

Board – ICSE

Class – 9

Topic – Digestive System

### 1. Define digestion. Why is it necessary?

Ans: Digestion is the process by which insoluble complex food substances are broken down into soluble and simpler form having smaller molecules, which can easily be absorbed by blood. It is through this process of digestion that food is converted into simpler diffusible molecules which can easily pass through membranes and enter blood. Food is thus carried to all parts of the body.

### 2. State the importance of hydrochloric acid in stomach.

Ans: Hydrochloric acid in stomach performs two functions:

- (i) It kills bacteria swallowed along with the food.
- (ii) It provides an acidic medium for pepsin to act upon proteins.

### 3. Give the end products of digestion of protein, fats and carbohydrates.

Ans: Proteins → Amino acids

Fats → Fatty acids and glycerol

Carbohydrates → Simple sugars

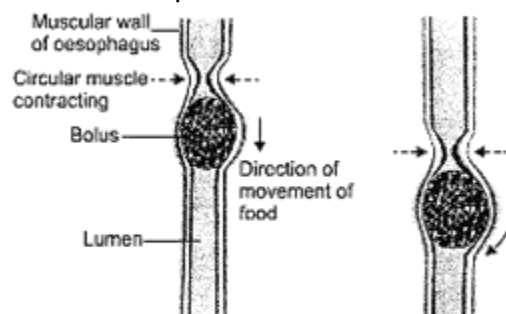
Starch → Maltose → Glucose

Sucrose → Glucose and fructose

Lactose → Glucose and galactose

### 4. Define peristalsis. Mention its role in digestion.

Ans: The movement of food along the esophagus and rest of the alimentary canal is brought about by the rhythmic contraction and relaxation of the muscular walls. The rhythmic waves of contractions and relaxation by which food moves down the alimentary canal is called peristalsis. Peristalsis thus help in the movement of food downwards in the alimentary canal.



Movement of Bolus in oesophagus by peristalsis

## 5. What are villi? How are they adapted for the absorption of food?

Ans: Villi are finger-like projections on the inner surface of small intestine. Each villus is covered by a single layer of epithelium and contains blood capillaries and lymph vessel. Villi increase the surface area for absorption. The epithelium of villi helps in easy diffusion of digested food.

## 6. What is the fate of food after it is digested and absorbed?

Ans: The food after digestion and absorption is assimilated into body substances and protoplasm of the cells. This takes place in following ways:

- (i) The final products of fat digestion — fatty acids and glycerol — are absorbed in the blood stream through the lacteals. In the body, they are again converted into fats and excess fats are stored in adipose tissue. This stored fat can be utilized by the body in times of need.
- (ii) The simple sugars absorbed through the intestinal villi are used for generating energy for various life activities. The excess sugars are converted in man into a complex polysaccharide, glycogen, in the liver. It can be reutilized during stress conditions.
- (iii) The amino acids are utilized to synthesize different proteins required by the body. Amino acids are not stored in the body. The excess amino acids are broken down in the liver by a process of deamination and is converted into urea for excretion. The remaining part may be converted into glucose and stored for future use.

## 7. What are enzymes? Give three characteristics of enzymes.

Ans: Enzymes are chemical compounds, proteinaceous in nature, produced in the cells of living organisms. Characteristics of Enzymes: Enzymes show the following characteristics:

- (i) Enzymes are proteins in nature. Being proteinaceous, they are destroyed by heating.
- (ii) Enzymes are biocatalysts; they accelerate the rate of chemical reactions.
- (iii) Enzymes are specific in their action. A particular enzyme acts only on one substrate
- (iv) Enzymes always produce the same end-product.
- (v) Enzymes work within a narrow temperature range of 35°C to 40°C. At higher or lower temperatures, enzyme activity is reduced. At very high or very low temperatures, enzymes become ineffective as they get destroyed.

(vi) Enzymes are sensitive to changes in acidity or alkalinity (pH). They act most rapidly in a particular degree of acidity or alkalinity. For example, the enzyme – pepsin requires an acidic medium, while trypsin requires an alkaline pH.

**8. Name the enzymes present in the succus entericus.**

Ans: Peptidase, lipase, maltase, sucrose and lactase.

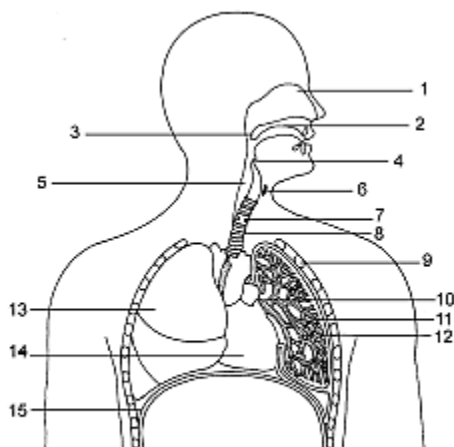
**9. State three conditions under which the enzymes become inactive.**

Ans:

- (i) At very high or very low temperatures, enzymes become inactive.
- (ii) Since enzymes require a specific pH to act upon, any change in acidity or alkalinity of the medium affects the enzyme activity or even inactivates them
- (iii) Some chemicals inactivate the enzymes.

**10. Draw a labelled diagram to show the alimentary canal of man.**

Ans:



**Digestive System of Human**

**11. Name the enzymes present in pancreatic juice and state their functions.**

Ans: Pancreatic juice contains a number of enzymes which act in alkaline medium. The

Enzymes are

- (i) Trypsin: converts remaining proteins into peptones and the peptones into peptides and amino acids
- (ii) Amylase: converts the undigested starch into maltose (continues the process begun in mouth) and
- (iii) Steapsin (Lipase): converts fats into fatty acids and glycerol

**12. What is bile? Give its function.**

Ans: Bile: It is a yellowish fluid produced in liver and stored in gall bladder. It contains

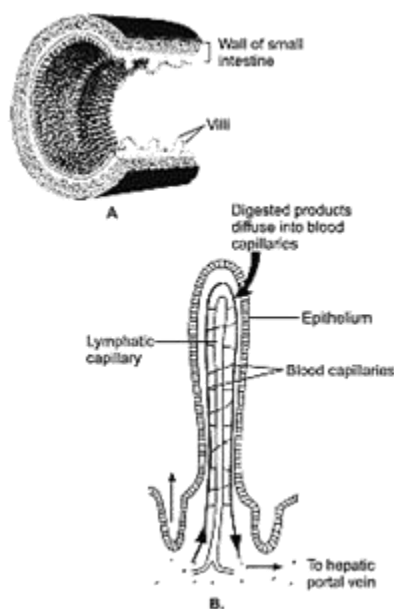
- (i) Sodium salts: These reduce the acidity of chyme (making the medium alkaline) and emulsify fats (breaks them into smaller globules and lowers the surface tension), and

(ii) The pigments which are the excretory products resulting from disintegration of red blood cells (this gives yellow colour to the bile). Bile contains no enzymes.

### 13. How is ileum adapted for the absorption of food?

Ans: The ileum is well adapted for the process of digestion. It is long so that food is retained in it for a longer period, and shows following characters:

- (i) The inner lining of small intestine has millions of fingerlike projections called villi throughout its length. These increase the surface area for absorption.
- (ii) Single- cell epithelium.
- (iii) The epithelium of villi has mucus lining throughout its length for easy diffusion of digested food.



### 14. One should not talk during swallowing. Give reasons.

Ans: During swallowing, the food has to pass over the windpipe (trachea) to enter the esophagus. To avoid the entry of food into the trachea and choking, one should not talk during swallowing.

### 15. What is dentition? Give dental formula of man, dog and rabbit.

Ans: Dentition: The arrangement of different types of teeth on the jaws is called dentition.

$$\text{Dental formula of man } I = \frac{2}{2}, C = \frac{1}{1}, P = \frac{2}{2}, M = \frac{3}{3} = \frac{8}{8} \times 2 = 32$$

$$\text{Dental formula of dog } I = \frac{3}{3}, C = \frac{1}{1}, P = \frac{4}{4}, M = \frac{2}{2} = \frac{10}{11} \times 2 = 42$$

$$\text{Dental formula of rabbit } I = \frac{2}{1}, C = \frac{0}{0}, P = \frac{3}{2}, M = \frac{3}{3} = \frac{8}{6} \times 2 = 28$$