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B -147, Sector -6 Noida, UP - 201301,
www.askiitians.com
Email: info@askiitians.com
Tel: 1800-2000-838

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Class: 11
Subject: Biology
Topic: Digestion and absorption
No. of Questions: 25

Q1. What are enzymes?

Sol. Enzymes are organic catalysts found in living organisms, which alter the fate of a chemical change, but remains unchanged themselves at the end of the reaction.

Q2. What is the main function of the villi and microvilli?

Sol. The main function of the villi and microvilli is to increase the absorptive area of the intestine.

Q3. How is ingested fat absorbed in the body?

Sol. Fat is absorbed in the small intestine. Bile salts secreted by the liver break down the bigger molecules of fat globules into smaller droplets. This process is known as emulsification. The enzyme lipase acts on emulsified fast and converts them into diglycerides and monoglycerides. In the end, the fats are converted into fatty acids, glycerol and monoglycerides.

Q4. What is egestion?

Sol. Egestion is passing out undigested food from the body.

Q5. Name the enzyme secreted by the salivary glands of man.

Sol. Saliva contains an enzyme ptyalin or salivary amylase, which acts upon starch and converts it into sugars.

Q6. What is the function of teeth?

Sol. The function of the teeth is to tear and crush food particles.

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Q7. You have eaten boiled rice for lunch. Make a list of enzymes that will act upon the rice and the changes it will undergo before being absorbed in the small intestine.

Sol. Rice contains starch. The digestion of starch takes place in the mouth or buccal cavity. The saliva contains salivary amylase enzyme, which converts starch into maltose, isomaltose and dextrin. The pancreatic juice also contains amylase, which upon the starch and changes it into glucose and fructose. The intestinal juice also acts upon maltose, isomaltose and converts them into glucose.

Q8. Where the taste buds are located?

Sol. The taste buds are located on the tongue.

Q9. Name the source of trypsin and the food constituent, which this enzyme hydrolyses.

Sol. Pancreatic juice is the source of trypsin. It hydrolyses proteins into peptides.

Q10. What is meant by digestion? Briefly describe the process of digestion of food in the small intestine of man.

Sol. Digestion is a process in which complex food materials are broken down by enzymes into simpler substances, which can easily assimilated by the body.

The process of digestion in the small intestine begins from the stomach. The pancreatic duct and bile duct open into the duodenum. Here the food gets mixed by bile juice and pancreatic juice. Bile juice does not contain any enzyme. However, it plays an important part in digestion as it provides an alkaline medium to food and helps in emulsification of fat. The pancreatic juice contains the following enzymes, which act upon different kinds of food stuffs.

(i) Trypsin, which acts on proteins and changes them to peptones.
(ii) Pancreatic amylase, which acts on carbohydrates and changes them to maltose or to other complex sugars.
(iii) Lipase, which acts on fats and changes them to soluble fatty acids and glycerol.

The intestinal glands secrete enzymes like,

1. Pepsin, which helps to convert peptides into amino acids.
2. Maltose, which changes maltose to glucose.
3. Lactose changes into glucose and

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4. Sucrose changes into glucose.

In this way, the digestion of food is completed in the small intestine.

Q11. Where gastric juice is found?

Sol. Gastric juice is found in the stomach.

Q12. What is intracellular digestion?

Sol. Intracellular digestion is the digestion occurring with in the cell.

Q13. How does coagulation of milk in the alimentary canal take place?

Sol. When milk reaches the stomach, protein digestion starts. Pepsin stimulates the digestion of proteins in milk. HCl activates pepsinogen into pepsin. It hydrolyses soluble casein into paracasein to make solid curd, i.e., coagulation of milk. Renin, a milk coagulating enzyme is secreted as pro-renin, but in HCl it is hydrolysed into active rennin. Renin hydrolyses casein into paracasein leading to milk coagulation.

Q14. Write the role of bile salts in the digestion and absorption of fats.

Sol. Bile is secreted by the liver and is very important in the digestion of fats. It reduces the size of the fat globules. Smaller the size, larger the surface area of fat droplets and hence, greater the action of lipase. Bile juice also helps in the absorption of fats. Most of the water-soluble end products of fat digestion are actively absorbed from the intestine. But monoglycerides, diglycerides and fatty acids are insoluble in water. So they cannot be directly absorbed from the intestine. As a result of bile action, small droplets called micelles are formed. These micelles are absorbed into the intestinal walls.

Q15. Which is the largest gland of the body?

Sol. largest gland of the body is liver.

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Q16. Differentiate between the large intestine and small intestine.

Sol.

| Small intestine | Large intestine |
|---|---|
| (a) The intestine is – 4.5 to 6m in length. | 1. The large intestine is only 1.5 m long. |
| (b) It does not have epiploic appendages. | 2. Epiploic appendages are present. |
| (c) Digestion is completed in the small intestine. | 3. Large intestine plays no role in digestion. |
| (d) The small intestine secretes a number of hormones. | 4. The large intestine does not secrete hormones. |
| (e) It absorbs the digested nutrients. | 5. It takes part only in the absorption of water. |
| (f) Villi are present. | 6. Villi area absent. |
| (g) Peyer's patches are present in the small intestine. | 7. Payer's patches are absent in the large intestine. |
| (h) Taeniae coli is absent. | 8. Taeniae coli is present. |
| (i) Haustra are absent. | 9. Haustra are present. |
| (j) The small intestine is narrow and 3.5 to 4.5 cm in width. | 10. The large intestine is comparatively broader and 4.6 cm in diameter. |
| (k) The small intestine has three parts Duodenum, Jejunum and ileum. | 11. The large intestine has four parts Caecum, colon, Rectum and Anus. |
| (l) Circular folds (Plicae circulares) are present in the small intestine. | 12. Circular folds are absent in the large intestine. |

Q17. Can man digest cellulose?

Sol. No man can digest cellulose.

Q18. What are micelles?

Sol. Monoglycerides, long chain fatty acids and digested fats unite with bile salts to form small spherical droplets known as micelles.

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Q19. How would it affect the digestion of proteins and carbohydrates in the duodenum of a man, if there is a blockade in the pancreatic duct? Explain.

Sol. When there is a blockage in the pancreatic duct will be non-availability of pancreatic juice. The protease and amylase do not act on protein and carbohydrate in the duodenum. So digestion of proteins and carbohydrates in the duodenum of a man is not seen.

Q20. What are the digestive fluids added to the food in the duodenum? What is their action?

Sol. In the duodenum, pancreatic juice and bile juice are discharged by the pancreas and liver respectively. The pancreatic juice is secreted by pancreas and is brought to the duodenum with the help of pancreatic duct. Bile juice is secreted by liver cells. The pancreatic juice contains three enzymes, they are,

**(i)** Trypsin – It converts peptones into peptides and polypeptides.
**(ii)** Amylase – It converts all digestible polysaccharides to disaccharides.
**(iii)** Lipase – It converts fats to fatty acids and glycerol.

Q21. How would non-secretion of saliva affect digestion of food in the mouth?

Sol. Salivary amylase would not be able to digest starch of sugars.

Q22. The wall of the alimentary canal has a thick layer of muscles. What is their function?

Sol. The thick layers of muscles in the alimentary canal breaks the solid food into semi liquid food. It also facilitates the movement of food in the alimentary canal towards small intestine.

Q23. How would non-secretion of hydrochloric acid in our stomach affect food digestion? Explain.

Sol. In the absence of HCL (Hydrochloric acid) pepsinogen is not activated and converted into pepsin.

(i) Hence no protein digestion takes place.
(ii) It will not kill bacteria in the stomach (antiseptic action).

Q24. Name any two proteases in the pancreatic juice. What are their specific roles?

Sol. Chymotrypsin and trypsin are the two proteases in the pancreatic juice. They enable simultaneous stimulation of all pancreatic proteases for a very rapid digestion of proteins.

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Q25. Name the cells that secrete mucus. What are the functions of mucus?

Sol. Goblet cells secrete mucus. They are found in mucosal epithelium and are celled mucous glands.

Functions of mucus:

(i) Mucus acts as lubricant.
(ii) It protects the epithelial surface from excoriation and digestion.
(iii) It makes the food slippery also.