Chapter 3

Digestion and Absorption

Solutions

SECTION - A

Objective Type Questions

(Digestive System)

1. Pyloric sphincter regulates the opening of

   (1) Pharynx into oesophagus (2) Oesophagus into stomach

   (3) Stomach into duodenum (4) Ileum into large intestine

Sol. Answer (3)

Pyloric sphincter present in the pyloric region of the stomach which regulates the opening of stomach into duodenum.

2. The structural and functional unit of liver is

   (1) Cystic duct (2) Hepatic lobule

   (3) Hepatopancreatic duct (4) Sphincter of Oddi

Sol. Answer (2)

Hepatic lobules are the structural and functional units of liver containing hepatic cells arranged in the form of cords.

3. Match the following

	Column I (Salivary gland)		**Column II (Their location)**
a.	Parotids	(i)	Below tongue
b.	Sub-maxillary/sub-mandibular	(ii)	Lower jaw
c.	Sub-linguals	(iii)	Cheek

(1) a(i), b(ii), c(iii) (2) a(i), b(iii), c(ii) (3) a(ii), b(i), c(iii) (4) a(iii), b(ii), c(i)

Sol. Answer (4)

Parotid - Present near cheek

Sub-maxillary/sub - Mandibular - Present at lower jaw

Sub-linguals - Present below tongue

4. Bile can be prevented from being release into duodenum by

(1) Sphincter of Oddi (2) Cardiac sphincter (3) Pyloric sphincter (4) Ileo-caecal valve

Sol. Answer (1)

Sphincter of Oddi guards the common hepatopancreatic duct, through which the bile is released into duodenum.

5. Dental formula for the monophyodont teeth of human is

(1) $\frac{0021}{0021}$ (2) $\frac{0003}{0003}$ (3) $\frac{2120}{2120}$ (4) $\frac{2102}{2102}$

Sol. Answer (1)

Monophyodont $\Rightarrow \frac{0021}{0021}$

Diphyodont $\Rightarrow \frac{2102}{2102}$

Incisors Canines Premolars Molars

6. Upper molars in human dentition have

(1) Four roots (2) Three roots (3) Two roots (4) Single root

Sol. Answer (2)

Root formula = $\frac{1\ 1\ 2\ 3}{1\ 1\ 1\ 2} \rightarrow$ Upper jaw / Lower jaw

I C P M

7. Which of the following can be taken as true stomach in ruminants?

(1) Rumen (2) Reticulum (3) Omasum (4) Abomasum

Sol. Answer (4)

In ruminants, abomasum is a true stomach which secrete gastric juice and release all enzyme here.

8. Oblique muscle layer is present in

(1) Stomach (2) Duodenum (3) Colon (4) All of these

Sol. Answer (1)

An oblique muscle layer is found inner to the circular muscle layer in stomach.

9. Sphincter of Boyden which helps in the filling up of gall bladder is present in

(1) Ductus choledoccus (2) Duct of Wirsung (3) Ampulla of Vater (4) Duct of Santorini

Sol. Answer (1)

Sphincter of Boyden present in ductus choledoccus (common bile duct), help in filling up of gall bladder. The sphincter opens to release the bile into hepatopancreatic duct.

10. Thecodont teeth are present in

a. *Sphenodon* b. Crocodiles c. Mammals d. *Scoliodon*

(1) c only (2) b & c only (3) a, b, & c only (4) a, b, c & d

Sol. Answer (2)

Crocodiles and mammals $\rightarrow$ Thecodont teeth

Sphenodon and Scoliodon $\rightarrow$ Acrodont teeth

11. Cholecystitis refers to

(1) Gall bladder (2) Stomach (3) Spleen (4) Lungs

Sol. Answer (1)

Cholecystitis refers to inflammation of gall bladder.

12. Adenoids are

(1) Tubal tonsils (2) Palatine tonsils (3) Lingual tonsils (4) Pharyngeal tonsils

Sol. Answer (4)

Pharyngeal tonsils are also known adenoids.

(Digestion of Food)

13. Which carbohydrate splitting enzyme initiates the chemical process of digestion in the oral cavity?

(1) Lysozyme (2) Salivary amylase (3) Pepsin (4) Rennin

Sol. Answer (2)

Lysozyme, pepsin, rennin, are not carbohydrate-digesting enzyme.

Salivary amylase : Only enzyme produced in buccal cavity that starts carbohydrate digestion.

14. The type of cells present in the gastric glands which secretes intrinsic factor?

(1) Peptic cells (2) Chief cells (3) Parietal cells (4) Both (1) & (2)

Sol. Answer (3)

Peptic cell or chief cells - Secrete pepsinogen.

Parietal or oxyntic cell - Secrete HCl and intrinsic factor which is essential for the absorption of Vit. B_{12}.

15. The proteolytic enzyme found in the gastric juice of infants which helps in the digestion of milk proteins is

(1) Renin (2) Rennin (3) Salivary amylase (4) Lysozyme

Sol. Answer (2)

Renin : It helps in osmoregulation

Rennin : Proteolytic enzyme found in the gastric juice of infants which helps in the digestion of protein.

Salivary amylase : help in digestion of carbohydrates.

Lysozyme : It is an antibacterial enzyme, present in saliva.

16. The pancreatic juice contains various enzymes, except

(1) Pepsinogen (2) Trypsinogen (3) Chymotrypsinogen (4) Procarboxypeptidase

Sol. Answer (1)

Pepsinogen is secreted by chief cells of gastric glands.

17. Select the **incorrect** option

(1) Bilirubin and biliverdin are the bile pigments

(2) Emulsification is the breakdown of the fats into very small droplets

(3) Rennin is a proteolytic enzyme found in the pancreatic juice of infants which helps in the digestion of milk protein

(4) Mucus and bicarbonates protect mucosal epithelium from excoriation by highly conc. HCl

Sol. Answer (3)

Rennin is found in the gastric juice, not in pancreatic juice.

18. The main enzymes present in the gastric juice are
(1) Trypsin, pepsin and lipase
(2) Pepsin, amylase and trypsin
(3) Pepsin, rennin and carboxypeptidase
(4) Pepsin, lipase and rennin

Sol. Answer (4)
Amylase is found in mouth and pancreatic juice

Carboxypeptidase, Trypsin } found in pancreatic juice

19. Match the following columns

Column I	Column II
a. Lysozyme	(i) HCl
b. Peptic cells	(ii) Antibacterial enzyme
c. Saliva	(iii) Sublingual gland
d. Oxyntic cells	(iv) Pepsinogen

(1) a(i), b(ii), c(iii), d(iv) (2) a(ii), b(iv), c(iii), d(i) (3) a(i), b(ii), c(iv), d(iii) (4) a(ii), b(iv), c(i), d(iii)

Sol. Answer (2)
Lysozyme – Has antibacterial activity
Peptic cell – Secrete pepsinogen
Saliva – Produced by sublingual salivary gland
Oxyntic cell – Secrete HCl

20. The digestion of which food component is affected if pancreas is removed?
(1) Carbohydrates (2) Proteins (3) Fats (4) All of these

Sol. Answer (4)
Pancreatic juice contains amylase for the digestion of carbohydrates, trypsinogen, chymotrypsinogen and carboxypeptidase for the digestion of proteins and lipase for lipid digestion.

21. At which site the emulsification of fat takes place?
(1) Pancreas (2) Gall bladder (3) Liver (4) Duodenum

Sol. Answer (4)
The bile juice stored in gall bladder travels through bile duct to the duodenum for emulsifying the fat.

22. Select the ions used for activation of ptyalin
(1) Sodium ions (2) Potassium ions (3) Chloride ions (4) None of these

Sol. Answer (3)

$$\text{In mouth, Starch}_{(30\%)} \xrightarrow[Cl^-]{\text{Ptyalin, pH = 6.8}} \text{Maltose + Isomaltose + Dextrins}$$

23. Select the *odd one*
(1) Gastrin (2) Trypsin (3) Secretin (4) Enterocrinin

Sol. Answer (2)
Trypsin is the enzyme and rest all are hormones.

24. When a piece of bread is chewed it tastes sweet because
(1) The sugar contents are drawn out (2) Saliva converts starch into maltose
(3) Saliva converts proteins into peptides (4) The taste buds are stimulated by chewing

Sol. Answer (2)
Bread has carbohydrate (starch) which when chewed in mouth, will digested by salivary amylase and converts it into maltose, which is sugar and sweet in taste.

25. Which of the following papillae are without taste buds in human tongue?

(1) Vallate (2) Fungiform (3) Fusiform (4) Filiform

Sol. Answer (4)

Filiform papillae are without taste buds in human tongue.

26. Digestion is completed in

(1) Duodenum (2) Ileum (3) Stomach (4) Cloaca

Sol. Answer (2)

It is a part of small intestine.

(Absorption of Digested Product, Disorder of Digestive System)

27. Select the **incorrect** option regarding digestion and absorption of substances in different parts of digestive system

(1) In large intestine, absorption of water, some minerals and drugs takes place

(2) Absorption of water, simple sugars and alcohol takes place in stomach

(3) Small intestine is the principal organ for absorption of nutrients

(4) Digestion is completed in large intestine

Sol. Answer (4)

The digestion is completed in small intestine, while large intestine helps in absorption of water.

28. Which of the following is a modification of mucosa of alimentary canal?

(1) Villi (2) Microvilli (3) Rugae (4) All of these

Sol. Answer (4)

Rugae are found in mucosal layer of stomach wall.

29. In acute constipation, purgatives that are used to stimulate intestinal peristalsis and evacuation of fluid faeces contain salts of

(1) Sodium (2) Magnesium (3) Potassium (4) Calcium

Sol. Answer (2)

For acute constipation, purgatives containing salts of magnesium are used to stimulate intestinal peristalsis and evacuation of fluid faeces as it increases the fluidity and volume of intestinal contents.

30. Prolonged constipation may cause

(1) Hemorrhoids (2) Ulcers (3) Cholera (4) Dysentery

Sol. Answer (1)

Prolonged constipation may cause hemorrhoids due to the rupture of blood vessel (varicose vein).

Hemorrhoids is also known as piles.

31. The blood capillaries of intestinal villi cannot absorb

(1) Glucose (2) Salts

(3) Long chain fatty acids and glycerides (4) Amino acids

Sol. Answer (3)

Long chain fatty acids and glycerides being insoluble, cannot be absorbed into blood. They first converted into chylomicrons, which are then transported into the lymph vessels (lacteals) in the villi. The lymph vessels ultimately release the absorbed substance into the blood stream.

32. Vitamin containing cobalt cyanide linkage is

(1) A (2) B_1 (3) B_6 (4) B_{12}

Sol. Answer (4)

Vitamin B_{12} contains cobalt cyanide linkage and thus is called cyanocobalamin.

33. Pernicious anaemia is caused by the deficiency of _____ vitamin

(1) B_1 (2) B_{12} (3) C (4) D

Sol. Answer (2)

Deficiency of vitamin B_{12} causes pernicious anaemia. It is a deadly anaemia because it is required for the maturation of RBC, DNA synthesis and myelin sheath synthesis.

34. Beri-beri is due to deficiency of vitamin

(1) B_7 (2) A (3) C (4) B_1

Sol. Answer (4)

Beri-beri disease occurs due to the deficiency of vitamin B_1 (Thiamine)

In this, muscle degeneration and nerve inflammation usually occur.

35. Which of the following pairs is **not** correctly matched?

(1) Vitamin B_{12} – Pernicious anaemia
(2) Vitamin B_6 – Loss of appetite
(3) Vitamin B_1 – Beri-beri
(4) Vitamin B_1 – Pellagra

Sol. Answer (4)

Pellagra is caused due to deficiency of vitamin B_3 i.e., Niacin.

SECTION - B

Previous Years Questions

1. Which of the following gastric cells indirectly help in erythropoiesis? **[NEET-2018]**

(1) Chief cells (2) Mucous cells (3) Parietal cells (4) Goblet cells

Sol. Answer (3)

Parietal or oxyntic cell is a source of HCl and intrinsic factor. HCl converts iron present in diet from ferric to ferrous form so that it can be absorbed easily and used during erythropoiesis.

Intrinsic factor is essential for the absorption of vitamin B_{12} and its deficiency causes pernicious anaemia.

2. Which of the following terms describe human dentition? **[NEET-2018]**

(1) Thecodont, Diphyodont, Homodont

(2) Thecodont, Diphyodont, Heterodont

(3) Pleurodont, Diphyodont, Heterodont

(4) Pleurodont, Monophyodont, Homodont

Sol. Answer (2)

In humans, dentition is

- Thecodont : Teeth are present in the sockets of the jaw bone called alveoli.
- Diphyodont : Teeth erupts twice, temporary milk or deciduous teeth are replaced by a set of permanent or adult teeth.
- Heterodont dentition : Dentition consists of different types of teeth namely incisors, canine, premolars and molars.

3. Which cells of 'Crypts of Lieberkuhn' secrete antibacterial lysozyme? **[NEET-2017]**

(1) Argentaffin cells (2) Paneth cells (3) Zymogen cells (4) Kupffer cells

Sol. Answer (2)

– Kupffer-cells are phagocytic cells of liver.

– Zymogen cells are enzyme producing cells.

– Paneth cells secretes lysozyme which acts as anti-bacterial agent.

– Argentaffin cells are hormone producing cells.

4. A baby boy aged two years is admitted to play school and passes through a dental check-up. The dentist observed that the boy had twenty teeth. Which teeth were absent? **[NEET-2017]**

(1) Incisors (2) Canines (3) Pre-molars (4) Molars

Sol. Answer (3)

Total number of teeth in human child = 20. Premolars are absent in primary dentition.

5. Which of the following options best represents the enzyme composition of pancreatic juice? **[NEET-2017]**

(1) Amylase, peptidase, trypsinogen, rennin

(2) Amylase, pepsin, trypsinogen, maltase

(3) Peptidase, amylase, pepsin, rennin

(4) Lipase, amylase, trypsinogen, procarboxy-peptidase

Sol. Answer (4)

Rennin and pepsin enzymes are present in the gastric juice. Maltase is present in the intestinal juice.

6. Which of the following guards the opening of hepatopancreatic duct into the duodenum? **[NEET-2016]**

(1) Sphincter of Oddi (2) Semilunar valve (3) Ileocaecal valve (4) Pyloric sphincter

Sol. Answer (1)

Sphincter of Oddi guards the opening of hepatopancreatic duct into the duodenum.

7. In the stomach, gastric acid is secreted by the **[NEET-2016]**

(1) Acidic cells (2) Gastrin secreting cells (3) Parietal cells (4) Peptic cells

Sol. Answer (3)

In stomach, gastric acid (HCl) is secreted by parietal cells of gastric gland

8. The primary dentition in human differs from permanent dentition in not having one of the following type of teeth **[Re-AIPMT-2015]**

(1) Incisors (2) Canine (3) Premolars (4) Molars

Sol. Answer (3)

Dental formula of human adult (permanent dentition) = $\frac{2123}{2123}$.

Dental formula of child (primary dentition) = $\frac{2102}{2102}$

So premolars and third molar (last molar) are absent in primary dentition.

9. The enzyme that is **not** present in succus entericus is **[Re-AIPMT-2015]**

(1) Lipase (2) Maltase (3) Nucleases (4) Nucleosidase

Sol. Answer (3)

Succus entericus is intestinal juice that contains maltase, lipase, nucleosidase. Nucleases are the enzymes of pancreatic juice.

10. Which of the following statements is **not correct**? **[AIPMT-2015]**
(1) Acini are present in the pancreas and secrete carboxypeptidase
(2) Brunner's glands are present in the submucosa of stomach and secrete pepsinogen
(3) Goblet cells are present in the mucosa of intestine and secrete mucus
(4) Oxyntic cells are present in the mucosa of stomach and secrete HCl

Sol. Answer (2)
Brunner's gland do not secrete pepsinogen. Peptic/chief cells secrete pepsinogen.

11. Gastric juice of infants contains **[AIPMT-2015]**
(1) Amylase, rennin, pepsinogen (2) Maltase, pepsinogen, rennin
(3) Nuclease, pepsinogen, lipase (4) Pepsinogen, lipase, rennin

Sol. Answer (4)
Maltase, Nuclease are found in intestine while rennin and pepsinogen are gastric secretions.

12. The initial step in the digestion of milk in humans is carried out by **[AIPMT-2014]**
(1) Lipase (2) Trypsin (3) Rennin (4) Pepsin

Sol. Answer (3)
The initial step in the digestion of milk in human is carried out by rennin a proteolytic enzyme.

13. Fructose is absorbed into the blood through mucosa cells of intestine by the process called: **[AIPMT-2014]**
(1) Active transport (2) Facilitated transport (3) Simple diffusion (4) Co-transport mechanism

Sol. Answer (2)
Fructose is absorbed by a mechanism which is independent of Na^+ called facilitated transport.

14. Select the **correct** match of the digested products in humans given in **column I** with their absorption site and mechanism in **column II** **[NEET-2013]**

Column I	**Column II**
(1) Fructose, Na^+	Small intestine, passive absorption
(2) Glycerol, fatty acids	Duodenum, move as chylomicrons
(3) Cholesterol, maltose	Large intestine, active absorption
(4) Glycine, glucose	Small intestine, active absorption

Sol. Answer (4)

15. Where do certain symbiotic microorganisms normally occur in human body **[AIPMT (Mains)-2012]**
(1) Duodenum (2) Caecum
(3) Oral lining and tongue surface (4) Vermiform appndix and rectum

Sol. Answer (2)
Caecum of large intestine is the site which hosts the symbiotic micro-organism.

16. Anxiety and eating spicy food together in an otherwise normal human, may lead to **[AIPMT (Prelims)-2012]**
(1) Vomiting (2) Indigestion (3) Jaundice (4) Diarrhoea

Sol. Answer (2)
During indigestion, the food is not properly digested leading to a feeling of fullness. The cause of indigestion are inadequate enzyme secretion, anxiety, food poisoning, spicy food and over eating.

17. Which one of the following enzymes carries out the initial step in the digestion of milk in humans? **[AIPMT (Prelims)-2011]**
(1) Trypsin (2) Pepsin (3) Rennin (4) Lipase

Sol. Answer (3)
Rennin is a proteolytic enzyme, that first acts on milk.

18. Two friends are eating together on a dining table. One of them suddenly starts coughing while swallowing some food. This coughing would have been due to improper movement of **[AIPMT (Prelims)-2011]**

(1) Tongue (2) Epiglottis (3) Diaphragm (4) Neck

Sol. Answer (2)

Epiglottis prevents entry of food in wind pipe by closing glottis.

19. Which one of the following correctly represents the normal adult human dental formula? **[AIPMT (Mains)-2011]**

(1) $\frac{2}{2},\frac{1}{1},\frac{2}{2},\frac{3}{3}$ (2) $\frac{3}{3},\frac{1}{1},\frac{3}{3},\frac{3}{3}$ (3) $\frac{3}{3},\frac{1}{1},\frac{3}{2},\frac{1}{1}$ (4) $\frac{2}{2},\frac{1}{1},\frac{3}{2},\frac{3}{3}$

Sol. Answer (1)

There are 32 teeth in a human adult $\frac{2123}{2123}\times 2 = 32$

20. One of the constituents of the pancreatic juice while poured into the duodenum in humans is **[AIPMT (Mains)-2011]**

(1) Trypsin (2) Enterokinase (3) Trypsinogen (4) Chymotrypsin

Sol. Answer (3)

Trypsin is an active form of trypsinogen. Enterokinase is present in intestinal juice.

In Duodenum, $\text{Trypsinogen} \xrightarrow{\text{Enterokinase}} \text{Trypsin}$

$\text{Chymotrypsinogen} \xrightarrow{\text{Trypsin}} \text{Chymotrypsin}$

Trypsin and chymotrypsin are not present in pancreatic juice; their inactive forms **(zymogen)** are is present in pancreatic juice.

21. If for some reason our goblet cells are non-functional, this will adversely affect **[AIPMT (Prelims)-2010]**

(1) Smooth movement of food down the intestine

(2) Production of somatostatin

(3) Secretion of sebum from the sebaceous glands

(4) Maturation of sperms

Sol. Answer (1)

Goblet cells secrete mucus.

22. Carrier ions like Na^+ facilitate the absorption of substances like **[AIPMT (Prelims)-2010]**

(1) Fructose and some amino acids

(2) Amino acids and glucose

(3) Glucose and fatty acids

(4) Fatty acids and glycerol

Sol. Answer (2)

Amino acids and glucose both are absorbed by carrier mediated facilitated transport.

23. If for some reason the parietal cells of the gut epithelium become partially non-functional, what is likely to happen? **[AIPMT(Mains)-2010]**

(1) The pancreatic enzymes and specially the trypsin and lipase will not work efficiently

(2) The pH of stomach will fall abruptly

(3) Steapsin will be more effective

(4) Proteins will not be adequately hydrolysed by pepsin into proteoses and peptones

Sol. Answer (4)

Oxyntic cell $\rightarrow$ Secretes HCl

Pepsinogen $\xrightarrow{HCl}$ Pepsin(active)

Protein $\xrightarrow{Pepsin}$ Proteoses + Peptones

So, if for some reason, the oxyntic cells of the gut epithelium become partially non-functional, then protein will not be adequately hydrolysed by pepsin into proteoses and peptones.

24. Jaundice is a disorder of **[AIPMT (Mains)-2010]**

(1) Excretory system (2) Skin and eyes

(3) Digestive system (4) Circulatory system

Sol. Answer (3)

In jaundice, the liver is affected, bile pigments like bilirubin, get increase in blood causing yellowness in skin and eyes.

25. 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: **[AIPMT (Prelims)-2009]**

(1) Rickets (2) Kwashiorkor

(3) Pellagra (4) Marasmus

Sol. Answer (4)

Marasmus occurs due to deficiency of protein and calories and it usually occurs in infant i.e., below one year of age.

26. 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. What is this yellow colour due to? **[AIPMT (Prelims)-2009]**

(1) Bile pigments passed through bile juice

(2) Undigested milk protein casein

(3) Pancreatic juice poured into duodenum

(4) Intestinal juice

Sol. Answer (1)

The yellow colour of faecal matter is due to stercobilin, which is obtained from the breakdown of bilirubin which is a bile pigment.

27. Which one of the following pairs of food components in humans reaches the stomach totally undigested? **[AIPMT (Prelims)-2009]**

(1) Starch and fat (2) Fat and cellulose (3) Starch and cellulose (4) Protein and starch

Sol. Answer (2)

The enzyme cellulase is not present and fats are digested in small intestine after emulsification with bile.

28. What will happen if the secretion of parietal cells of gastric glands is blocked with an inhibitor?

[AIPMT (Prelims)-2008]

(1) Enterokinase will not be released from the duodenal mucosa and so trypsinogen is not converted to trypsin

(2) Gastric juice will be deficient in chymosin

(3) Gastric juice will be deficient in pepsinogen

(4) In the absence of HCl secretion, inactive pepsinogen is not converted into the active enzyme pepsin.

Sol. Answer (4)

In the absence of HCl secretion, inactive pepsinogen is not converted into the active enzyme pepsin.

Parietal cells of gastric gland is responsible for the secretion of HCl and further HCl is responsible for the conversion of pepsinogen into pepsin.

29. Which one of the following is the correct matching of the site of action on the given substrate, the enzyme acting upon it and the end product? **[AIPMT (Prelims)-2008]**

(1) Stomach : Fats $\xrightarrow{\text{Lipase}}$ micelles

(2) Duodenum : Triglycerides $\xrightarrow{\text{Trypsin}}$ monoglycerides

(3) Small intestine : Starch $\xrightarrow{\alpha \text{ Amylase}}$ Disaccharide (Maltose)

(4) Small intestine : Proteins $\xrightarrow{\text{Pepsin}}$ Amino acids

Sol. Answer (3)

First option is wrong because

Fats $\xrightarrow{\text{Lipase}}$ Monoglycerides

Second option is wrong because

Triglycerides $\xrightarrow{\text{Lipase}}$ Monoglycerides

Second option is wrong because

In stomach, Proteins $\xrightarrow{\text{Pepsin}}$ Amino acids

30. Which one of the following is a fat-soluble vitamin and its related deficiency disease?

[AIPMT (Prelims)-2007]

(1) Calciferol– Pellagra

(2) Ascorbic acid – Scurvy

(3) Retinol – Xerophthalmia

(4) Cobalamine – Beri-beri

Sol. Answer (3)

Vitamin C and B complex are water soluble vitamins.

31. A person who is on a long hunger strike and is surviving only on water, will have:

[AIPMT (Prelims)-2007]

(1) Less urea in his urine

(2) More sodium in his urine

(3) Less amino acids in his urine

(4) More glucose in his blood

Sol. Answer (1)

32. 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 **[AIPMT (Prelims)-2006]**

(1) Thiamine (2) Folic acid and cobalamine

(3) Riboflavin (4) Iron compounds

Sol. Answer (2)

This patient is suffering from megaloblastic anemia and can treated by consuming folic acid.

33. A patient is generally advised to specially, consume more meat, lentils, milk and eggs in diet only when he suffers from **[AIPMT (Prelims)-2005]**

(1) Kwashiorkor (2) Rickets (3) Anaemia (4) Scurvy

Sol. Answer (1)

Protein rich dict is recommended in case of malnutrition disorder like kwashiorkor.

34. Secretin and cholecystokinin are digestive hormones. They are secreted in : **[AIPMT (Prelims)-2005]**

(1) Oesophagus (2) Ileum (3) Duodenum (4) Pyloric stomach

Sol. Answer (3)

Secretin and CCK are secreted in duodenum.

35. Which group of three of the following five statements (A-E) contain is all three correct statements regarding beri-beri?

A. A crippling disease prevalent among the native population of sub-Sahara Africa.

B. A deficiency disease caused by lack of thiamine (vitamin B_1).

C. A nutritional disorder in infants and young children when the diet is persistently deficient in essential protein.

D. Occurs in those countries where the staple diet is polished rice.

E. The symptoms are pain from neuritis, paralysis, muscle wasting, progressive oedema, mental deterioration and finally heart failure. **[AIPMT (Prelims)-2005]**

(1) A, B and D (2) B, C and E

(3) A, C and E (4) B, D and E

Sol. Answer (4)

Option 'A' and 'C' are observed in case of children suffering from PEM.

36. Protective components of food are

(1) Minerals, vitamins and water (2) Minerals, carbohydrate and proteins

(3) Minerals, carbohydrate and fats (4) Vitamins, water and carbohydrate

Sol. Answer (1)

Minerals, vitamins and water are protective principles of food because although they do not provide us energy but their deficiency cause diseases and abnormalities. Carbohydrate, protein and fats are proximate principles of food.

37. Which of the following is **correct** location and function of Meissner's plexus of intestine?

(1) Muscularis external - Peristalsis

(2) Muscularis internal - Peristalsis

(3) Submucosa - Mucosal secretions

(4) Mucosa - Mucosal secretions

Sol. Answer (3)

Meissner's plexus are located in the sub mucosa of alimentary canal and their function is mucosal secretion.

Meissner's plexus also known as Remak's plexus.

38. Which of the following is true regarding the source and nature of the enamel?

(1) Odontoblast, mesodermal (2) Odontoblast, ectodermal

(3) Ameloblast, mesodermal (4) Ameloblast, ectodermal

Sol. Answer (4)

Enamel is ectodermal in origin.

39. Choose the correct enzyme-substrate pair

(1) Lipase, carbohydrate (2) Maltase, lactose (3) Rennin, casein (4) Amylase, protein

Sol. Answer (3)

$$\underset{\text{(substrate)}}{\text{Casein}} \xrightarrow[\text{(enzyme)}]{\text{Renin}} \text{Paracasein}$$

40. The following are absent in case of upper one third part of oesophagus, **except**

(1) Visceral peritoneum (Serosa) (2) Digestive gland

(3) Myenteric plexus (4) Skeletal muscles

Sol. Answer (4)

Because upper 1/3rd part of oesophagus is voluntary and lower 2/3rd part of oesophagus is involuntary.

Skeletal muscles are also known as voluntary muscles so they are present in the voluntary part of oesophagus (*i.e.,* 1/3rd part)

41. Mark the **correct** statement

(1) In lower one third part of oesophagus both Myenteric and Meissner's plexus are absent

(2) Carboxypeptidase is exopeptidase acting on 'N' terminal end of peptide chain

(3) Galactosemia is metabolic genetic disorder due to deficiency of the enzyme uridyl transferase

(4) Nucleotidase and nucleosidase enzymes are present in pancreatic juice

Sol. Answer (3)

Statement-1 is wrong, because in upper one-third part of oesophagus both myenteric and meissner's plexus are absent.

Statement-2 is wrong, because carboxypeptidase is an exopeptidase acting on 'C' terminal end of peptide chain.

Statement-4 is wrong, because nucleotidase and nucleosidase enzymes are present in intestinal juice.

42. Sphincter of Oddi guards

(1) Hepato-pancreatic duct (2) Common bile duct

(3) Pancreatic duct (4) Cystic duct

Sol. Answer (1)

The common bile duct and the pancreatic duct open together into the duodenum as the common hepatopancreatic duct which is guarded by sphincter of Oddi.

Cystic duct $\rightarrow$ Duct of gall bladder (neck of gall bladder)

43. Which of the following is correct pairing of site of action and substrate of rennin?

(1) Mouth-starch (2) Small intestine-protein

(3) Stomach-casein (4) Stomach-fat

Sol. Answer (3)

In infants, rennin acts on casein (milk protein) and converts casein to paracasein in stomach

So, site of action is stomach and substrate is casein.

44. If liver is removed, the compound which is not absorbed by mucosa of intestine is

(1) Proteins (2) Carbohydrates

(3) Fats (4) Lactose

Sol. Answer (3)

If liver is removed, fats will not be absorbed by mucosa of intestine because liver produces bile juice for the emulsification of fats.

45. What is common among amylase, rennin and trypsin?

(1) These are produced in stomach

(2) These act at a pH lower than 7

(3) These all are proteins

(4) These all are proteolytic enzymes

Sol. Answer (3)

Amylase, rennin and trypsin, they all are digestive enzymes and enzymes are usually protein in nature

They all are not proteolytic enzymes because amylase acts on carbohydrate.

46. Hydrolytic enzymes which act in low pH are called

(1) Lipases (2) α-Amylase

(3) Hydrolases (4) Peroxidase

Sol. Answer (3)

All digestive enzymes are hydrolytic enzymes but hydrolases is the only enzyme among four given options which acts in low pH.

Lipases $\rightarrow$ Act in alkaline pH

α-Amylases $\rightarrow$ Act in weak acidic and alkaline medium

Peroxidase $\rightarrow$ Enzymes present in peroxisome and act on neutral pH.

47. Which of the following hydrolyses internal phosphodiesterase bonds in a polynucleotide chain?

(1) Lipase (2) Protease

(3) Endonuclease (4) Exonuclease

Sol. Answer (3)

Endonuclease is an enzyme which hydrolyses internal phosphodiesterase bonds in a polynucleotide chain.

48. Brunner's glands are present in

(1) Stomach (2) Oesophagus (3) Ileum (4) Duodenum

Sol. Answer (4)

Brunner's glands are located in the submucosa of duodenum

49. The enzyme enterokinase helps in the conversion of

(1) Paracasein into casein (2) Trypsinogen into trypsin

(3) Pepsinogen into pepsin (4) Proteins into polypeptides

Sol. Answer (2)

$$\text{Trypsinogen} \xrightarrow{\text{Enterokinase}} \text{Trypsin}$$

$$\text{Casein} \xrightarrow{\text{Renin}} \text{Paracasein}$$

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

$$\text{Protein} \xrightarrow[\text{enzyme}]{\text{Proteolytic}} \text{Polypeptide}$$
$$\{\text{trypsin, pepsin etc}\}$$

50. Activation of pro-carboxypeptidase into carboxypeptidase is brought about by

(1) Enterokinase (2) Endopeptidase (3) Exopeptidase (4) Trypsin

Sol. Answer (4)

$$\text{Trypsinogen} \xrightarrow{\text{Enterokinase}} \text{Trypsin}$$

$$\text{Procarboxypeptidase} \xrightarrow{\text{Trypsin}} \text{Carboxypeptidase}$$

51. Which of the following is the function of enterogastrone?

(1) It inhibits the secretion of gastric juice

(2) It stimulates the secretion of digestive juice in the stomach

(3) It stimulates the flow of pancreatic juice

(4) It regulates the flow of bile

Sol. Answer (1)

It inhibits the secretion of gastric juice. Enterogastrone is a gastric inhibitory protein which acts on stomach and inhibits gastric juice secretion.

52. The contraction of gall bladder is caused by

(1) Cholecystokinin (2) Enterogastrone (3) Gastrin (4) Secretin

Sol. Answer (1)

Cholecystokinin is a hormone, which acts on gall bladder and stimulates the contraction of gall bladder to release bile juice.

53. The hormone that stimulates the stomach to secrete gastric juice is

(1) Enterokinase (2) Enterogastrone (3) Gastrin (4) Rennin

Sol. Answer (3)

This hormone is secreted in stomach and stimulates the gastric gland to secrete and release the gastric juice.

54. Cholecystokinin and duocrinin are secreted by

(1) Adrenal cortex (2) Thyroid gland (3) Intestine (4) Pancreas

Sol. Answer (3)

Hormone	**Source**
Cholecystokinin	Small intestine
Pancreozymin	Small intestine
Duocrinin	Duodenum (part of small intestine)

55. Which part of body secretes the hormone secretin?

(1) Stomach (2) Oesophagus (3) Ileum (4) Duodenum

Sol. Answer (4)

Duodenum secretes secretin which decreases the secretion of gastric juice.

56. Which of the following hormones is **not** secreted by duodenum to inhibit the gastric motility?

(1) GIP (2) Enterogastrone (3) Secretin (4) Enterokinase

Sol. Answer (4)

Enterokinase is not a hormone, it is an enzyme.

57. Which of the following carries glucose from digestive tract to liver?

(1) Pulmonary vein (2) Hepatic artery

(3) Hepatic portal vein (4) None of these

Sol. Answer (3)

Hepatic portal vein carries glucose from digestive tract to liver via a hepatic portal circulation.

58. In case of vertebrates lacteals are found in

(1) Oesophagus (2) Ear (3) Small intestine (4) Ischium

Sol. Answer (3)

Lacteals are found in villi of small intestine.

59. The movement of ions against the concentration gradient will be

(1) Active transport (2) Osmosis (3) Diffusion (4) All of these

Sol. Answer (1)

Active transport requires energy (ATP) for the movement of ions against the concentration gradient.

60. Vomiting centre is located in the

(1) Medulla oblongata (2) Stomach and sometimes in duodenum

(3) GI tract (4) Hypothalamus

Sol. Answer (1)

Vomiting centre is located in medulla oblongata.

61. Which one of the following vitamins can be synthesized by bacteria inside the gut?

(1) D (2) A (3) B_1 (4) C

Sol. Answer (3)

Vitamin K and Vitamin B complex are synthesized by bacteria of large intestine (colon).

62. Which one of the following is a protein deficiency disease?

(1) Kwashiorkor (2) Night blindness (3) Eczema (4) Cirrhosis

Sol. Answer (1)

Kwashiokor $\rightarrow$ Occurs due to deficiency of protein.

Night blindness $\rightarrow$ Due to deficiency of vitamin A.

Eczema $\rightarrow$ Scaliness of skin due to allergy or due to deficiency of Vit. B_7.

Cirrhosis $\rightarrow$ It occurs due to deposition of fibre in liver in alcoholic person.

63. Stool of a person is whitish grey coloured due to malfunction of which of the following organ?

(1) Pancreas (2) Spleen (3) Kidney (4) Liver

Sol. Answer (4)

The yellow colour of stool is due to stercobilin, which is a breakdown product of bile pigment (bilirubin)

And as liver is responsible for the production of bile juice. If there is malfunctioning of liver, then bile will not produce and stool of person become whitish grey.

64. Constipation can be prevented or removed by

(1) Taking more roughage (2) Taking purgatives rich in magnesium salt

(3) Taking distilled water (4) Both (1) & (2)

Sol. Answer (4)

Constipation can be prevented by taking more roughage because it is a fibre and retains more water with it and increase the fluidity.

And constipation is also removed by taking purgatives rich in magnesium salt because it stimulates intestinal peristalsis and evacuation of fluid faeces.

65. During prolonged fasting, in what sequence are the following organic compounds used up by the body?

(1) First carbohydrates, next fats and lastly proteins (2) First fats, next carbohydrates and lastly proteins

(3) First carbohydrates, next proteins and lastly lipids (4) First proteins, next lipids and lastly carbohydrates

Sol. Answer (1)

Carbohydrates are nutrients that are utilised first providing energy followed by fats that also provide energy. Proteins will provide energy at last because proteins are actually a body building biomolecules.

66. A moderately active person requires energy per day

(1) 2000 kcal (2) 1000 kcal (3) 750 kcal (4) 2800 kcal

Sol. Answer (4)

The minimum energy required for routine metabolic rate is 2200 kcal (in female) and 2800 kcal (in male)

SECTION - C

Assertion-Reason Type Questions

1. A : Gastrectomy causes iron deficiency anaemia.

R : Hydrochloric acid secreted by oxyntic cells converts ferric into ferrous and iron is absorbed as ferrous ions.

Sol. Answer (1)

Gastrectomy is surgical removal of stomach which removes HCl producing cells.

2. A : Cholagogues are substances that cause contraction of gall bladder.

R : These substances cause release of CCK-PZ from duodenum.

Sol. Answer (1)

Cholagogues increase the secretion of bile juice.

3. A : Aptyalism patients have higher than normal incidences of dental caries.

R : Aptyalism is caused by the action of parasympathetic nervous system.

Sol. Answer (3)

Aptyalism is a condition in which no saliva is produced, so there will be no lysozyme with anti-microbial activity prevent a person from dental caries.

4. A : In humans, duct of Wirsung from pancreas combines with bile duct before opening into duodenum.
R : Blockage in duct of Wirsung will prevent the endocrine function of pancreas.

Sol. Answer (3)

Blockage of duct of Wirsung will prevent exocrine function of pancreas.

5. A : In acute constipation, purgatives containing magnesium salts are generally used.
R : The osmotic effect of Mg^{2+} in the intestinal lumen prevents water reabsorption from intestine.

Sol. Answer (1)

Purgatives are used for the treatment of acute constipation.

6. A : Liver assists in digestion of fats.
R : Hepatic secretion contains bile salts which emulsify fat

Sol. Answer (1)

Liver secretes bile juice which is rich in bile salts.

7. A : Vomiting is the forcible expulsion of the contents of the upper gastrointestinal tract through the mouth.
R : The strongest stimuli for vomiting are irritation and distension of the stomach.

Sol. Answer (2)

Both assertion and reason are true but the reason is not the correct explanation of the assertion.

8. A : Gastric emptying is slowest after a fat-laden meal containing large number of triglycerides.
R : Fatty acids in chyme stimulate release of both CCK and GIP, which slow stomach emptying.

Sol. Answer (1)

GIP (Gastric Inhibitory Peptide) decreases gastric motility and CCK (Cholecystokinin).

9. A : Trypsin is secreted in pancreatic juice as trypsinogen.
R : Zymogenic forms protect pancreas from autodigestion.

Sol. Answer (1)

Trypsinogen is inactive form of trypsin.

10. A : Trypsin is an example of endopeptidase and is present in the pancreatic juice.
R : Trypsin acts on the interior peptide bonds of a protein molecule.

Sol. Answer (1)

Pepsin, trypsin and chymotrypsin are endopeptidase enzymes.

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