1. Choose the correct answer among the following:
(a) Gastric juice contains
(i) pepsin, lipase and rennin
(ii) trypsin, lipase and rennin
(iii) trypsin, pepsin and lipase
(iv) trypsin, pepsin and rennin.
(b) Succus entericus is the name given to
(i) a junction between ileum and large intestine
(ii) intestinal juice
(iii) swelling in the gut
(iv) appendix.
Solution:
(a) (i) Pepsin, lipase and rennin
(b) (ii) Intestinal juice

2. Match column I with column II.

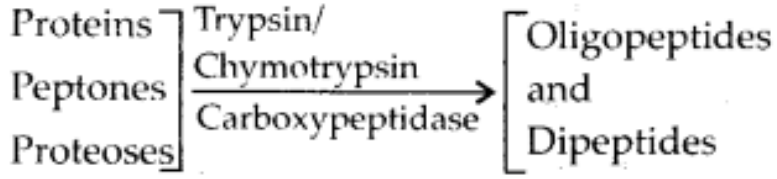
Column I		Column II	
(a)	Bilirubin and biliverdin	(i)	Parotid
(b)	Hydrolysis of starch	(ii)	Bile
(c)	Digestion of fat	(iii)	Lipases
(d)	Salivary gland	(iv)	Amylases

Solution:
(a) - (ii),- (b) - (iv), (c) - (iii),- (d) - (i)

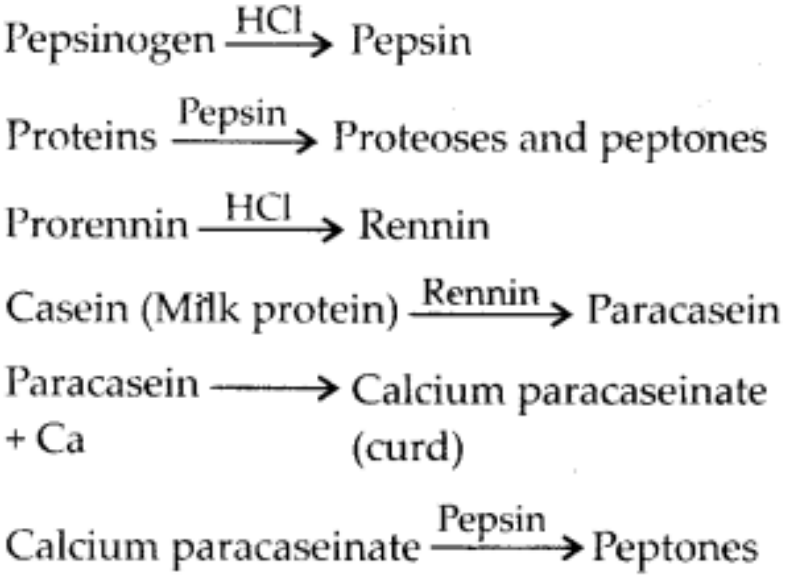
3. Answer briefly:
(a) Why are villi present in the intestine and not in the stomach?
(b) How does pepsinogen change into its active form ?
(c) What are the basic layers of the wall of alimentary canal?
(d) How does bile help in the digestion of fats ?
Solution:
(a) The absorptive surface area of small intestine is enormously increased by microvilli and as maximum absorption of digested food takes place in small intestine as compared to other organs, therefore, villi are present in small intestine and not in stomach. Moreover, stomach is primarily associated with temporary storage of food.
(b) The proenzyme pepsinogen, on exposure to hydrochloric acid, secreted by oxyntic cells of gastric glands gets converted into the active enzyme pepsin, the proteolytic enzyme of the stomach.
(c) The wall of alimentary canal from oesophagus to rectum possesses four layers, namely serosa, muscularis, sub-mucosa and

mucosa. Serosa is the outermost layer and is made up of a thin mesothelium with some connective tissues. Muscularis is formed by smooth muscles. The sub-mucosal layer is formed of loose connective tissues containing nerves, blood and lymph vessels. In duodenum, glands are also present in sub-mucosa. 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 foldings called villi in the small intestine.
(d) Bile has no enzymes but contains bile salts, namely, sodium bicarbonate, sodium glycocholate and sodium taurocholate that reduce the surface tension of large fat droplets and break them into many small droplets by a process known as emulsification. These small fat droplets present large surface area for lipase (fat digesting enzyme) to act upon them. Moreover, bile also activates lipases.

4. State the role of pancreatic juice in digestion of proteins.
Solution: The pancreatic juice contains inactive enzymes - trypsinogen, chymotrypsinogen, procarboxypeptidases. Trypsinogen is acti¬vated by an enzyme enterokinase, (secreted by the intestinal mucosa) into active trypsin, which in turn activates the other enzymes of the pancreatic juice. Proteins, proteoses and peptones (partially hydrolysed proteins) in the chyme reaching the intestine are acted upon by these proteolytic enzymes of pancre¬atic juice.



5. Describe the process of digestion of protein in stomach.
Solution: The gastric glands of the stomach secrete gastric juice that contains HCl and proenzymes - pepsinogen and prorennin. The proenzyme pepsinogen, on exposure to HCl gets converted into the active enzyme pepsin, the proteolytic enzyme of stomach. The pepsin converts proteins into proteoses and peptones (peptides). Prorennin is found in gastric juice of infants and is activated by pepsin into active rennin. It helps in digestion of milk protein casein.



6. Give the dental formula of human beings.
Solution: The dental formula of human beings is

$$\frac{2123}{2123} \text{ i.e. } i\frac{2}{2},\ c\frac{1}{1},\ pm\frac{2}{2},\ m\frac{3}{3} = 16$$

It shows arrangement of teeth in each half of the upper and lower jaw.

$$\text{or} \quad \frac{2+1+2+3}{2+1+2+3} \times \frac{2}{2} = \frac{16}{16} \quad \text{or } 32.$$

7. Bile juice contains no digestive enzymes, yet it is important for digestion. Why ?
Solution: Bile has no enzymes but contains bile salts, namely, sodium bicarbonate, sodium glycocholate and sodium taurocholate that reduce the surface tension of large fat droplets and break them into many small droplets by a process known as emulsification. These small fat droplets present large surface area for lipase (fat digesting enzyme) to act upon them. Moreover, bile also activates lipases.

$$\text{Fat (triglyceride)} \xrightarrow{\text{Bile}} \text{Emulsified fat}$$

8. Describe the digestive role of chymotrypsin. Which two other digestive enzymes of the same category are secreted by its source gland ?
Solution: Chymotrypsin is a proteolytic enzyme of pancreatic juice secreted by exocrine part of pancreas. It helps in digestion of proteins. It converts proteins, peptones and proteoses into oligopeptides and dipeptides. Two other proteolytic enzymes present in pancreatic juice are trypsinogen and procarboxypeptidase.

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