk, yeast, meat, leafy vegetable and whole grains
II. Deficiency of vitamin thiamine causes loss of appetite, muscle depreciation, fatigue and mental confusion
III. Prolonged deficiency of tocopherol reduces reproductive capacity in human being
IV. Gastrovascular cavity performs, *i. e.*, both function digestion and distribution of nutrients
Choose the correct option accordingly
a) All statements are incorrect
b) All statements are correct
c) I and II are correct only
d) I and II are incorrect only

342. What do you mean by the absorption of food?
a) It is a process by which the end products of the digestion passes through the intestinal mucosa into blood or lymph
b) It is a process of transportation of digestive food from the human alimentary canal to blood and lymph
c) It is a process to utilise the absorbed food substances
d) Absorption is a process by which nutrients are absorbed from the large intestine into the blood and lymph through its mucous membrane

343. Name that part of small intestine in which the pyloric region of stomach opens
a) Duodenum
b) Ileum
c) Jejunum
d) None of the above

344. Secretion of gastric juice is controlled by
a) Gastrin
b) Cholecystokinin
c) Enterogastrin
d) None of these

345. How many salivary glands are present in human being?
a) 6
b) 10
c) 8
d) 12

346. Which one is not a part of large intestine?
a) Rectum
b) Caecum
c) Ileum
d) Colon

347. The lactase hydrolyses lactose into
a) Glucose
b) Glucose and galactose
c) Fructose
d) Glucose and fructose

348. What is cholecystokinin?
a) Enzyme
b) Bile-pigment
c) Gastro- intestinal hormone
d) Lipid

349. Identify wheather the given statements are true or false in the context of deficiency of essential amino acids and choose the correct option accordingly
I. Incomplete break down of proteins in the digestive system
II. Deregulation of mood and sleep
III. Increased production of sulphur
IV. Decreased amount of niacin

a) I – True
II – True
III – False
IV – True

b) I – True
II – True
III – True
IV - False

c) I – False
II – True
III – True
IV - False

d) I – True
II – False
III – False
IV – True

350. Which of the following symptoms is related to the deficiency of antioxidant vitamins?
a) Retrolental fibroplasia
b) Truncal and limb atoxia
c) Scurvy
d) All of these

351. Which one is not associated with the secretion of saliva in human being?
a) Paratoids glands
b) Sublinguals glands
c) Zymogenic cells
d) Sub-maxillary glands

352. In intestine, food materials are absorbed through
a) Villi
b) Subtentacular cells
c) Sub-mucosa
d) Gastric glands

353. Chymotrypsinogen, trypsinogen and nucleases along with amylases and lipases are
a) Inactive forms of enzyme in gastric juices
b) Active enzymes of intestinal juices
c) Inactive enzymes of pancreatic juices
d) Active enzymes of intestinal juices

354. Choose the most appropriate option to describe the composition of human saliva
a) Amylase, hydrolase
b) Electrolytes amylase/ptylin, lysozymes and mucous
c) Amylase/ptylin, mucous
d) Ptylin only

355. Production of glucose from amino acids, fatty acids and glycerol is called
a) Glycogenesis
b) Gluconeogenesis
c) Glycogenolysis
d) Glycolysis

356. With reference to a normal human being, which one of the following statements is not correct?
a) Human saliva is slightly alkaline
b) An adult human may secrete 1 to 1.5 litres of saliva per day
c) Saliva is secreted by six pairs of salivary glands in human beings
d) The salivary enzyme (ptyalin) breaks down cooked starch into maltose

357. Which vitamin should not be stored?
a) Calciferol
b) Retinol
c) Niacin
d) Ascorbic acid

358. Which of the following match is correct?
a) Rennin – Protein
b) Trypsin – Starch
c) Invertase – Sucrose
d) Amylase – Lactose

359. Which one of the following amino acids is an essential part of human diet?
a) Glycine
b) Phenylalanine
c) Serine
d) Aspartic acid

360. Sacculus rotundus is a dilated part at posterior end of
a) Ileum
b) Oesophagus
c) Ilium
d) Colon

361. Which of the following is absorbed from undigested food in the large intestine?
a) Water and vitamins
b) Water and product of bacterial digestion
c) Water and salt
d) Water and alcohols

362. Which one of the following sequence is in correct order?
a) Descending portal colon → Rectum → Anus
b) Colon → Anus → Rectum
c) Stomach → Jejunum → Duodenum
d) Ileum → Colon → Caecum

363. Which enzyme is responsible for the digestion of milk in infants?
a) Pepsin b) Trypsin
c) Rennin d) Various proteolytic enzyme

364. Which one statement is incorrect regarding the process of digestion and absorption in humans?
a) Small intestine is the major site for the absorption of all nutrients
b) Around 40% of the total absorption of nutrients takes place in the proximal part of the small intestine
c) Drugs, alcohols, little water and salt are absorbed in the stomach through the mucous membrane
d) Large intestine is the site of absorption for water and products of bacterial digestion

365. Deficiency of which vitamin causes type 1 and type 2 diabetes?
a) Vitamin-B b) Vitamin-A c) Vitamin-D d) Vitamin-K

366. Which of the following is a water soluble vitamin?
a) Vitamin-A b) Vitamin-B c) Vitamin-D d) Vitamin-E

367. Which one of the following pairs of the kinds of cells and their secretion are correctly matches?
a) Oxyntic cells - A secretion with pH Between 2.0 And 3.0
b) Alpha cells of islets of Langerhans - Secretion that decreases blood sugar level
c) Kupffer's cells - A digestive enzyme that hydrolyses nucleic acids
d) Sebaceous glands - A secretion that evaporates for cooling

368. Digestion is accomplished by
a) Mechanical and chemical processes b) Chemical processes only
c) Mechanical processes only d) None of the above

369. Argentaffin may arise in
a) Pancreas b) Bile duct
c) Gastro-intestinal tract d) None of these

370. Prolonged deficiency of thiamine in human diet may lead to
a) Pellagra b) Beri-beri c) Anaemia d) Haemorrhage

371. Which action of digestive enzyme is/are correct regarding its site of action, substrate and the end product?

| | Enzyme | Site of Action | Substrate | End product |
|---|---|---|---|---|
| i | Rennin | Calf's stomach | Casein | Ca Paracaesinate |
| ii | Pepsin | Human's stomach | Proteins | Two or more molecule of amino acid |
| iii | Nuclease | Small intestine | Nucleosides | Nucleosides and - $iPO_4$ |
| iv | Entero-kinase | Small intestine | Trypsinogen | Trypsin |

a) All actions are correct b) Actions I, II and III are correct
c) Action I, II and IV are correct d) Only action III is correct

372. Continued consumption of a diet rich in butter, red meat and eggs for a long period may lead to
a) Vitamin-A toxicity b) Kidney stones
c) Hypercholesterolemia d) Urine laden with ketone bodies

373. Which one is a disorder of overnutrition?
a) Kidney and gall bladder stone
b) Scurvy and osteomalacia
c) Hypercholesterolemia and fluorosis
d) Vitamin-A toxicity and urine laden with ketone bodies

374. The epithelial cells lining the stomach of vertebrates is protected from damage by HCl because
a) Hydrochloric acid is too dilute
b) The epithelial cells are resistant to the action of HCl
c) HCl is neutralized by alkaline gastric juice
d) The epithelial cells are covered with a mucous secretion

375. In rabbit, the digestion of cellulose takes place in
a) Colon
b) Ileum
c) Caecum
d) Secretin

376. Read carefully the following statements regarding the absorption of nutrients. Find the incorrect statements and choose the correct option from the given below codes
I. Absorption of carbohydrates takes place in the stomach and jejunum part of intestine
II. The water soluble end products of food can reach the blood and lymph directly
III. Large intestine and buccal cavity do not functions as the site of absorption
IV. Large intestine is the site of absorption of about 90% of the total water present in the hydrolysed food
**Codes**
a) I, III and IV are incorrect
b) I, II and IV are incorrect
c) I and II are incorrect
d) III and IV are incorrect

377. Which of the following is correct chronological order for enzyme activity of some enzymes taking part in protein digestion?
a) Pepsin → Trypsin → Peptidase
b) Pepsin → Peptidase→ Trypsin
c) Trypsin → Pepsin→ Peptidase
d) Peptidase→ Trypsin→ Pepsin

378. Vitamin-C is present as
a) Oxalic acid
b) Glutamic acid
c) Ascorbic acid
d) Citric acid

379. Deficiency of which vitamin, causes loss of appetite, mental confusion, fatigue and muscle depreciation?
a) Vitamin-K
b) Vitamin-C
c) Thiamine
d) Riboflavin

380. Treatment with alloxan destroys
a) STH cells
b) Alpha cells of islets of Langerhans
c) Beta cells of islets of Langerhans
d) Cells of Leydig

381. Which one is not true about vitamins?
a) Vitamins are organic catalysts
b) Vitamins are indispensable for life
c) Vitamins act as a source of energy
d) Tocopherol is anti-sterility vitamin

382. Enzyme present in saliva is
a) Maltase
b) Ptyalin
c) Sucrase
d) Invertase

383. Which of the following is true for vitamin-C?
a) Also called as ascorbic acid
b) Also called as fumaric acid
c) Obtained from citrus fruits
d) Both (a) and (c)

384. The back flow of faecal matter in the large intestine is prevented by the presence of
a) Epiglottis
b) Sphincter of Oddi
c) Ileo-caecal valve
d) Pyloric sphincter

385. Elephant tusks are
a) Molars
b) Canines
c) Incisors
d) Premolars

386. Which of the following best describes the process of nutrition?
a) A process to obtain necessary energy and growth substances
b) A process to obtain energy from foods
c) A process to supply the necessary nutritive elements to body

d) A sum total of processes which provides the necessary nutritive element for growth, maintenance and to meet the need of energy

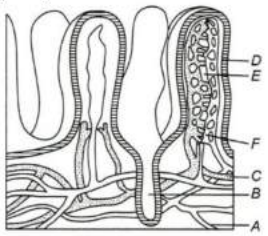
387. Name the process by which swallowed food is conveyed to pharynx and oesophagus respectively

a) Deglutition b) Peristalsis c) Ingestion d) Succus entricus

388. The vitamin, synthesized by bacteria is

a) B b) D c) K d) E

389. Label the given diagram of transverse section of mucosa of small intestine showing small finger like projections. Choose the correct option accordingly




a) A-Vein, B-Crypt, C-Artery, D-Villi, E-Lacteal, F-Capillaries

b) A-Artery, B-Crypt, C-Vein, D-Villi, E-Capillaries, F-Lacteal

c) A-Vein, B-Artery, C-Crypt, D-Villi, E-Capillaries, F-Lacteal

d) A-Villi, B-Lacteal, C-Capillaries, D-Artery, E-Crypt, F-Vein

390. Which of the following molecule can be digested by pancreatic juices?

a) Fat, protein and nucleic acids b) Carbohydrates and proteins

c) Carbohydrates and fats d) All of the above

# DIGESTION AND ABSORPTION

## : ANSWER KEY :

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) | a | 2) | b | 3) | a | 4) | c | 165) | c | 166) | c | 167) | d | 168) | c |
| 5) | d | 6) | a | 7) | b | 8) | d | 169) | a | 170) | d | 171) | d | 172) | a |
| 9) | d | 10) | d | 11) | b | 12) | c | 173) | a | 174) | c | 175) | a | 176) | b |
| 13) | b | 14) | a | 15) | b | 16) | a | 177) | b | 178) | a | 179) | d | 180) | a |
| 17) | d | 18) | b | 19) | d | 20) | c | 181) | b | 182) | b | 183) | a | 184) | c |
| 21) | a | 22) | a | 23) | b | 24) | c | 185) | b | 186) | c | 187) | b | 188) | d |
| 25) | c | 26) | a | 27) | d | 28) | b | 189) | c | 190) | c | 191) | a | 192) | c |
| 29) | b | 30) | b | 31) | a | 32) | a | 193) | a | 194) | c | 195) | b | 196) | d |
| 33) | c | 34) | a | 35) | b | 36) | a | 197) | d | 198) | b | 199) | d | 200) | d |
| 37) | a | 38) | b | 39) | c | 40) | b | 201) | d | 202) | b | 203) | b | 204) | a |
| 41) | c | 42) | a | 43) | a | 44) | d | 205) | b | 206) | c | 207) | a | 208) | b |
| 45) | a | 46) | d | 47) | a | 48) | d | 209) | d | 210) | c | 211) | d | 212) | b |
| 49) | a | 50) | a | 51) | c | 52) | a | 213) | b | 214) | a | 215) | a | 216) | a |
| 53) | a | 54) | c | 55) | c | 56) | d | 217) | a | 218) | b | 219) | a | 220) | d |
| 57) | b | 58) | c | 59) | d | 60) | b | 221) | c | 222) | c | 223) | a | 224) | c |
| 61) | d | 62) | b | 63) | d | 64) | a | 225) | b | 226) | a | 227) | a | 228) | c |
| 65) | d | 66) | c | 67) | a | 68) | d | 229) | a | 230) | c | 231) | a | 232) | a |
| 69) | c | 70) | c | 71) | a | 72) | c | 233) | b | 234) | a | 235) | a | 236) | c |
| 73) | d | 74) | d | 75) | c | 76) | a | 237) | c | 238) | b | 239) | c | 240) | a |
| 77) | b | 78) | c | 79) | c | 80) | d | 241) | c | 242) | c | 243) | a | 244) | c |
| 81) | a | 82) | c | 83) | c | 84) | d | 245) | b | 246) | d | 247) | d | 248) | c |
| 85) | d | 86) | c | 87) | b | 88) | c | 249) | b | 250) | d | 251) | a | 252) | c |
| 89) | d | 90) | b | 91) | c | 92) | a | 253) | c | 254) | a | 255) | c | 256) | d |
| 93) | c | 94) | a | 95) | b | 96) | c | 257) | a | 258) | d | 259) | b | 260) | c |
| 97) | a | 98) | a | 99) | a | 100) | d | 261) | b | 262) | b | 263) | a | 264) | b |
| 101) | b | 102) | b | 103) | c | 104) | d | 265) | d | 266) | d | 267) | a | 268) | d |
| 105) | b | 106) | c | 107) | a | 108) | d | 269) | b | 270) | a | 271) | a | 272) | c |
| 109) | a | 110) | d | 111) | a | 112) | c | 273) | b | 274) | c | 275) | c | 276) | a |
| 113) | b | 114) | a | 115) | d | 116) | c | 277) | a | 278) | b | 279) | c | 280) | b |
| 117) | d | 118) | a | 119) | a | 120) | b | 281) | a | 282) | a | 283) | d | 284) | a |
| 121) | b | 122) | c | 123) | c | 124) | a | 285) | c | 286) | b | 287) | b | 288) | b |
| 125) | c | 126) | d | 127) | a | 128) | c | 289) | b | 290) | d | 291) | a | 292) | c |
| 129) | c | 130) | a | 131) | d | 132) | d | 293) | c | 294) | d | 295) | d | 296) | a |
| 133) | a | 134) | d | 135) | b | 136) | b | 297) | a | 298) | a | 299) | a | 300) | c |
| 137) | a | 138) | d | 139) | b | 140) | c | 301) | a | 302) | b | 303) | c | 304) | a |
| 141) | d | 142) | c | 143) | c | 144) | d | 305) | d | 306) | d | 307) | d | 308) | c |
| 145) | a | 146) | a | 147) | c | 148) | b | 309) | b | 310) | c | 311) | b | 312) | c |
| 149) | b | 150) | b | 151) | c | 152) | d | 313) | d | 314) | d | 315) | a | 316) | d |
| 153) | b | 154) | d | 155) | d | 156) | c | 317) | a | 318) | c | 319) | d | 320) | a |
| 157) | c | 158) | b | 159) | a | 160) | a | 321) | a | 322) | c | 323) | a | 324) | a |
| 161) | c | 162) | b | 163) | d | 164) | b | 325) | a | 326) | a | 327) | d | 328) | b |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 329) a | 330) a | 331) a | 332) c | 365) c | 366) b | 367) a | 368) a |
| 333) c | 334) a | 335) d | 336) b | 369) c | 370) b | 371) c | 372) c |
| 337) b | 338) a | 339) a | 340) b | 373) c | 374) d | 375) c | 376) d |
| 341) a | 342) a | 343) a | 344) a | 377) d | 378) c | 379) c | 380) c |
| 345) a | 346) c | 347) b | 348) c | 381) c | 382) b | 383) d | 384) d |
| 349) a | 350) a | 351) c | 352) a | 385) c | 386) d | 387) d | 388) c |
| 353) c | 354) b | 355) b | 356) c | 389) a | 390) d | | |
| 357) d | 358) c | 359) b | 360) a | | | | |
| 361) b | 362) a | 363) c | 364) b | | | | |

# DIGESTION AND ABSORPTION

## : HINTS AND SOLUTIONS :

1 **(a)**
Vitamin-$B_{12}$ (cyanocobalamin) is only vitamin not found in vegetable. It is present in animal protein such as meat, liver, fish, etc. Recently, it has been considered that the alge *Spirulina* (single cell protein or SCP) also contains this vitamin.

2 **(b)**
Cholecystokinin, a hormone secreted from intestine causes contraction of gall bladder to release bile into duodenum.

3 **(a)**
In infants, defecation is not under voluntary control and it takes place by reflex actions, *i.e.,* process of defecation occur by the reflex action without the voluntary control of external anal sphincter. Both involuntary and voluntary muscles are directed by brain

4 **(c)**
Vitamin-E or tocopherol is obtained from green leafy vegetables, seed oils, milk, cheese, butter, egg, etc. It is an antisterility factor and is antioxidative for membrane lipids, skin (reduces keratinization) and hair, reduces atherosclerosis and inhibits oxidation of vitamin-A and unsaturated fatty acids. Its deficiency causes erythrocyte break down (anaemia) muscular dystrophy (cramps), miscarriage and reduced fertility.

5 **(d)**
Brunner's glands are simple, branched tubular glands presents in the submucosal layer of duodenum. Brunner's glands open in crypts of Leiberkuhn. The goblet cells of Brunner's glands secrete mucus, which helps in lubricating the food and separate the solid particles of food.

6 **(a)**
The correct chronological order of food processing in human beings is
Ingestion (Taking food) → Digestion → Absorption → Egestion (Undigested) → Assimilation

7 **(b)**
Vitamin-$B_2$ is riboflavin.

8 **(d)**
**Glycogen** is the reserve food in animals that's why, it is also called animal starch.

9 **(d)**
In **small intestine**, the wall of duodenum contains crypts of Leiberkuhn (intestinal glands) and Brunner's glands (duodenal glands). The intestinal juice or **succus entericus** is secreted by **crypts of Leiberkuhn**.
Pancreatic juice contains trypsin, for digesting protein and pancreatic amylase (amylopsin) for breakdown of starch and pancreatic lipase (steapsin) acting upon emulsified fats.

10 **(d)**
Vitamin-B complex and vitamin-C are water soluble, while vitamin-A, D, E and K are fat soluble. Vitamin –C (ascorbic acid) has antioxidant property. The rich source of vitamin-C are citrus fruits.

11 **(b)**
**Oxyntic** or **parietal cells** are located upon the surface of the gastric glands and secrete hydrochloric acid.

12 **(c)**
Human tooth consists of enamel, dentine, cement, periodontal ligament and pulp cavity. Pulp cavity is enclosed by dentine. Narrow extension of the pulp cavity, which runs through the root of the tooth is known as root canals

13 **(b)**
Liver, the largest digestive gland of the body performs various function. The synthesis of glucose or glycogen from non-carbohydrate sources such as amino acids, glycerol, etc, is called gluconeogenesis. The process takes place when glycogen supply in the liver is exhausted. Gluconeogenesis involves the conversion of excess of glucose into glycogen by liver with the

help insulin hormone. Glycogenolysis involves the conversion of glycogen into glucose

14 **(a)**
Due to the deposition of bile pigments, the eyes of patients turns down to be yellow during jaundice

15 **(b)**
The disease xerophthalmia is caused due to deficiency of fat soluble vitamin-A (retinol). Calciferol or vitamin-D is also fat soluble but its deficiency disease are rickets, osteomalacia and dental caries. Pellagra is caused due to niacin (vitamin-$B_3$) deficiency.

16 **(a)**
Duodenum of small intestine possesses Brunner's gland, which secretes large amount of mucous and bicarbonates, which in turn, proteins, the duodenal mucosa and neutralises the acidic chyme. It also secretes two hormones, secretin and cholecystokinin. However, secretin is secreted by duodenal wall and cholecystokinin is secreted by the epithelium of small intestine

17 **(d)**
Cyanocobalamin or vitamin-$B_{12}$ is obtained from milk, egg, liver, fish and also synthesized by some colon bacteria. The deficiency (hypovitaminosis) of vitamin-$B_{12}$ or cyanocobalamine causes pernicious anaemia, demyelination of never fibres and glossitis (inflammation of tongue).

18 **(b)**
In human being, digestion process starts from the mouth, continues in stomach and is completed in small intestine of the gut. About 25-30% of carbohydrates (polysaccaridess) are digested or converted into disaccharides (maltose) in the buccal cavity. Rest of the digestion of carbohydrates is completed in small intestine of human alimentary canal

19 **(d)**
Vitamins are necessary for normal cell functioning. These can be grouped into two categories water soluble (vitamin-B complex and and-C) and fat soluble (vitamin-A, D, E and K)

20 **(c)**
*E. coli* lives in the colon part of large intestine of humans. The cells of *E. coli* produce bacteriocin proteins. This bacteria is symbiont of human intestine and produce vitamins which are absorbed by the wall of colon

21 **(a)**
During starvation, *i. e.*, when food requirement of body is not fulfilled by ingested food, reserve carbohydrates is used up first by the boy and after carbohydrates, fat is used as energy source and at last when both carbohydrates and fats are completely consumed, proteins are used as energy sources. Proteins are used as last because proteins are main structural component of body.

22 **(a)**
The 'islets of Langerhans' are the clusters of cells of the endocrine portion of pancreas. These contain four types of cells (i) Alpha cells (32-38%) secreting glucagon (ii) Beta cells (60-70%) secreting insulin, (iii) Delta cells secreting somatostatin and (iv) F-cells secreting pancreatic polypeptide hormone to control somatostatin.

23 **(b)**
A tooth consists of three region, *i.e.,* crown, neck and root. The exposed part, crown is surrounded by the hardest material of the body. This hardest material is enamel which is the secretion of cells of ameloblast

24 **(c)**
Liver is the largest exocrine gland. Each liver lobe is formed of hexagonal lobules surrounded by a comective tissue sheath called Glisson's capsule. Kupffer's cells of liver act as phagocytes.

25 **(c)**
peristalsis is always towards anus. This is called 'Law of gut' The peristalsis is minimum in oesophagus and maximum in duodenum (12 per min). There is no peristalsis in rectum.

26 **(a)**
Digestive enzymes are hydrolases.

27 **(d)**
Scurvy disease is caused due to deficiency of **vitamin-C.** The disease is characterized by spongy and bleeding gums, loose and falling teeth, fragility of blood vessels, bones and nervous breakdown.

28 **(b)**
Brunner's glands secrete large amount of mucus and bicarbonates to protect duodenal mucosa and to neutralize the acidic chyme. It also secretes two hormones :
(i) Secretin (ii) Cholecystokinin (CCK)

29 **(b)**

Lacteals are found in villi. These are many intestinal lymph vessels that absorb fat from digested food.

30 **(b)**
Pepsin remains active below pH 5 and became inactive at pH 5. Proteins are hydrolysed by pepsin. The optimum pH of pepsin is about 2, so it is more active in acidic medium of gastric juices. However, it remains inactivated in the basic medium, *i.e.,* above pH-7

31 **(a)**
Lacteals absorbs fatty acids and glycerol in the small intestine of human. Fatty acids and glycerol are insoluble in water so, they cannot be absorbed in blood stream directly. They are first broken down into small, water soluble droplets with the action of bile salts called micelles. The later are absorbed by the intestinal cells where these are resynthesised in the endoplasmic reticulum and are transferred in form of smaller fat droplets – chylomicrons through lacteals. Due to the dilation of intestinal lacteals lymph gets, lost into the lumen of small intestinal, which results into lymphopenia, hypoproteinemia, etc.

32 **(a)**
Cyanocobalamine or simply cobalamine (vitamin-$B_{12}$) deficiency causes pernicious anaemia. Vitamin-$B_{12}$ is required for RBCs maturation. DNA synthesis, myelin formation, etc. It acts as a co-enzyme. Its sources are fish liver, egg and milk white. It can be best obtained from *Spirulina* alga (SCP) and mutton. It is the only vitamin, which is not found in vegetables

33 **(c)**
Fats can be classified as saturated and unsaturated fats. Plant lipids contains unsaturated fatty acids, while animal lipids have saturated fatty acids. Excess intake of both saturated and unsaturated fats is responsible for increasing blood cholesterol level. So, excess of fats particularly, saturated fats should not be taken by old person and patients of heart disease and high blood pressure

34 **(a)**
Flavin adenine dinucleotide (FAD) is a coenzyme derived from riboflavin or vitamin-$B_2$

35 **(b)**
When food in the form of bolus reaches into the stomach by involuntary movement of muscular coat from oesophagus, it mixes thoroughly with the gastric juices present in the stomach. This thoroughly mixed food is called chyme

36 **(a)**
Pancreas is a yellowish, leaf like mixed gland which is located posterior to the stomach in abdominal cavity. It is composed of two parts namely, an exocrine part and an endocrine part. The exocrine part secretes a slightly alkaline juice, which is known as pancreatic juice. This pancreatic juice contains trypsinogen, chymotripsinogen, and carboxypeptidase (proenzyme) and sodium bicarbonate. Pancreatic lipase, pancreatic-amylase, DNase and RNase are also present in little amount in gastric juices

37 **(a)**
The graph indicates that cholesterol is an essential dietary requirement of Khapra beetle because weigh of insect larva increases with the increase in amount of cholesterol and weight becomes static at 6 µg cholesterol/g basal diet. If the growth rate would have been directly proportional to the cholesterol concentration then the graph would have been straight line.

38 **(b)**
Throat (pharynx) can be divided into three parts, *i.e.,* nasopharynx, oropharynx and laryngopharynx. The later part loads into the oesophagus behind and into the larynx (middle portion), which is a common passage for both food and air

39 **(c)**
Horse.
Elephant, snakes and crocodile exhibits polyphyodont dentition

40 **(b)**
About 90% of the total water is absorbed in the small intestine, while balance 10% are absorbed in the stomach and large intestine. Large intestine also absorbs some minerals, drugs and products of bacterial digestion like amino acids and vitamins B-complex and vitamin-K. It secretes mucous which, lubricate faeces and facilitate its flow into the rectum, where it is stored temporarily.
Electrolytes and amino acids are absorbed in the duodenum and jejunum

41 **(c)**
Physiological jaundice is the mild form of jaundice, which occurs due to the elevation of unconjugated bilirubin concentration during the

first week of newborn children. It disappear as the liver matures. Neonatal jaundice is the severe form of jaundice

42 **(a)**
Colon part of the large intestine contains some bacteria. Some of them are symbiotic in nature. These bacteria feeds on undigested matter. This bacteria (*E. coli*) in turn produce vitamin-$B_{12}$, vitamin-K along with vitamin-$B_1$ and $B_2$

43 **(a)**
Vitamin-$B_1$ (thiamine) is found in whole wheat bread. Its deficiency causes beri-beri.

44 **(d)**
The upper surface of tongue has small projections called papillae. These papillae can be divided into four types: circumvallale or vallale papillae, fungiform papialle, filiform papillae and foleate papillae. Out of four, filiform papillae lacks taste buds, while rest all three have taste buds. Opening of stomach into duodenum is guarded by pyloric sphincter, while oddi sphincter guards the opening of hepatic ampulla into duodenum

45 **(a)**
One half of each jaw has four different types of teeth (i) two incisors (ii) one canine (iii) two premolars (iv) three molars. Last (*i. e.*, third) molars are called wisdom teeth thus, these are totally four in number.

46 **(d)**
**Pancreas** is single endodermal flat leaf-like yellowish, heterocrine gland present between ascending and descending limb of duodenum. **Serosa** is the outermost covering of human intestine. It is followed by submucosa and mucosa.

47 **(a)**
Saliva - the secretion of salivary glands in human constitutes a mixture of water and salts or electrolytes. It's medium is slightly acidic with the pH 6.8. Saliva also contains antibacterial agent, lysozyme

48 **(d)**
Sulcus terminals (an inverted V shape furrow) divides the upper surface of furrow into buccal part and pharyngeal part. This upper surface of tongue has several small projections. These projection are termed as papillae

49 **(a)**
**Nucleotidase** enzyme is secreted by **intestinal juice** or **succus entericus**. It hydrolyses nucleotides into nucleosides and phosphate.

50 **(a)**
Digestion of nucleic acids takes place in the small intestine. The enzyme present in pancreatic and intestinal juices acts on nucleic acids as follows

$$\text{RNA} \xrightarrow[\text{Pancreatic juice}]{\text{RNase}} \text{Ribonucleotides}$$

$$\text{Ribonucleotides (Nucleotides)} \xrightarrow{\text{Nucleotidases}} \text{Nucleosides} + IPO_4$$

$$\text{Nucleosides} \xrightarrow{\text{Nucleosidases}} \text{Nitrogenous base} + \text{Pentose sugar}$$

51 **(c)**
Fats are broken down by lipases with the help of bile into di- and monoglycerides.

$$\text{Fats} \xrightarrow[\text{Bile}]{\text{Lipases}} \text{Diglycerides} \rightarrow \text{Monoglycerides}$$

52 **(a)**
The rights and left hepatic duct join to form the common hepatic duct which joins the cystic duct arises from gall bladder. The cystic duct and common hepatic duct join to form bile duct which after joining the main pancreatic duct forms hepatopancreatic ampulla. The ampulla opens into duodenum. The opening is guarded by sphincter of Oddi?

53 **(a)**
Stomach is located in the upper left part of the abdominal cavity. It has three parts, a **cardiac portion**; a **fundic portion** and a **pyloric portion**, which opens into the proximal part of small intestine

54 **(c)**
The opening of the common bile duct is guarded by sphincter of Oddi.

55 **(c)**
Small intestine of alimentary canal consists of region/part namely duodenum, colon, rectum. Duodenum (proximal part) is some what C-shaped. The middle jejunum is coiled part and the distal or lower part, ileum is highly coiled. The later part opens into the first part of, large intestine (caecum)

56 **(d)**
Pellagra is caused due to deficiency of vitamin-$B_3$ (niacin or nicotinic acid). Deficiency of vitamin – $B_{12}$ (cyanocobalamin) causes pernicious anaemia. Deficiency of vitamin-$B_6$ (pyridoxine) causes loss

of appetite. Deficiency of Vitamin-$B_2$(thiamine) causes beri-beri.

57 **(b)**
**Incisors** are located anteriorly. Incisors are chisel-shaped and possess sharp cutting end and, therefore, specialized for cutting.

58 **(c)**
Pepsin is a proteolytic enzyme, secreted by chief cells or peptic cells of gastric glands in the form of pepsinogen. It acts in highly acidic medium (pH = 2).

59 **(d)**
Glisson's capsule is formed by a layer of connective tissue surrounding the liver and ensheathing hepatic artery portal vein and bile ducts within the liver. It was so named after the biologist **Francis Glisson** (1597-1677)

60 **(b)**
The correct sequence of food processing, in human being is
Mouth → Buccal cavity → Pharynx → Oesophagus → Stomach → Duodenum → Ileum → Caecum → Rectum → Elimination

61 **(d)**
**Anaemia** refers to any condition in which there is an abnormally low haemoglobin concentration and/or blood cell count. The most common cause is deficiency of iron, which is an essential element of haemoglobin molecule. Thus, the iron compounds in the diet will help to alleviate the symptoms of anaemia.

62 **(b)**
The dentition in human being is diphyodont, heterodont and thecodont. Permanent teeth of mammals are arranged systematically in each jaw. Dental formula provides half of the total number of teeth. Therefore, dental formula is the arrangement of teeth in each half of the upper and lower jaw in the order of incisors, canines, premolars and molars

63 **(d)**
Balance diet possesses the major component it of the food in requisite proportion, which is required for the maintenance of health, activity, growth and development. Therefore, it must contain carbohydrates (60-70%), fats (15-25%), proteins (10-15%), vitamins, minerals electrolytes, etc.

64 **(a)**
Vitamin-$B_{12}$ or cyanocobalamin is a dark red-cooloured cobalt based vitamin having porphyrin ring in its structure.

65 **(d)**
Carbohydrates, fats and proteins will remain undigested on removal of pancreas.

66 **(c)**
Dicumarol is a natural anticoagulant. Its anticoagulant property was discovered, when cattles who consumed improperly cured 'sweet clover hay' was suffered by 'sweet clover diseases' In this disease, cattle suffer by vitamin-K deficiency, which resulted into prolonged bleeding or even fatal haemorrhage.

67 **(a)**
The intestinal juice or succus entericus is secreted by crypts of Leiberkuhn.

68 **(d)**
Saliva contains a starch splitting enzyme ptyalin (α amylase). HCl of gastric juice inactivated the ptyalin in stomach.

69 **(c)**
Vitamin-K (phylloquinone) deficiency causes bleeding disease or haemorrhage, *i.e.,* inability in blood clotting. Vitamin-C (ascorbic acid) deficiency causes scurvy. Scurvy is characterised by spongy and bleeding gums, loose and falling teeth, fragility of blood vessels, bones and nervous breakdown

70 **(c)**
In majority of the mammal including human being, the number of teeth is fixed and are produced in two sets, *i.e.*, milk or deciduous teeth and permanent teeth. Milk teeth in human includes 8 incisors, 4 canines and 8 molars. Dental formula of a child below 7 years of age is $\frac{212}{212} \times 2 = 20$

71 **(a)**
**Crypts of Leiberkuhn** or intestinal glands are present in the duodenum and ileum (parts of small intestine) only. These are formed by the folding of lamina propria and secrete succus entericus, *i. e.*, intestinal juice.

72 **(c)**
Bile is secreted by hepatic cells. It passes through hepatic ducts and then stored and concentrated in a thin muscular sac. Gall bladder the pH of hepatic bile is 8.6, while the pH of gall bladder is 7.6 or 7.5

The salts present in bile juice are responsible for emulsification of fats in small intestine. These salts are mainly, salts of taurocholic acid and glycocholic acid. Horse and rats donot have gall bladder

73 **(d)**

When common hepatic duct (left and right hepatic ducts) joins the cystic duct of gall bladder, the formation of bile duct or common bile duct takes place. This bile duct downward posteriorly joins the main pancreatic duct to form the hepatopancreatic duct.

Pancreas is a mixed gland. Its exocrine part secretes pancreatic juices, while insulin and glucagon are secreted by the endocrine parts

74 **(d)**

The pancreatic juice contains starch digesting enzyme, called pancreatic **$\alpha$ -amylase**, which converts starch into maltose, isomaltose and $\alpha$ -dextrins. Digestion of starch completed in duodenum with the help of intestinal juice.

75 **(c)**

Carbohydrates and proteins used as diet are stored within the body in the form of fat (lipid). Oxidation of lipids, produce fatty acids and glycerol. **Linoleic acid** is a fatty acid, which is not synthesized by the human body and we take it from the food directly.

76 **(a)**

Caecum is a small, pouch-like structure, which ends into a tubular structure called vermiform appendix. In rabbit, caecum is concerned with digestion of cellulose and conduction of food.

77 **(b)**

Proenzymes (inactive form of enzyme) or zymogens are secreted by chief cells or zymogenic cells of gastric glands. These proenzymes are secreted by peptic cells and are activated by HCl secreted by oxyntic or parietal cells of gastric glands

78 **(c)**

Poison glands of snake are modified salivary glands.

79 **(c)**

In the intestine, enterokinase converts inactive protein into active protein. Albumin is a protein, hence, in the absence of enterokinase, the digestion of albumin would be affected in our intestine.

80 **(d)**

Vitamin-$B_1$, thiamine is responsible for normal working of human being. The best source of vitamin-$B_1$ is whole wheat bread and its derivative.

Besides these source, it can also be obtained from yeast, peanuts beans and lean meat. A prolonged deficiency of vitamin-$B_1$ in diet may leads to paralytic disease beri-beri

81 **(a)**

Small finger-like projections responsible for the increase of surface area for absorption of food are prominent in small intestine of human gut. These small projections are better known as villi, which are supplied with a network of blood capillaries and a large lymph vessel called the lacteal

82 **(c)**

| Deficiency Disease | Vitamin |
|---|---|
| Bleeding | K |
| Scurvy | C |
| Xerophthalmia | A |
| Osteomalacia | D |

83 **(c)**

**Omnivores** have maximum variety of enzymes because they can feed like both herbivores and carnivores.

84 **(d)**

The stomach is anatomically distinguished into three parts --- (i) fundus, (ii) body (iii) pyloric part or antrum.

The antrum leads into the intestine through a pyloric orifice (*i. e.*, pylorus). Thus, pylorus is present between stomach and duodenum (part of the small intestine connecting the stomach to the ileum).

85 **(d)**

I – Enterokinin, II – Somatostatin, III – Duocrinin

86 **(c)**

Rabbit or *Oryctolagus cuniculus* best represents the class-Mammalia. Dentition in majority of the mammals is heterodont (*i.e.,* dissimilar teeth). In humans, canine is pointed in each maxillary of upper jaw and each dentary of lower jaw, while in rabbit and other herbivores canines are absent. Hence, some part of the gums between the teeth remains teethless, *i.e.*, gap is found between incisors and PM. Dental formula of rabbit is

$$I\frac{2}{1}C\frac{0}{0}PM\frac{3}{2}M\frac{3}{3}\times 2 = 28$$

87 **(b)**

Acetylcholinesterase enzyme splits acetylcholine into acetic acid and choline.

88 **(c)**
Bile is secreted from liver and contains bile pigments and bile salts (sodium taurocholate and sodium glycocholate). Emulsification of fat will not take place in absence of bile salts.

89 **(d)**
Starfish and *Sepia* eat their preys. Leech is sanguivorous, which feeds on blood.

90 **(b)**
In the wall of small intestine, lymphatic tissues are present called Peyer's patches. These are groups of lymph nodules that are most numerous in the ileum. They produce lymphocytes.
Rugae are prominant folds found in empty stomach. Maceus membrane of small intestine is grown into many finger-like projections known as villi.

91 **(c)**
The wall of alimentary canal is made up of four basic layers. First of all, there is serosa, which is a thin membranous covering around oesophagus. Then, there is muscle layer-outer layer of longitudinal muscles and inner layer of circular muscles. Last, there is submucosa, which contains a few oesophageal glands. Then comes mucosa, which has several layers of flattened cells.

92 **(a)**
Diastema is the gap in the teeth along the jawbone. In herbivores, the diastema separates the incisors from the premolars resulting in an elongation of the jaw and aiding in feeding.

93 **(c)**
Digestion of carbohydrates starts from the mouth. In mouth (buccal cavity), 30% of starch is converted into maltose (disaccharide). Diet of food containing carbohydrates, is required by the body as carbohydrate is the source of instant energy

94 **(a)**
Enzyme enterokinase converts trypsinogen into trypsin.

95 **(b)**
Fe, I, Mn, Cu, Zn and fluorine are required in minimum amount by human.

96 **(c)**
Vestigial organs are present in reduced form and are of no use to the animal, in which they are present. Man has 180 vestigial organs, *e. g.*, nictitating membrane, vermiform appendix, wisdom tooth, muscle of pinna and forehead, mammary glands in male, etc.

97 **(a)**
Fluid secreted by salivary gland is known as saliva. Saliva is chemically a mixture of water, electrolyte (salts) of sodium potassium chloride and bicarbonates, salivary amylase (ptylin) and lysozyme. Lysozyme acts as an antibacterial agent

98 **(a)**
**Canines** are dagger-shaped or shovel-shaped and lie behind the incisors. These are used for cutting and tearing.
**Incisors** are sharp, pointed, chisel-shaped and used for cutting. Premolars and molars are specialized for erushing and grinding the food.

99 **(a)**
The secretion of intestinal gland is called **intestinal juice** or **success entericus.**

100 **(d)**
During prolonged hunger strike or starvation of food the reserve food (carbohydrates) is used up first by the body. Fats are used as second source of energy after carbohydrates. At last, when both carbohydrates and fats are used completely, proteins are used as a source of energy. Proteins are used at last because they are the main structural components of body

101 **(b)**
Food is absorbed in its simple forms. The simpler forms are formed by the hydrolysis of food in different parts of alimentary canal. Most of the carbohydrates are absorbed as monosaccharides. Monosaccharides like, glucose and galactose (end product of milk sugar) are absorbed in the duodenum and jejunum by active process. The two monosaccharides with glucose are absorbed most rapidly, *i.e.*, galactose is absorbed first with glucose

102 **(b)**
Succus entricus or intestinal juices are the secretion of intestinal glands. Brunner's glands in the intestine opens into crypts of lieberkuhn, which secretes enzymes and mucous. Basically, succus entricus is considered as the secretion of crypt of Lieberkuhn

103 **(c)**
There are three pair of salivary gland in human being sublingual, submandibular and parotid. The parotid glands are the largest and are located near the ears. Submandibular or submaxillary

gland are medium sized, while sublingual glands are the smallest, which is situated beneath the tongue. Zymogens or proenzyme are secreted by the secretion of zymogenetic cells or peptic cells or chief cells

104 **(d)**

| Column I | Column II |
|---|---|
| Goblet cells | Mucus |
| Lysozyme | Antibacterial agent |
| Saliva | Sublingual gland |
| Oxyntic cells | Hydrochloric acid |

105 **(b)**

The hump of camel has stored fats. Camel can live 4 to 5 days without food and water. The energy is provided by the fat stored in the hump. Camel is thus called ship of desert.

106 **(c)**

pH value of saliva is 6.8. Hence, it is slightly acidic in medium. It is composed of water and salts of sodium, potassium, chlorides and bicarbonates. Saliva also contains an antibacterial agent, lysozyme

107 **(a)**

Bile is secreted by liver. It is a complex watery fluid containing bile salts (Na glycocholate and Na-taurocholate) bile pigments (bilirubin and bilivirdin), cholesterol, mucin, lecithin and fats. It acts on the fats and emulsify them into simple forms; mono or diglycerides by the action of lipase

108 **(d)**

**Atrial Natriuretic Factor** (ANF) is secreted by walls of cardiac atrium. It inhibits rennin secretion and affects juxtaglomerular apparatus.

109 **(a)**

**Pellagra** is a vitamin deficiency disease most commonly caused by a chronic lack of niacin (vitamin-$B_3$) in the diet. It may also result from alternations in protein metabolism in disorders such as carcinoid syndrome. A deficiency of the amino acid lysin can lead to a deficiency of niacin as well.

110 **(d)**

Deficiency of calciferol or vitamin-D causes rickets in children and osteomalacia in adults. This causes weak soft bones, skeletal distortions and poor muscle development.

111 **(a)**

Dental formula provides half of total number of teeth in a jaw bone

Dental formula of human is $1\frac{2}{2}C\frac{1}{1}PM\frac{2}{2}M\frac{3}{3}$

112 **(c)**

Milk is regarded as one of the main component of balanced diet. It contains, water, protein casein, calcium and a little amount of lipid. Lactose in tolerance is the inability of certain individuals to digest lactose the sugar found in milk, due to the deficiency of the enzyme lactose in the intestine

113 **(b)**

The secretion of pancreatic juice is stimulated by both **secretin** and **cholecystokinin** (CCK).

114 **(a)**

Dentition in human is diphyodont, heterodont and teeth are arranged in socket of jaw bone, *i.e.*, thecodont. Diphyodont means that teeth appears in two set during their life. A set of milky or temporary or deciduous teeth, which are replaced by permanent teeth between 6-12 of age. These milky teeth in human child includes 8 incisors, 4 canines and 8 molars (PM are absent). So, the dental formula of a child between the age of 4-6 years is $I\frac{2}{2}\ C\frac{1}{1}\ PM\frac{0}{0}\ M\frac{2}{2} \times 2 = 20$

115 **(d)**

The liver secretes bile, which stored in gall bladder. Bile contains some bile salts like sodium carbonate, sodium glycocholate, sodium taurocholate, which helps in the digestion of fats in the small intestine by bringing about emulsification of fat (*i. e.*, conversion of large fat droplets into small ones).

116 **(c)**

Jaundice, diarrhea and constipation are digestive system disorders, while emphysema is a respiratory disorder. It is an inflation or abnormal distension of the bronchioles of the lungs. Its major causes are smoking or inhalation of toxic substances

117 **(d)**

Bile is secreted by liver and stored in gall bladder. Bile is a watery fluid, having bile salts, bile pigments and sodium bicarbonate, cholesterol, mucin, lecithin fats, etc. It is mixed with the food in intestine along with the pancreatic and intestinal juices

118 **(a)**

Vitamin-C, E and β -carotene (provitamin-A) are called antioxidant vitamins, as their inactive

oxygen free radicals are highly reactive particles that carry an unpaired electron.

119 **(a)**
Maximum percentage of lipoprotein is found in chylomicron. Lipoproteins transport lipids in the blood, carry triglycerides and cholesterol to tissues and remove excess cholesterol from the blood.

120 **(b)**
Sucrose is hydrolysed into one molecule of glucose and one molecule of fructose by sucrase or invertase enzyme

$$\text{Sucrose} \xrightarrow{\text{Sucrase}} \text{Glucose} + \text{Fructose}$$

121 **(b)**
Celiac disease is a digestive disorder that damages the small intestine and interferes with absorption of nutrients from food

122 **(c)**
Oxyntic cells are present in pits within the wall of vertebrate stomach. Their function is to secrete hydrochloric acid, giving the gastric fluid a pH of about 2.0 HCl converts proenzyme prorennin and pepsinogen into active rennin and pepsin respectively.

123 **(c)**
Gastro-oesophageal sphincter is also called as cardiac sphincter as it is present at the cardiac part of stomach, which in turn lies near the heart. Actually, cardiac sphincter is not a true valve but functions as sphincter

124 **(a)**
Twenty types of amino acids are found in proteins. These amino acids are synthesised by almost all the plants. While animals are not able to synthesise all amino acids. However, several amino acids (about 10) are synthesised by the animals through transformation or transamination. Those amino acid, which are essential component of our diet but are not synthesised inside the body, can be called as essential amino acids. These are taken in diet. Those amino acids which are synthesised by the body are termed as non-essential amino acids. Deficiency of isoleucine causes deregulation of blood sugar

125 **(c)**
Vitamin-K is also called anti-haemorrhagic vitamin or coagulation factor. It is necessary for the formation of prothrombin in the liver of human beings which is essential for blood coagulation. Vitamin-K also affects the formation of other blood clotting proteins.

126 **(d)**
Absorption of amino acids occur by the active and facilitated transport. But major absorption takes place by the active transport. Absorption of amino acids occur mainly in duodenum and jejunum and parts of the small intestine. Here, about 97 – 98% of amino acids are absorbed

127 **(a)**
Erepsin, trypsin and pepsin are proteolytic enzymes.

$$\text{Polypeptides} + \text{Oligopeptides} \xrightarrow[\text{Amino peptidase}]{\text{Erepsin}} \text{Amino acids}$$

$$\text{Trypsinogen} \xrightarrow[\text{Autocatalysis}]{\text{Trypsin}} \text{Trypsin}$$

$$\text{Proteins} + \text{Peptones} \xrightarrow{\text{Pepsin}} \text{Polypeptides} + \text{Oligopeptides}$$

128 **(c)**
Some of the important deficiency disease/disorder are night blindness, xeropthalamia, anaemia, goitre and PEM. The later protein energy malnutrition disorder are the most common in young children below 8 years. It is of two types, kwashiorkor and marasmus. Kwashiorkor is observed in children of age group between 1-8 years and is caused by the deficiency of both carbohydrates and proteins, while marasmus is commonly seen in the children of age below two years and is caused by deficiency of proteins only

129 **(c)**
Fat soluble vitamins are absorbed *via* simple diffusion. Amino acids are absorbed by active transport and few are absorbed by facilitated transport. Glucose and galactose are absorbed by the active transport and fructose is absorbed by facilitated transport

130 **(a)**
In the intestine at the bases of villi, the epithelium dips into lamina propria and form simple tubular glands or crypts of Leiberkuhn that secrete intestinal juice.

131 **(d)**
Carnassial teeth are found in carnivorous mammals. These are cutting teeth. Carnassial teeth are the last premolar in upper jaw and first molar in lower jaw in carnivorous animals. These have flattened cups with sharp cutting edges.

132 **(d)**
The hardest part in the animal body is enamel found on the upper layer of teeth.

133 **(a)**
Majority of the carbohydrates are absorbed as monosaccharides in the stomach and middle part of the small intestine (jejunum). Glucose and amino acids are absorbed by active transport. Glucose is absorbed in the stomach and jejunum, while around 95 – 98% amino acids are absorbed in the duodenum and jejunum

134 **(d)**
In ruminants (*e. g.*, cow, goat and camal) the stomach is four chambered as follows:
(a) Rumen ( cellulose is digested)

(b) Reticulum (cellulose is digested)

(c) Omasum (absorb water)

(d) Abomasum ( true stomach)

Gastric gland are found only in abomasum for the secretion of gastric juice. Abomasum is responsible for protein digestion, from their the food passes to small intestine for further digestion.

135 **(b)**
Enamel is the hardest part of human body. It covers the dentine in the crown. There are two types of cells, which are dentine forming **odontoblasts** and **enamel forming ameloblasts.**

136 **(b)**
Iodine is essential for the life of animals. It is required for the formation of thyroxine hormone, which controls **basal metabolic rate** (BMR). This hormone stimulates protein synthesis and therefore, promote growth of body tissues.

137 **(a)**
Bile is synthesized in liver and stored in gall bladder. Bile helps in emulsification of fats. Bile is release in duodenum. So, amount of bile is released in proportional to the amount of fat in meal.

138 **(d)**
Cholecystokinin- pancreozymine hormone is secreted by the epithelium of entire small intestine. It stimulates the gall bladder to release bile and pancreas to secrete and release digestive enzymes in the pancreatic juice.

139 **(b)**
Nutrients are the chemical constituents of food, which are the primary requirement of life. These can be grouped into two types: macronutrient which include carbohydrate, fats and proteins and micronutrient or trace nutrient, which are required in small amount by the body

140 **(c)**
Beri-beri is a disease caused due to deficiency of vitamin-$B_1$. Its symptoms include anorexia, retarded growth, degeneration of bones and muscles, fatigue and even paralysis and cardiovascular disease. Vitamin-$B_1$ and the disease beri-beri were discovered by **Eijkman** in 1897.

141 **(d)**
Yeast is the source of vitamin-$B_1$, not vitamin –A.

142 **(c)**
**Digestion** is the process, in which non-diffusible food is converted into diffusible food with the helps of digestive enzymes. Digestion is mainly carried out by the process of hydrolysis using water molecules for the cleavage. So, digestive enzymes are hydrolases.

143 **(c)**
The major site of protein break down into absorbable form, *i.e.,* amino acids takes place in the small intestine. The process of conversion of the end products of food is carried out with the help of bile and intestinal juices

144 **(d)**
Digestion of protein starts in stomach and completed in small intestine. Duodenum is the main digesting part of alimentary canal, while ileum is related with absorptive function.

145 **(a)**
Digestion involves both mechanical and bio-chemical processing of food. Basically, it is the break down of complex organic substances of food like carbohydrates, proteins and fats (macronutrients) into simple, soluble inorganic substances. So, it can be defined as the conversion of insoluble polymer of food into their soluble monomers

146 **(a)**
pH refers to the relative concentration of $H^+$ ions in a solution. Low pH values indicate high concentrations of $H^+$ ions (acids) and high pH values indicate low concentrations basic.

147 **(c)**

**Chylomicrons** are lipoprotein particles synthesized by intestinal epithelial cells and consisting mainly of triglycerides. Chylomicrons are the form, in which dietary fat is transported in the circulatory system.

148 **(b)**
A-Molar, B-Premolar, C-Canine, D-Incisor. Incisors teeth have chisel like edge thus, also called as cutting teeth, while canines are pointed and lies behind the cutting teeth. They are used for cutting and tearing. Premolar and molars are called check teeth. They are broad and are used to crush the food. Third molar of human being is called wisdom teeth

149 **(b)**
Insulin is a hormone, produced by β-cells of islets of Langerhans of pancreas.

150 **(b)**
There are three pair of salivary glands in human being namely, paratoid glands, sublingual glands and submaxillary glands. All of the three pairs of glands secretes saliva into buccal cavity through their ducts. About 1000-1500 mL of saliva is secreted per day by an adult person

151 **(c)**
Dental formula of rabbit is $\frac{2033}{1023} \times 2 = 28$.
Canines are absent in rabbit.

152 **(d)**
**Vitamin-$B_{12}$(Cyanocobalamin)** is required for RBCs maturation, DNA synthesis, myelin formation. It acts as coenzyme. Its deficiency causes pernicious anaemia. Best source of vitamin-$B_{12}$are fish, liver, eggs, milk, colon bacteria.

153 **(b)**
Retinol, is a chemical name of vitamin-A. Deficiency of vitamin-A in diet causes night blindness and xerophthalmia. The later may lead to advanced stage, which is characterised by keratinised cornea

154 **(d)**
In human, 20 teeth (incisor, canine, premolar) are diphyodont, *i. e.*, grow twice in life and 12 teeth (molars) are monophyodont, *i. e.*, grow once in life.

155 **(d)**
Dental formula is the number of teeth one half of upper jaw divided by teeth one half of lower jaws.
Rat dental formula $\frac{1003}{1003} = 16$

156 **(c)**
Secretin and cholecystokinin (CCK) are two main gastrointestinal (GI) hormones secreted in duodenum of alimentary canal. CCK stimulates gall bladder contraction and thus increases the flow of bile salts into the intestine. While, secretin stimulates the release of an alkaline pancreatic fluid that neutralizes stomach acid as it enters the intestine.

157 **(c)**
Kupffer's cells of liver are phagocytic cells, which destroy worn out white and red blood corpuscles, bacteria and micro-organisms passing from the liver.

158 **(b)**
Process of digestion starts in the mouth, continues in stomach and is completed in small intestine. In buccal cavity or oral cavity, the digestion of carbohydrates gets started and 30% of polysaccharides present in the food gets converted into disaccharides (maltose). Rest 70% of carbohydrates the completely digested in the small intestine

159 **(a)**
Bile is secreted by liver. Pancreatic juices, secretion of exocrine part of pancreas and succus entricus are secreted by goblet cells of mucosa along with the brush border cells of mucosa. These secretions gets mixed with the partially hydrolysed food in the small intestine

160 **(a)**
Fatty acids, glycerol and monoglycerides are in soluble in water so they cannot reach the blood stream directly. In intestinal lumen, they first incorporated into small, spherical, water soluble micelles and then into chylomicrons (very small fat molecules). Chylomicrons release from intestinal cells into the lymph present in the lymph vessels (lacteals ) within the villi.

161 **(c)**
Reverse flow of food from stomach to oesophagus of rabbit (mammal) is prevented by **cardiac sphincter.** Through pyloric sphincter chyme is transferred to the intestine.

162 **(b)**
Old non-functional RBCs are destroyed in spleen, liver and bone marrow. The most important site or RBCs disposal is spleen, so it is called as then graveyard.

163 **(d)**

Protein hydrolysing enzymes are called peptidases or proteases. A majority of protein hydrolases are secreted in inactive forms called proenzymes as their active forms can digest cellular or extracellular proteins of individuals itself. Hydrolases secretin and cholecystokinin are secreted by the duodenum of intestine and epithelium of the entire small intestine, respectively

164 **(b)**
Niacin or nicotinamide (nicotinic acid) is also called anti-pellagra vitamin. Its deficiency causes pellagra in which skin becomes scaly and pigmented. Deficiency of pyridoxine (Vit-$B_6$) causes anaemia, neuritic pain, convulsions, skin lesions, etc. Deficiency of folic acid causes megaloblastic or macrocytic anaemia, while deficiency of biotin (vitamin-$B_4$ or vitamin-H) causes dermatitis and anorexia.

165 **(c)**
After heavy meal, blood pressure in the brain gets decreased, which causes drowsiness

166 **(c)**
The innermost layer lining the lumen of the alimentary canal is the mucosa. The mucosa layer forms irregular folds in the stomach, known as rugae. Rugae disappear when the stomach is distended with food. Loss of the rugal are one of the earliest sign of stomach cancer.

167 **(d)**
Liver is the largest gland of body and is situated in the upper right side of the abdominal cavity just below the diaphragm. It is divided into two main lobes, which are separated by a falciparum ligament

168 **(c)**
Enterogasterone (gastric inhibitory peptide) is secreted by the duodenal epithelium. It inhibits gastric secretion and motality. It slows gastric contraction hence, called gastric inhibitory peptide.

169 **(a)**
Liver secretes bile which is a complex watery fluid containing bile salts (Na-taurocholate and Na-glycocholate), bile pigments (biliverdin and bilirubin), cholesterol, mucin, lecithin and fats, etc. It breaks and emulsifies the fat.

170 **(d)**
Cod and shark liver oil is a good source of vitamins like retinol and calciferol. Vitamins and minerals are micronutrient and provide no energy but their deficiency causes specific disease or abnormalities or so they protect the human body and can be considered as protective nutrients. Vitamin-B is water soluble hence, it is more beneficial than A, D, E which are fat soluble

171 **(d)**
Monosaccharides are absorbed in the stomach and middle part of the small intestine (jejunum). Glucose and galactose are absorbed by the active transport while, monosaccharides (fructose and amino acids) absorption takes place by facilitated transport

172 **(a)**
Colon is sac-like structure, in which water absorption from digested food takes place.

173 **(a)**
(a) Cystic fibrosis – Production of thick mucus that clogs airways
(b) Sickle cell anaemia - Defective haemoglobin in RBCs, effect on oxygen transport, tendency to form clots in vessels
(c) Achondroplasia- Dwarfism
(d) Huntington's disease - Progressive deterioration of brain cells

174 **(c)**

| Digestive juice | Source | pH Range |
|---|---|---|
| Gastric juice | Gastric glands | 1. 3.5 |
| Bile | Liver | 7.7 |
| Pancreatic juice | Pancreas | 7.5 - 8.3 |
| Intestinal juice | Intestinal glands | 7.5 - 8.0 |

175 **(a)**
Process of digestion is completed in the small intestine of alimentary canal. Majority of the substances and nutrient are also absorbed by the walls of the this part of alimentary canal. Undigested and unabsorbed food is passed to the large intestine, where balance water and product of bacterial digestion are absorbed from the food and rest of the matter is excreted through the anus

176 **(b)**
Gastric juice contains water (99%), mucus, inorganic salts, Castle's intrinsic factor, HCl (0.5%

conc) and enzymes prorennin, pepsinogen and gastric lipase

177 **(b)**
Compound saccular glands are salivary glands.

178 **(a)**
Vitamin-D has alcohol group in it, *i. e.*, having formula $C_{27}H_{43}OH$.

179 **(d)**
α-amylase, lysozyme and lipase are the potent enzymes present in human saliva.
α-amylase (ptylin) breaks down starch into simpler sugars. Lipase helps in the initiation of fat digestion and lysozymes has antibacterial effects

180 **(a)**
Secretion of salivary glands is known as saliva. This secretion is rich in hydrolases. The salivary secretion of parotid glands secretes much of salivary amylase or ptylin

181 **(b)**
Placoid scales are similar to mammalian teeth. It is characteristic feature of elasmobranch fishes only, each placoid scale consists of a backwardly directed spine arising from a rounded basal plate embedded in dermis.

182 **(b)**
In human, small intestine is the longest portion in the alimentary canal. The absorption of digested food mainly occurs in small intestine. Absorption requires a very large surface area, which is provided by numerous intestinal villi.

183 **(a)**
The enzyme rennin coagulates casein, the soluble protein of the milk, into insoluble calcium salt of casein, which is then digested by the pepsin

184 **(c)**
Bile juice is secreted by liver and stored in the gall bladder. Bile contains bile salts such as sodium glycocholate, taurocholate, ect. Bile acts as a super detergent. It combines with fats to from microscopic droplets called **micelles** in a process known as **emulsification**.

185 **(b)**
*Oryctolagus cuniculus* (rabbit) is a good representative of class-mammalia. Dentituion in all the mammals are heterodont (*i. e.*, dissimilar teeth). Canine is one, pointed in each maxillary of upper jaw and each dentary of lowar jaw. In rabbit and other herbivorous mammals, canines are absent. Hence, some parts of gums between incisors and other teeth remain teethless and called diastema.
Rabbit possesses three pairs of wall developed, sharp, chisel like incisors, two pairs in the premaxillaries of upper jaw and one pair in denteries of lowar jaw. Dental formula of rabbit is :

$$I\frac{2}{1}, C\frac{0}{0}, Pm\frac{3}{2}, M\frac{3}{3} \times 2 = 28$$

186 **(c)**
Indigestion is caused by the inadequate enzyme secretion, anxiety, food poisioning, overeating, etc.

187 **(b)**
The pancreatic juice contains α-**amylase**, Which converts starch into maltose, isomaltose and α-dextrins in small intestine.

$$\text{Starch} \xrightarrow{\alpha-\text{amylase}} \text{Maltose (disaccharide)}$$

188 **(d)**
The lower part of pharynx leads into the food pipe behind and to voice box infront of it. Opening of pharynx to larynx is called **glottis**, which has a leaf like cartilaginous flap called epiglottis. During swallowing of food, epiglottis prevents the entry of food into glottis

189 **(c)**
As carbohydrates are absorbed in the form of monosaccharides, the most rapidly transportable and absorbable monosaccharides is galactose

190 **(c)**
*E. coli* lives in large intestine of human. The cells of *E. coli* produce bacteriocin proteins.

191 **(a)**
Pepsinogen is the inactive form of enzyme pepsin. Pepsinogen is secreted by peptic or chief cell of gastric gland and is activated by HCl acid – a secretion of parietal cells of gastric glands

$$\text{Pepsinogen} \xrightarrow{\text{HCl}} \text{Pepsin}$$

192 **(c)**
The deficiency of vitamin-A causes keratomalacia. It is the advanced stage of xerophthalmia in which the cornea becomes keratinized.

193 **(a)**
The animals, which consume only plant materials are called **herbivorous**, *e. g.*, cow, rabbit, etc.

194 **(c)**
The amylase enzyme converts the starch into maltose and isomaltose.

$$\text{Starch} \xrightarrow{\text{Amylase}} \text{Maltose} + \text{Isomaltose}$$

195 **(b)**
Vitamin-D is a steroid, which is synthesized from cholesterol. Vitamin-$D_2$is formed from plant sterol, ergosterol, which occurs in yeast and other fungi in the presence of ultraviolet light. Vitamin-$D_3$ formed from animal sterol, 7- dehydroxy cholesterol, which occurs in animal skin. Its synthesis also needs ultraviolet light.

196 **(d)**
The right and left hepatocyte ducts combine to form common hepatic duct and this common hepatic duct joins to the duct arising from gall bladder (cystic duct) and forms common bile duct. When the later joins to pancreatic duct, and the combination is called as hepatopancreatic duct or ampulla, which opens up into the duodenum

197 **(d)**
Correct label is A-serosa, B-muscularis, C-submucosa, D-mucosa

198 **(b)**
Vitamin-K or phylloquinone is essential for normal functioning of liver, clotting of blood and preventing haemorrhage . Haemorrhage is characterized by deficiency of prothrombin in blood and also deficiency of factor VII, IX and X which are essential for blood coagulation.

199 **(d)**
Absorption of fats and fat soluble vitamins are carried out by the simple process of diffusion. Being insoluble in water, fatty acids and glycerol cannot reach the blood stream directly. They are first broken down into water soluble droplets called micelles with the help of bile salts. From micelles, fatty acids, glycerol and vitamins (fat soluble) are absorbed into intestinal the cells by diffusion. Here, they are resynthesised in ER and are changed into small fat molecules called chylomicrons, which are the released from intestinal cells into the blood stream

200 **(d)**
Barium is not used in human body.

201 **(d)**
The inflammation of the intestinal tract is the most common ailement due to the bacterial or viral infectons

202 **(b)**
Protein digesting enzymes are known as proteases. Rennin and pepsin are protein digesting enzymes of gastric juice, secreted from stomach.

203 **(b)**
The stools, which the infant passes out is quite yellowish due to bile pigments passed through bile juice.

204 **(a)**
If breast feeding is replaced by less nutritive food, the infants are likely to suffer with marasmus diseases only. Prolonged starvation causes marasmus due to generalised wasting of body because of both energy and protein deficiency. The disease is characterised by lean body, depressed eyes and wrinkled skin

205 **(b)**
The secretion of hepatocytes of liver, pancreas and intestine itself gets mixed with food in small intestine and facilitates the digestion of food in small intestine

206 **(c)**
Trypsin and chymotrypsin are proteolytic endopeptidases. They secreted in inactive forms trypsinogen and chymotrypsinogen. The enterokinase secreted by intestine converted inactive trypsinogen to trypsin.

207 **(a)**
**Pancreas** is a mixed gland, *i. e.*, pancreas secreted hormones and enzymes both. **Glisson's capsule** is present in liver.

208 **(b)**
In aerobic respiration, glycolysis is linked with Krebs' cycle through acetyl Co-A because pyruvic acid first converted into acetyl Co-A and acetyl Co-A is enters in the Krebs' cycle. The formation of acetyl Co-A is involved with some cofactors like $Mg^{2+}$ ions, thiamine pyrophosphate (Vit $-$ $B_1$), $NAD^+$, Co $-$ A and lipoic acid.

209 **(d)**
In human, teeth are thecodont, heterodont and diphyodont. Thecodont means that teeths are present in bony sockets. When teeth are different in structures and functions, called heterodont, *e. g.*, metatherian and eutherian mammals. When teeth develop during life in two successive sets, this condition is known as diphyodont, *e. g.*, mammals.

210 **(c)**

Flavin Adenine Dinucleotide (FAD) is a co-enzyme derived from riboflavin or vitamin-$B_2$. Co-enzyme take part in group transfer reactions. This co-enzyme requires two apoenzyme, one for picking up the group and second for transferring the group

211 **(d)**
Food is one of the basic need of the living being that is taken to get necessary element, which in turn are helpful for growth and maintenance. Carbohydrates, proteins and fats constitutes the major components of food

212 **(b)**
The pH value of the substances refers to the relative concentration of $H^+$-ions in a solution. Low pH value indicates high concentration of $H^+$-ions (acids) and high pH value means the low concentrations of $H^+$ ions

213 **(b)**
Bile secreted by liver is an alkaline, yellowish green, juice which has no enzyme. It contains of water, sodium bicarbonates, bile pigments (bilirubin and biliverdin) and two bile salts (sodium glycocholates and sodium taurocholate). Fats are finally emulsified in small intestine by the action of bile salts.

214 **(a)**
Prolonged starvation causes **marasmus** due to a generalized wasting of body because of both energy and protein deficiency. The body becomes lean and weak, eyes depressed and skin wrinkled.
**Kwashiorkor** is a disease caused by continued deficiency of proteins in diet although energy intake may be adequate.
**Rickets** (in children) occurs due to deficiency of vitamin-D.
**Pellagra** occurs due to deficiency of nicotinamide (vitamin-$B_3$).

215 **(a)**
Stomach is located in the upper left portion of abdominal cavity. It is a J-shaped structure and is the widest organ or alimentary canal or human gut. Caecum, a small blind sac host symbiotic microbes and it is a part of large intestine. Oesophagus is a thin, long tube, which extends posteriorly, passing through the neck, thorax and diaphragm and leads to stomach

216 **(a)**
Majority of the electrolytes are absorbed actively into the blood stream throughout the entire small intestine. Amino acids are absorbed in duodenum and jejunum, while calcium and are absorbed in the duodenum of the small intestine

217 **(a)**
Detritus is particulate organic matter release in the process of decomposition of dead organisms or dead part of organism. An animal feeding on decaying organic matter or detritus is called detritivorous.

218 **(b)**
Bile probably contains no digestive enzyme but contains inorganic salts. They neutralize the HCl, imparting alkalinity to chyme and inactivating gastric pepsin. Here, the fat is emulsified, which facilitates easy action of lipases of pancreatic juice upon the fat. The bile salts also help in absorption of fatty acid, monoglycerides, cholesterol and other lipids from chyme.

219 **(a)**
Fats and fat soluble vitamins are absorbed by passive transport or simple diffusion. Being insoluble in water, the molecules of fatty acid and glycerol cannot reach into the blood stream directly. Hence, they are broken down (emulsified) by the salts of bile into small water soluble droplets called micelles. These micelles (an aggregate of fatty acids, glycerol, sterol and vitamins) are absorbed into intestine by diffusion. In intestine, they are again synthesised in endoplasmic reticulum and are converted into small fat droplets called chylomicrons. These chylomicrons are released from the intestinal cells in the blood stream through lacteals

220 **(d)**
Kwashiorkor, a disease of protein malnutrition, causes low levels of blood proteins (serum albumins), which cause poor return of tissues through capillaries. It leads t the swelling of tissues through increase of its tissue fluid which results into oedema.

221 **(c)**
The oxyntic cells or parietal cells of the gastric glands secrete HCl. This HCl converts pepsinogen and prorennin to pepsin and rennin respectively.

222 **(c)**
The intestinal tract infection is not caused by lactobacelli. This microbe is used in probiotic drinks and food

223 **(a)**

In the process of digestion and absorption, masticated food (bolus) enters into oesophagus and is pushed further into the stomach by involuntary muscle movements. This involuntary muscle movement is responsible for food transfer from food pipe to rectum and is called peristalsis. The muscular coat of alimentary ($II^{nd}$ from outside and $III^{rd}$ from lumen) is composed of outer longitudinal and inner circular muscle fibres.
Both muscle fibres of muscularis (unstriped or smooth) are responsible for peristalsis. Between these two muscle fibres of muscular coat, a network of nerve fibre is present, which is known as plexus of auerbach, (controls peristalsis)

224 **(c)**
Deficiency of vitamin –D causes rickets in children and osteomalacia in adults, thiamine (Vitamin-$B_1$) deficiency causes beri-beri in human and polyneuritis in animals, vitamin-K (phylloquinone) deficiency causes bleeding disease or haemorrhages, reduced fertility or sterility is caused by vitamin-E ( tocopherol) deficiency and pellagra is due to niacin or nicotinamide deficiency.

225 **(b)**
**Rennin** enzyme is secreted only in mammals as an inactive proenzyme called **prorennin.** HCl activates it into active rennin. It changes the soluble **casein** protein of milk into insoluble, semifluid **calcium paracaseinate**. This change is termed curdling of milk.

226 **(a)**
Chief cells of stomach secrete proenzymes pepsinogen and prorennin.

227 **(a)**
**Kupffer's cells** are the phagocytic cells present over the lining of sinusoids (spaces between the hepatic cords) in liver.

228 **(c)**
Bile juices contain bile salts and bile pigments. The stool of a breast feeding baby is quite yellowish due to the presence of bile pigments, which passes through the bile juice

229 **(a)**
Enamel, the hardest material of the body surrounds the crown of tooth. It is helpful in the mastication of food. Tooth is composed of a hard substance called dentine. Dentine is formed by the odontoblast cells

230 **(c)**
Maltose is a disaccharide that gives two molecules of glucose on hydrolysis. It is found during germination of starchy seeds. It is produced commercially from starch by a starch hydrolyzing enzyme diastase.

231 **(a)**
All lipid digestion takes place in the small intestine. Fatty acids and glycerol are the digestion products of lipids.

232 **(a)**
Dental formula is the number of teeth one half of upper jaw divided by teeth of one half of lower jaw. Human dental formula is $I\frac{2}{2}\ C\frac{1}{1}\ Pm\frac{2}{2}\ M\frac{3}{3}$.

233 **(b)**
Chief cells of gastric gland of stomach are simple coiled tubular.

234 **(a)**
Vitamin-C, B complex, P and H are water soluble vitamins. Disease scurvy is caused due to deficiency of ascorbic acids. Vitamin-C (ascorbic acid) has antioxidant property. The rich source of vitamin-C are citrus fruits, *e. g.*, amla, lemon, orange, mausmi, etc.

235 **(a)**
Thiamine ($B_1$) deficiency is common in alcoholics. It leads to decreased mental function, double vision and reduced muscular contraction and the resulting disorder is known as Wernicke's syndrome.

236 **(c)**
The wall of human gut consists of four basic layers. From periphery (outer) to centre (towards the lumen) they are, serosa or visceral peritonium → muscularis or muscular coat → submucosa → mucous membrane or mucosa

237 **(c)**
Secretin is secreted by duodenum, part of small intestine. It stimulates the flow of pancreatic juice and controls volume of pancreatic juice including water and electrolytes. Argentaphilic cells of pyloric part of stomach, secrete gastrin hormone. Gastrin hormone increase gastric secretion.

238 **(b)**
Vitamin-D has no role in blood coagulation. Vitamin-D involves in $Ca^{2+}$ metabolism.

239 **(c)**
Vitamin-C is a water soluble Vitamin needed to be taken into the body in small amount.

240 **(a)**
In human beings, process of digestion starts from the mouth. In oral cavity, polysaccharides are converted into disaccharides (maltose) with the action of salivary amylase. Major site of protein digestion is stomach, fats are digested in the small intestine

241 **(c)**
Vitamin –K is required for clotting process; it is required for the formation of prothrombin in liver, the deficiency of which leads to severe bleeding disorders. Deficiency of vitamin-A causes night blindness, xerophthalmia, keratomalacia, retarded growth. Deficiency of vitamin-B causes beri-beri disease. Deficiency of vitamin-E causes sterility.

242 **(c)**
In Humans, starch is digested in buccopharyngeal cavity. Cellulose is not digested in the humans because cellulose contains$\beta - 1$, 4-linkage and vertebrates themselves do not possess any enzyme capable of hydrolyzing $\beta - 1$, 4-linkages. Protein is digested in stomach and fat in small intestine. Thus, in the given options, fat and cellulose reach totally undigested in the stomach of humans.

243 **(a)**
Intestinal juices or succus entericus is the combined secretion of goblet cells of mucosa (mucous) along with the secretion of brush border cells of mucosa. It is rich in variety of enzymes like maltase, lipase, dipeptidase and nucleosidases etc. Partially hydrolysed proteins entering in the intestine from the stomach are converted into dipeptides (two amino acid) by pancreatic juices. Proteins and polysaccharides are converted into disaccharides by amylase present in pancreatic juice. Fats are broken down into diglycerides or monoglycerides by the action of lipase and with help of bile juices. The enzyme present in succus entricus acts on these end products and convert them into simple absorbable forms

$$\text{Proteins} \xrightarrow{\text{Trypsin}} \text{Dipeptides} \xrightarrow[\text{(Intestinal juice)}]{\text{Dipeptiase}} \text{Amino acids}$$

244 **(c)**
Process of digestion starts from mouth. When a piece of bread is ingested for sometimes, polysaccharides of the food gets converted into disaccharides. So, sweetness is realised. Around 30% of the starch is converted into disaccharides in buccal cavity

245 **(b)**
Assimilation can be defined as "a process of absorbed food nutrients utilisation by the tissues in living beings for energy, growth and maintenance". When nutrients from the food are absorbed, they are transferred into the blood circulation and from the blood, these nutrients are transported to different body cells and tissues, where these nutrients become an integral part of the living protoplasm and provides energy, stimulate growth and repair injured tissues of the body. The whole process can be termed as assimilation

246 **(d)**
Oesophagus (food pipe), epiglottis, is a 25 cm long muscular tube, which transfers masticated food from pharynx to stomach. A sphincter lies at the opening between oesophagus and stomach. This sphincter is called as gastro-oesophageal sphincter and the opening of oesophagus into stomach is regulated by this sphincter

247 **(d)**
Rumen and reticulum are specialized for microbial digestion of plant material. Omasum is specialized for absorbing water from enormous amount of saliva. Water is used for microbial digestion.

248 **(c)**
Enterokinase or enteropeptidase is secreted by crypts of Leibrekuhn in the duodenum. It is a serine protease enzyme. When food enters into the duodenum, enterokinase converts proenzyme trypsinogen into trypsin, which indirectly activating a number of pancreatic digestive enzyme. It also activates other proteases in the pancreatic juice. Thus, absence of enterokinase affects the conversion of proteases intosmall peptides.

249 **(b)**
The villi increases the surface of absorption for food in small intestine. Each villus is covered with an epithelium and contains abundant blood capillaries and lymph vessels called lacteal

250 **(d)**
Most abundant mineral element of animal body is calcium, the main constituent of teeth and bones.

251 **(a)**

The upper surface of the tongue bear four type of papillae or small projections namely, valate papillae, filiform papillae, fungiform papillae and foliate papillae. Out of them, filiform papillae lacks taste buds but rest of them bear it

252 **(c)**

**Potbelly syndrome** is a malnutrition disease in man, while Cri du chat syndrome, Klinefelter's syndrome and Edward's syndrome are genetic diseases.

253 **(c)**

Goblet cells are present throughout, the epithelium of mucosa, which secret mucous and continuously lubricate the inner most layer. It protects the stomach wall along with bicarbonates of gastric juices, against HCl action and protein digesting enzymes

254 **(a)**

Digestion of starch (polysaccharides) starts from the mouth, whereas stomach is the main site of protein digestion. About 30% of starch converts into maltose in oral cavity

255 **(c)**

Vitamins are necessary for normal cell functioning. These can be grouped in water soluble (vitamin-B-complex and C) and fat soluble (vitamin-A, D, E and K).

256 **(d)**

Lacteals absorb fatty acids and glycerol in the small intestine of human.

257 **(a)**

Oral cavity or buccal cavity consists of a number of teeth and a tongue. The later lies partially in pharynx. This muscular organ is attached to the floor of oral cavity by a median fold of mucous membrane called frenulum

258 **(d)**

$$\text{Starch} \xrightarrow{\text{Amylase}} \text{Maltose} + \text{Isomaltose} + \text{limit dextrins}$$

Lactose

$$\text{Milk sugar} \xrightarrow[\beta\text{-galactosidase}]{\text{Lactase}} \text{Glucose} + \text{Galactose}$$

$$\text{Maltose} \xrightarrow[\alpha\text{-glucosidase}]{\text{Maltase}} \text{Glucose} + \text{Glucose}$$

Sucrose

$$\text{Cane sugar} \xrightarrow[\beta\text{-fructosidase}]{\text{Sucrase/invertase}} \text{Glucose} + \text{Fructose}$$

259 **(b)**

**Deamination** is the removal of an amino group ($-NH_2$) from a compound. It occurs in liver and important for protein metabolism especially their degradation.

260 **(c)**

Vitamin-D is a fat soluble vitamin found in fish liver oils and also produced in the skin when subjected to ultraviolet rays from sunlight.

261 **(b)**

A – Parotid gland, B – Gall bladder, C – Pharynx, D – Pancreas, E – Transverse colon, F – Caecum

262 **(b)**

Chymotrypsin is produced by pancreas, which is a mixed gland. It secretes hormones as well as digestive juices. Chymotrypsin is used to carry out partial hydrolysis of protein (polypeptide ). Chymotrypsin is formed from inactive chymotrypsinogen.

263 **(a)**

Dental formula of rabbit is

$$I\frac{2}{1}, C\frac{0}{0}, Pm\frac{3}{2}, M\frac{3}{3}$$

264 **(b)**

Vitamin-$B_{12}$ is not found in plants. However, it is considered that *Spirulina* (an algae) contain $B_{12}$. Vitamin-$B_{12}$ is synthesized by intestinal bacteria, which in fact are main source of vitamin-$B_{12}$. Many micro-organisms (bacteria) of the stomach of ruminant mammals also synthesize large quantities of vitamin-$B_{12}$.

265 **(d)**

In humans, milk protein digesting enzyme in stomach is pepsin. In calves it is rennin. It is also present in small amount in human infants but not adults. Pepsin acts on water soluble caseinogen (milk protein) to form soluble casein. This combines with calcium salts to form insoluble calcium paracaseinate, which gets readily digested enzymatically.

266 **(d)**

Absorption of differents nutrients from the food is carried out by the simple diffusion, osmosis, facilitated transport and by active transport, *i.e.,* absorption of nutrients is carried out by passive, active diffusion and facilitated transport

267 **(a)**

The liver secreted **bile** (pH7.7) which is stored in gall bladder. The bile salts (sodium bicarbonate, sodium glycocholate, sodium taurocholate) help

in digestion of fats in the small intestine by bringing about their emulsification. **Bile pigments** (bilirubin and biliverdin) are excretory products.

268 **(d)**
Bile contains no digestive enzymes, yet it plays an important role in fat digestion. It intensifies the 'mixing contractions' of intestinal wall. The organic salts of bile reduce the surface tension of fat globules and suspend them in water of digestive juice. It is emulsification of fats. It facilitates easy action of pancreatic juice on fats. They also help in formation of micelles, which help to transport of all end-products of fat digestion from intestinal lumen to absorptive cells. The inorganic bile salts import alkalinity to chyme and inactivate gastric pepsin.

269 **(b)**
Enterogastrone, a gastrointestinal hormone regulates the digestive secretion along with the other hormones gastrin, secretin, cholecystokinin, etc. Enterogastrone slows down the gastric contraction. Therefore, it is also called as Gastro Inhibitory Peptide (GIP)

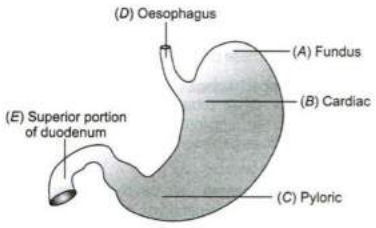
270 **(a)**
Salivary glands of human secrete about 1 to 1.5 L of saliva daily, which contains enzyme ptyalin or salivary amylase. It is a carbohydrate splitting enzyme and splits carbohydrates of food into maltose. In human, 30 to 40% food carbohydrates are converted into maltose by ptyalin.

271 **(a)**
Kuffer cells and Glisson's capsule are the characteristic features of mammalian liver. Glisson's capsule is composed of thin connective tissue, which covers each lobule of the liver. Crypt of Leiberkuhn and Brunner's gland are intestinal glands, which are formed by the epithelium of small intestine. Secretions of intestinal gland are commonly known as intestinal juices or succus entricus

272 **(c)**
Tocopherol or vitamin-E or anti-sterilitic factor or beauty vitamin can be obtained from green leafy vegetables, seed oils. Deficiency of vitamin-E leads to reversible sterility in female and male.

273 **(b)**
Amylase converts starch into maltose.

274 **(c)**
A-Fundic region; B-Cardic region; C-Pyloric region




275 **(c)**
Constipation or difficult defecation is characterised by decreased motility of intestine. It is treated by mild laxatives like milk of magnesia, which induce defecation. Ejection of stomach content through oesophagus, pharynx and out of the mouth is controlled by vomit centre in medulla oblongata of hindbrain

276 **(a)**
The dental formula of child (5-6 yr) is
$I\frac{2}{2}, C\frac{1}{1}, Pm\frac{2}{2}, M\frac{0}{0} \times 2 = 20$
In the age of 5 to 6 years, molars are absent, which start appearing at the age of 6 years.

277 **(a)**
Kupffer's cells of liver engulf disease causing microorganisms, dead cells and foreign matter.

278 **(b)**
The secretion of goblet cells of mucosa (mucous) along with the secretion of brush boder cells of mucosa in the intestine constitutes intestinal juices or succus entricus. Theses intestinal juices are rich in enzymes like maltase, dipeptidase, nucleosidaes, sucrase, lactase, enterokinase, aminopeptidase and nuceotidase. The enzymes present in the intestinal juices acts upon the end products of the food, which are then converted into simple absorbable forms

279 **(c)**
The liver of the man is divided into four lobes, the **right**, the **left**, **caudate** and **quadrate** lobes.

280 **(b)**
End product of milk sugar (lactose) are glucose and galactose. The absorption of all carbohydrates takes place in the stomach and middle part of the small intestine. Glucose and galactose are absorbed by active transport

281 **(a)**
Crypts of Leiberkuhn or intestinal glands are present in the duodenum and ileum (parts of small intestine only). The secretion of intestinal glands is called intestinal juice or succus entericus. It contains many enzymes-maltase, isomaltase, sucrase, lactase, $\alpha$-dextrinase,

enterokinase, aminopeptidase, dipeptidase, nucleotidases, nucleosidases and intestinal lipase.

282 **(a)**
Activities of gastrointestinal tract are regulated by neural system and hormones. The gastrointestinal tract is innervated by intrinsic as well as extrinsic nerves

283 **(d)**
Nucleases in the pancreatic juice act on nucleic acids to form nucleotides and further nucleosides.

284 **(a)**
Pulp cavity is lined by a single layer of branched, dentine secreting cells called odontoblasts.

285 **(c)**
Gastroporesis, also called delayed gastric emptying, is a disorder that slows or stops the movement of food from the stomach to the small intestine

286 **(b)**
Gastric juices are the secretion of gastric glands and contains water (98.8%), mucous, inorganic salts, HCl (0.5% conc) and proenzyme pepsinogen, prorennin etc. Gastric amylase and gastric lipase are also present in little amount

287 **(b)**
In liver, right and left hepatic ducts join to form a common hepatic duct which joins the duct of gall bladder (cystic duct), forming a common bile duct or ductus choledocus. The later opens into the proximal part of duodenum through a valvular pore guarded by sphincter called sphincter of Oddi.

288 **(b)**
**Liver** is endodermal in origin and is the largest gland in human body. It is the busiest and largest chemical factory in the body.

289 **(b)**
Absorption of fats and fat soluble vitamins takes place by simple diffusion. Fats and fats soluble vitamins like A, D, E, K cannot reach into the blood directly, due to insolubility in water. So, they are first incorporated into small, spherical water soluble droplets called micelles by the action of bile salts (Na-glycocholate and Na-taurocholate). Micelles (an aggregate of fat soluble vitamins, glycerides and cholesterol) are absorbed by intestinal cells, where they are again synthesised in the endoplasmic reticulum and are released from the intestinal cells into the blood stream through lacteals

290 **(d)**
Wilson's disease is a manifestation of abnormal copper metabolism in man. It is characterized by abnormally large accumulation of copper in the liver, brain and urine.

291 **(a)**
The rennin is present in proenzyme form (prorennin) in the gastric juice secreted by gastric glands of stomach. The HCl present in the gastric juice converts prorennin into rennin, which acts on casein (milk protein) and converts it into calcium paracaseinate. Rennin is present in infants and absent in adults.

292 **(c)**
Cud chewing animals are called ruminants because grazed food is swallowed into the rumen (a chamber of stomach) and mixed with mucus, undergoing partial and anaerobic digestion of cellulose by a symbiotic bacteria.

293 **(c)**
Saliva contains a starch splitting enzyme, ptylin (α-amylases). HCl of gastric juice inactivates ptylin present in the stomach. Ptylin or salivary amylase present in the saliva acts on the polysaccharides of food and around 30% of polysaccharides are converted into disaccharides (maltose)

$$\text{Starch} \xrightarrow{\text{amylase}} \text{Maltose}$$

294 **(d)**
The abnormal and frequent movements of bowl and increase in the frequency, volume, fluid content or liquidity of faeces is called diarrhea. Frequent diarrhea can result in the loss of water (dehydration) and salts or electrolyte imbalance

295 **(d)**
Secretin and cholecystokinin are the two main gastrointestinal hormones secreted in the duodenum of alimentary canal. Cholecystokinin stimulates gall bladder contraction and hence flow of bile salts is increased into the intestine, while secretin stimulates the release of an alkaline pancreatic fluid, which in turn, neutralises stomach acid

296 **(a)**
Vitamin-$B_2$ (Riboflavin) is also known as yellow enzyme. It is helpful in $RBC_S$ production. Its deficiency may lead to chelosis disease, while disease pellagra is caused by nicotoinic acid or nicotinamide or niacin (vitamin-$B_3$) deficiency

297 **(a)**

Hepatic caeca is a pouch-like diverticula, which helps in digestion and absorption of glucose.

298 **(a)**
Process of resynthesis of food materials from simpler food molecules is called **biosynthesis**. Absorption is the process by which digested nutrients are absorbed through the wall of gut into blood, while conversion of absorbed food into active cytoplasm within the cell is called assimilation.

299 **(a)**
Colon is the site of water absorption from undigested and unabsorbed food (faeces). When the pallet of faeces from the sigmoid portion of colon enters into the rectum, distension of the rectal wall initiate the feeling for defecation. It is due to **defecation reflex**. The defecation reflex induces peristalsis movement in the sigmoid portion of the colon and rectum, which forces faecal matter towards the egestion pore

300 **(c)**
Pepsin is inactivated at pH above 5. Pepsin is a proteolytic or protein splitting enzyme. The optimum pH of pepsin is about 2 and the enzyme, therefore, works well in the highly acidic gastric juice, while it is inactivated in the near basic medium.

301 **(a)**
Digestion of fat starts in the small intestine. Here, bile salts of bile juices emulsify the fats. Triglycerides (emulsified) are incorporated into the small, spherical water soluble, droplets of glycerides, fat soluble vitamins and sterol, which are called micelles. The later are absorbed in the endoplasmic intestinal cells and are resynthesised in the reticulum to form smaller fat droplets called chylomicrons. These chylomicrons are released from intestinal cells to lymph and from lymph and are they transported into the blood stream through lacteals

302 **(b)**
Oral cavity or mouth consist of a number of teeth and a muscular tongue. Teeth are embedded in a socket of jaw bone, this type of attachment is thecodont. Majority of the mammals have two set of teeth during their life, *i.e.*, diphyodont. Temporary or deciduous teeth (20 in number) are replaced by permanent teeth. An adult human has 32 teeth, *i.e.*, 16 in each jaw. These are of four different types (heterodont) namely incisors (I), canines (C), premolar (PM) and molars (M). The dentition in human being is diphyodont, heterodont and thecodont

303 **(c)**
α-amylase is found in pancreatic juices. Enzyme amylase converts starch into disaccharides, like maltose, isomaltose and dexrins in the small intestine.

$$\text{Starch} \xrightarrow{\text{Amylase}} \text{Maltose (disaccharides)}$$

Equation (a) is incorrect as stomach do not contains any fat emulsifying agent
In equation (b) is incorrect as proteins are converted to dipeptides, *i.e.,* two amino acids by the enzymes trypsin and equation (d) triglycerides are converted to diglycerides and fatty acids by lipase enzyme

304 **(a)**
Bile juice or simply bile is produced by hepatocytes of liver. Bile is collected in interlobular bile duct by bile canals or Hering's canals. The later are joined by bile capillaries, which receives bile from hepatocytes. Bile from hepatic duct is stored in gall bladder, which is a pear shaped structure and is attached to the posterior surface of the liver

305 **(d)**
Secretin hormone is secreted from the duodenum mucosa, it stimulates pancreas.

306 **(d)**
A – Gall bladder, B – Common bile duct, C – Pancreas, D – Pancreatic duct, E – Hepatopancreatic duct

307 **(d)**
Enzyme lactose hydrolyses milk sugar (lactose) into glucose and galactose

$$\text{Lactose} \xrightarrow{\text{Lactase}} \text{Glucose} + \text{Galactose}$$

308 **(c)**
**Vitamin-D** affects normal growth of body and formation of teeth and bones by depositing essential minerals in them. Vitamin–A is essential for maintenance of epithelial cells and bones. There is correlation between Vitamin-A and tooth development. Calcium is essential for formation of bone and teeth.

309 **(b)**
Bile juice is yellowish-green or greenish-blue alkaline (pH-7.7) fluid. It contains about 90% water, 60% bile salts, 3% bile pigments, etc. The common bile salts are sodium chloride, sodium

bicarbonate, sodium glycocholate and sodium taurocholate. **Cholecystokinin** directly stimulates contraction of gall bladder and bile flow starts.

310 **(c)**
Liver is the largest gland of human body and in most of mammals body, second largest gland in pancreas. Liver is situated in the upper right side of abdominal cavity. It is a bilobed structure and is heavier in males than females

311 **(b)**
Four basic layer of human alimentary canal exhibits modification in different parts of alimentary canal. Mucosa, the innermost lining of gut secretes mucous to lubricate the inner lining of the gut and it composed of lamina proporia, muscularis mucosa and the epithelium, which forms gastric gland in stomach, and villi and intestinal gland in small intestine

312 **(c)**
D is the hepatic portal vein and F is the hepatic vein

313 **(d)**
Linoleic, linolenic and arachidonic acid are unsaturated essential fatty acids for man.

314 **(d)**
Chloragen cells help in glycogen synthesis and storing the reserve food material. So, these cells are related with nutrition.

315 **(a)**
Digestion, is accomplished by both chemical and mechanical processes. Mastication of food is done with teeth and tongue. Mastication is facilitated by saliva- (secretion of salivary glands). Swallowing of masticated food is also facilitated by oral cavity. Fat digestion do not occurs in buccal cavity

316 **(d)**
Carboxypeptidase is an enzyme secreted by pancreas. It breaks larger peptides into smaller peptides.

317 **(a)**
The bacteria are found in the intestine, which in fact are the main source of vitamin-$B_{12}$ as this vitamin is not found in plants. Few micro-organisms of the rumen of stomach of ruminant mammals also synthesize large quantity of vitamin-$B_{12}$.

318 **(c)**
The food is masticated by teeth and tongue in the buccal cavity with the help of saliva. Masticated food is swallowed with the help of buccal cavity. This masticated food (in the form of bolus) is pushed into pharynx and then into the food pipe. Food pipe transfers the food into cardiac part of stomach. In stomach food is stored for 4-5 hours. Some of the digestive processes takes place in the stomach. Stomach is the main site of protein digestion

319 **(d)**
Goblet cells are present in the columnar epithelium of the mammalian intestine and secrete mucin, a mucoprotein that forms mucus when in solution. If Goblet cells become non-functional, this will adversely affect smooth movement of food downwards the intestine due to absence of mucin.

320 **(a)**
The third molar teeth appear very late and are called wisdom teeth.

321 **(a)**
Absorption of monosaccharides like glucose and galactose occurs by active transport. They are absorbed in the stomach and jejunum. Amino acid are absorbed in the duodenum and jejunum by active transport. While most of the ions (electrolyte), like Na, K, Mg, Fe, $PO_4$ are also actively absorbed throughout the small intestine

322 **(c)**
Angiotensinogen is a plasma protein produced and secreted by the liver cells. Rennin secreted from juxtaglomerular cells acts enzymatically on angiotensinogen to release 10 amino acid peptide angiotensin-I.

323 **(a)**
Each teeth is distinguishable into crown, neck and root. The crown is covered over by a thick layer of enamel, which is bluish white and hardest substance in body. The remaining part of tooth is covered by a thin layer of yellowish bone like cement. Beneath the enamel and cement, the main part of a tooth is formed of a thick layer of less hard and somewhat elastic **dentine.**

324 **(a)**
A balanced diet possesses all the essential components of the food in proper requisite proportion, which is required for maintenance, growth and development of body tissues. Therefore, it include carbohydrates (50-70%), fats (15-25% and proteins 10-15%) with micronutrients mineral and vitamins. It lacks

nucleic acids and enzymes as these are produced inside the body. However, essential amino acids are taken with diet

325 **(a)**
Faeces represents solid waste. It contains 3/4 water and $\frac{1}{4}$ solid matter. Brown colour of faeces is due to, stercobilinogen and stereobilin, which are formed from bilirubin by the action bacteria. This bacterial action is also responsible for the odour of faeces

326 **(a)**
Most of the simple sugars (monosaccharides) are absorbed in the stomach and jejunum through the mucosa layer. Around 90% of the water is absorbed in the small intestine through innermost layer cells into the blood capillaries in villi. Alcohol is lipid soluble, its absorption starts in the stomach. However, its absorption is much greater in the small intestine than stomach. Alcohol is absorbed more rapidly in duodenum

327 **(d)**
Chylomicrons concerned with the absorption of fats are produced in the epithelial cells of small intestine. They are aggregates of triglycerides, cholesterol and phospholipids protein, coated in small vesicles. Chylomicrons are small fat droplets, which are released from small intestinal epithelium cells into the lymph and from the lymph to blood stream through lacteals

328 **(b)**
Liver is the largest gland of body which lies in the upper right side of the abdominal cavity. Liver performs a lot of functions like, bile production, deamination glycogenesis, glycogenolysis, glucogneogenesis, detoxification, etc. Secretion of heparin is also one of the function of liver. Heparin is an anticoagulant

329 **(a)**
The rights and left hepatic duct joins to form the common hepatic duct, which joins the cystic duct arising from gall bladder. The cystic duct and common hepatic duct joins to form common bile duct, which after joining the main pancreatic duct forms, hepatopancreatic ampulla. The ampulla opens into duodenum. This opening is guarded by sphincter of Oddi

330 **(a)**
A-Oxyntic cells, B-Chief cells, C-Mucous cells, D-Argentaffin cells

331 **(a)**
Mucosa lines the lumen of alimentary canal. These innermost layers forms irregular folds in the stomach, which are called rugae. Villi, the small finger like projections are also formed by mucosa in small intestine. The cells lining the villi produce numerous microscopic projections called microvilli. The later give a brush boarder appearance. The villi in small intestine increasing the surface area for the absorption of food

332 **(c)**
The major site of protein breakdown to form free amino acids is in the small intestine in presence of bile.

333 **(c)**
$$\text{Milk protein (Casein)} \xrightarrow{\text{Rennin}} \underset{\text{Paracaesin}}{(A)} \xrightarrow{Ca^{2+}(B)} \text{calcium paracaseinate} \xrightarrow{\text{Pepsin}} \text{Peptones (C)}$$
Enzyme rennin is prominent in the stomach of infants, while both pepsin and rennin are absent in invertebrates

334 **(a)**
Liver and islets of Langerhans function as modulator and effector in the homeostatic control of blood sugar level.

335 **(d)**
Vitamin-K (naphthoquinone) is an essential cofactor is involved in the synthesis of prothrombin in the liver cells which is essential for blood clotting, prevention of haemorrhage and excessive bleeding in wounds. This vitamin is synthesised by colon bacterium hence, a dietary source is not usually necessary. Besides vitamin-K, some vitamin like vitamin-$B_{12}$, vitamin-$B_1$, vitamin-$B_2$ are also produced by the symbiotic bacteria (*E. coli*) in the large intestine of human beings

336 **(b)**
Small intestine is the major site of digestion and absorption. About 90% of food is digested completely in the duodenum of small intestine. Rest 10% is digested in the middle portion of the small intestine, while the distal part, ileum is the major site of absorption. About 90% of all absorption of nutrients takes place in the small intestine, while the rest occurs in stomach and large intestine

337 **(b)**

The liver produces and secretes 250 to 1500 mL of bile per day. The major constituents of bile are bilirubin, biliverdin, bile salts, cholesterol and phospholipids. The bile salts play a very important role in the digestion of fats. The bile salts, which are partly water and partly lipid-soluble, emulsify the fat particles and as a result, the fat- drops acquired a greater surface area.

338 **(a)**
Polysaccharides (starch) gets partly digested in the buccal cavity and stomach and gets digested completely in the small intestine, by the action of various enzymes. Starch is digested in the proximal part of the small intestine (duodenum)

339 **(a)**

| | |
|---|---|
| Pepsinogen | - Zymogenic cells |
| HCl | - Oxyntic cells |
| Mucus | - Goblet cells |
| Pancreatic juice | - Acinar cells |
| Ptyalin | - Salivary glands |

340 **(b)**
Lamina propria, the middle layer of mucosa of alimentary canal consists of loose connective tissue, blood vessels, glands and some lymphoid tissue. This layer contains all the glands of alimentary canal expect the Brunner's glands of duodenum.

341 **(a)**
Vitamin-$B_3$ (niacin) is known as antipellagra vitamin. Its deficiency causes the alternation in protein metabolism disorder such as carcinoid syndrome. Vitamin-$B_1$ deficiency causes loss of appetite, muscle depreciation, mental confusion and may leads to paralytic, disease beri-beri. Vitamin-E deficiency causes sterility. Digestion and distribution of nutrients occurs in the gastrovascular cavity

342 **(a)**
The end product of digestion are absorbed through the intestinal mucosa into the blood. Therefore, absorption, can be defined as a process of transportation of nutrients from the alimentary canal to the blood or lymph (circulatory system) through mucous membrane

343 **(a)**
Stomach it is a J-shaped structure of alimentary canal and consists of three parts. Cardiac portion, fundic portion and pyloric portion. The last part, *i.e.,* three pyloric portion opens into the proximal part of small intestine (duodenum)

344 **(a)**
Gastrin hormone is secreted by mammalian stomach and duodenal mucosae in response to proteins and alcohol. This hormone stimulates gastric glands to secrete large amount of gastric juice. However, its over- secretion may cause gastric ulcers.

345 **(a)**
There are three pair of salivary glands in human beings, a pair of **parotid glands**, largest salivary gland which are located near the ears. A pair of **sublingual glands** (smallest glands) which are located beneath tongue. a pair of submaxillary or submandibular gland which are situated at the angles of lower jaw

346 **(c)**
Large intestine can be divided into three parts for descriptive purposes like caecum, rectum and colon, lleum is a greatly coiled part of small intestine and it opens into large intestine

347 **(b)**
The enzyme lactase hydrolyses lactose (disaccharide) into glucose and galactose.

$$\text{Lactose} \xrightarrow{\text{Lactase}} \text{Glucose} + \text{Galactose}.$$

348 **(c)**
Cholecystokinin ( a hormone) is secreted by duodenum in response to presence of food. It stimulates flow of pancreatic enzymes and contraction of gall bladder.

349 **(a)**
There are twenty amino acids and amides in the proteins. Plants are capable of synthesising all the proteins and amino acids. In animals several amino acids (10 number) are formed through transamination or transformation. Those amino acids, which cannot be synthesised by animals are considered as essential amino acids. So, they must be taken in diet. Some of these are leucine, isoleucine, valine, tryptophan, phenylalanine, lysine, methionine and threanine. Tryptophan deficiency cause mood and sleep deregulation. Having a deficiency in lysine can lead to niacin deficiency and lack of methionine leads to decreased production of sulphur in body

350 **(a)**
Vitamins-CE and provitamin-A (β-carotene) are known as antioxidant vitamins because their inactive oxygen free radicals are highly reactive particles

351 **(c)**

There are three pair of salivary gland in human being. They are, a pair of parotids gland, a pair of sublingual glands and a pair of submaxillary gland. Zymogen cell are one type of gastic glands secretes zymogens or proenzyme – pepsinogen and prorennin along with, a small amount of gastric lipase and amylase

352 **(a)**
The innermost layer lining the lumen of the alimentary canal is the mucosa. This layer forms irregular folds (rugae) in the stomach and small finger-like folding called villi in the small intestine. The cells lining the villi produce numerous microscopic projections, called microvilli giving a brush border appearance. These villi increase the surface area for absorption of food materials.

353 **(c)**
Exocrine part of pancreas secretes alkaline pancreatic juices (pH 8.44) which are rich in bicarbonates of sodium and three proenzymes (inactive form), chymotrypsinogen, trypsinogen and nucleases along with amylases and lipases

354 **(b)**
The secretion of salivary glands is called saliva. Medium of saliva is slightly acidic. The quantity of saliva in an adult is 1000-1500mL/day.
Chemically, saliva is a mixture of water and electrolytes ($Na^+$, $K^+$ $Cl^-$, $HCO_3$). Some enzymes, salivary amylase and lysozyme, (an anti-bacterial agent) are also found in saliva

355 **(b)**
The synthesis of glucose from non-carbohydrate sources, such as amino acids, proteins, fatty acids, glycerol, etc is called **gluconeogenesis**. This occurs when the glycogen supply in the liver is exhausted.
Glycogenesis involves the conversion of glucose to glycogen, while glycogenolysis involves conversion of glycogen to glucose.

356 **(c)**
There are three pairs of salivary glands in man which secrete saliva into the oral cavity through ducts. About 1000-1500 mL of saliva is secreted per day.

357 **(d)**
Vitamin-C (ascorbic) is heat labile water soluble vitamin having virucidal property and its excess amount is excreted in urine.

358 **(c)**
Sucrose – a disaccharides give rise two molecules monosaccharides with the action of an enzyme invertase or sucrose

$$\text{Sucrose} \xrightarrow{\text{Invertase}} \text{Glucose} + \text{Fructose}/$$

Amylase hydrolyses polysaccharide (starch) into disaccharide rennin, which specifically function over milk protein, while trypsin function in protein hydrolysis and yields dipeptides

359 **(b)**
For human beings, eight amino acids are essential: leucine, isoleucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine.

360 **(a)**
The distal end of ileum is expanded to form a small dilated spherical sac called **sacculus rotundus** in rabbit.

361 **(b)**
Large intestine is the site of absorption for water left in the undigested food product of bacterial digestion like vitamin-B complex, vitamin-K (phylloquinone) and amino acids. They absorbed in the caecum of large intestine

362 **(a)**
Digestive system in mammals comprises an alimentary canal and concerned digestive glands. Human gut or alimentary canal consists of mouth → buccal cavity → pharynx → oesophagus (food pipes) → stomach → small intestine (duodenum → jejunum and → lleum) → large intestine (caecum → colon → rectum). The large part of large intestine terminate into 2-3 cm long anal canal and its opening is called anus. So, the correct chronological order is descending part of colon → rectum → anus

363 **(c)**
Porennin is secreted in the young ones of mammals *i.e.,* it is prominent in infants. HCl secreted by parietal cell activates the inactive form of enzymes. Rennin enzyme is responsible for the digestion of milk protein in infants

$$\text{Porennin} \xrightarrow{\text{HCl}} \text{Rennin}$$

$$\text{Casein} \xrightarrow{\text{Rennin}} \text{Paracaesin Ca} \rightarrow \text{Ca Paracaseinate}$$

364 **(b)**
About 90% of all absorption of nutrients occurs in entire small intestine. Duodenum (proximal part of intestine) is the major site of digestion, while amino acids are absorbed in this small intestine part (95 – 98%)

365 **(c)**

Vitamin-D is a sterol derivative, which is synthesised from cholesterol. Vitamin-$D_2$ is formed from plant sterol-ergosterol, which occurs in yeast and some other fungi, in the presence of UV light. Vitamin- $D_3$ is synthesised from animal sterol-7 hydroxy cholesterol, which occurs in animals. Its synthesis also requires UV light. Deficiency of vitamin-D causes type I and type II diabetes in humans

366 **(b)**

**Water soluble vitamins** include vitamin-B complex and vitamin –C. These are mostly found in whole grain cereals and legumes, leafy green vegetables, fruits, meat and dairy products.

367 **(a)**

Oxyntic cells occur in the wall of stomach. These secrete hydrochloric acid that forms part of the gastric juice and helps in the maintaining pH between 2 to 3.

368 **(a)**

Process of digestion is carried out both mechanically and chemically. Mastication of food and swallowing the masticated food are the two major mechanical functions of buccal cavity. Food is masticated and partly digested by salivary amylase which in the form of bolus is transferred to pharynx and then to oesophagus by deglutition and finally, it reaches into the stomach for chemical actions

369 **(c)**

**Argentaffin** is a type of **cell tumour**, which may arise in gastrointestinal tract. These tumours secrete serotonin and may produce the carcinoid syndrome.

370 **(b)**

Prolonged deficiency of thiamine (vitamin-$B_1$) in human diet may cause beri-beri disease. It is characterized by muscle weakness, retarded growth, weak heart beat and even heart failure.

371 **(c)**

Digestion of nucleic acids takes place in the small intestine. *These are digested in small intestine by the enzymes present in intestinal and pancreatic juices like*

$$\text{DNA} \xrightarrow[\text{Pancreatic juice}]{\text{DNase (deoxyribonucleaes)}} \text{Deoxyribonucleotides}$$

$$\text{Deoxyribonucleotides} \xrightarrow[\text{Intestinal Juice}]{\text{Nucleotidases}} \text{Nucleosides} + iPO_4$$

$$\text{Nucleosides} \xrightarrow[\text{Intestinal juice}]{\text{Nucleosidases}} \text{Purine/Pyrimidine} + \text{5-C sugar (Pentose)}$$

(Pentose)

372 **(c)**

Excessive intake of saturated fats like butter, ghee, vegetable oils, red meat and eggs in diet give rise to increase in blood cholesterol level, *i. e.*, hypercholesterolemia. Symptoms of this disease are rise in blood pressure and cardiac disorders.

373 **(c)**

Excessive intake of food like ghee, butter red meat and eggs in diet gives rise to increase in the blood sugar level, *i.e.,* hypercholesterolemis. It is characterised by high blood pressure and causes cardiac disorder. Fluorosis is caused by excessive intake of fluorine. Symptom of this disease are molted teeth

374 **(d)**

Mucous neck or goblet cells secrete mucus. It protects stomach wall against HCl action and protein digesting enzymes.

375 **(c)**

Cellulose is digested by bacteria and protozoans in large intestine of herbivorous mammals. In rabbits, fermentation and absorption of cellulose is not complete in a single passage. So, these animals eat their faeces (coprophagy).

376 **(d)**

Large intestine and buccal cavity are the site of absorption. In buccal cavity or oral cavity, certain drugs are absorbed when they comes in contact of mucosa and lower side of the tongue, while large intestine is the site of water, mineral and drugs absorption

377 **(d)**

Proteins are made up of amino acids. In stomach, the proteins are broken down into peptones and large peptides by **pepsin** or in small intestine, the proteins are broken down into large peptides by **trypsin** and the peptides into amino acids by **peptidases**.

378 **(c)**

Vitamin-C is an important sugar acid. It is present in the form of ascorbic acid in sour fruits like lemon, orange, amla, etc.

379 **(c)**

Thiamine or vitamin-$B_1$ or anti-neuritic or anti beri-beri vitamin is a water soluble vitamin. The sources of thiamine are wheat flour, egg, meat,

liver, yeast, ect. The deficiency of it causes beri-beri, polyneuritis and cardiovascular atrophy. The symptoms of disease are loss of appetite and weight, retarded growth , muscular dystrophy, heart enlargement, ect.

380 **(c)**
Treatment with alloxan and streptozoin destroys beta cells of islets of Langerhans. Both alloxan and streptozoin produce diabetic state.

381 **(c)**
Vitamins are the compounds of different complexity, which do not provide energy but control energy yielding reactions (metabolic activities) of our body. These actually work as organic catalysts or various cofactors for the enzymes of our body. Thus, these are essential or indispensible but required in very small quantities.

382 **(b)**
Enzyme ptyalin is present is saliva. It acts on some polysaccharides and convert them into disaccharide maltose.

383 **(d)**
Vitamin-C (ascorbic acid) is obtained from citrus fruits, *e. g.*, lemon, orange, amla, guave, etc. Vitamin-C helps in the formation of normal collagen, bone matrix, tooth dentine and other extracellular materials. It is essential for the formation and growth of connective tissues, cartilages, bones, teeth, etc.

384 **(d)**

| **Column I** | **Column II** |
|---|---|
| Goblet cells | Mucus |
| Lysozyme | Antibacterial agent |
| Saliva | Sublingual gland |
| Oxyntic cells | Hydrochloric acid |

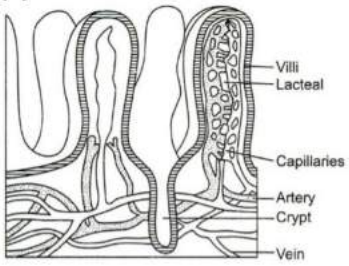
385 **(c)**
The tusks of an elephant are its second upper incisors. Tusks grows continuously.

386 **(d)**
Food or diet is composed of necessary nutrients, which provides the basic requirements of life, *i.e.,* energy and raw materials. So, nutrition can be defined as "the sum total of process which provides necessary nutritive elements for growth, maintenance and for meeting their energy need"

387 **(d)**
The bolus is conveyed into the pharynx and then into the oesophagus by swallowing or deglutition. Succus entricus is the secretion of goblet cells, which is also known as intestinal juices. Bolus contain masticated food particles

388 **(c)**
**Vitamin –K** (naphthoquinone) is an essential cofactor involved in synthesis of prothrombin in liver cells, which is in turn essential for blood clotting, prevention of haemorrhage and excessive bleeding in wounds. This vitamin is synthesized by colon bacterium hence, a dietary source is not usually necessary.

389 **(a)**




By a transverse section of mucosa of small intestine, villi can be observed along with capillaries, artery and crypt of Leiberkuhn. The four basic layers of alimentary canal shows modification in different parts of alimentary canal

390 **(d)**
Pancreatic juices can hydrolase carbohydrates, fats, proteins and nucleic acids

$$\text{Starch} \xrightarrow[\text{amylase}]{\text{Pancreatic}} \text{Maltose} + \text{Isomaltose} + \text{Dextrins}$$

$$\text{Peptones} \xrightarrow{\text{Chymotrypsin}} \text{Dipeptides}$$

$$\text{Emulsified fat} \xrightarrow[\text{lipase}]{\text{Pancreatic}} \text{Fatty acids} + \text{Diglycerides}$$

$$\text{DNA} \xrightarrow{\text{DNase}} \text{Deoxyribonucleotides}$$