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UNIQUE NOTES

BIOLOGY 10

Prepared for the Session 2026-27
According to the New Curriculum of PECTAA 2025-26



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Letter from the Research & Development (R&D) Department

Dear Respected Educators,

- It gives us great pleasure to present the sample chapter of our newly developed notes for the academic session 2026–27.
- These notes have been prepared with dedication and careful planning by our Research & Development team in line with the latest curriculum requirements.
- Designed to meet modern educational standards and student needs, these notes include accurate textbook solutions, additional questions, exam-focused practice material, and clear explanations to support excellent results.
- We believe that quality guidance and smart preparation lead to student success. Therefore, these notes aim to help students excel academically and compete for top positions.
- We are pleased to share this first chapter so your institution may begin planning and preparation while the complete books are being finalized.
- We sincerely hope these notes will prove valuable for your teachers and students. Your trust continues to inspire us to maintain the highest standards of educational excellence.

With best regards,

Ziyad Khan
Principal
Research & Development Department

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**Important Figures of Full Book for
Better Understanding**



Chapter 01

HUMAN DIGESTIVE SYSTEM

- i. Nutrition and its importance
- ii. Human Digestive System
- iii. Disorders of the Digestive System

EXTENSIVE ANSWER QUESTIONS

NUTRITION AND ITS IMPORTANCE

Q.1 What is nutrition? Describe its main steps in animals. 10401001

Ans. Key Points: Nutrition | Main steps of Nutrition

1. **Nutrition:** Nutrition is how organisms get and use nutrients. It helps them to grow, stay healthy, and repair their bodies.

2. **Heterotrophic Nutrition**

Animals, including humans, cannot make their own food. They get it from other organisms. This is called **heterotrophic nutrition**.

3. **Main Steps of Nutrition**

In animals, nutrition takes place in the following main steps:

- a. **Ingestion:** Taking in food and drinks through the mouth.
- b. **Digestion:** Breaking food into smaller parts the body can absorb.
- c. **Absorption:** Moving nutrients from the digested food into the blood or lymph.
- d. **Assimilation:** Using the absorbed nutrients in cells and tissues.
- e. **Egestion:** Removing undigested food and waste from the body.

S.Q: Define autotrophic and heterotrophic nutrition. 10401001a

Ans. Autotrophic nutrition is a mode of nutrition in which organisms produced their own food from inorganic substances using light or chemical energy.

Heterotrophic nutrition is a mode of nutrition in which organisms obtain their food by consuming other organisms or organic matter.

Q.2 What is digestion? Where it takes place? 10401002

Ans. Key Points: Digestion | Occurrence

1. **Digestion:** The food we eat consists of polymers i.e., large molecules like carbohydrates, proteins, and fats. They cannot pass through cell membranes. These polymers must be broken down into smaller, soluble parts called monomers - like sugars (glucose), amino acids, and fatty acids. This process is called **digestion**. These small molecules can enter the cells.

2. **Occurrence:** This process happens inside our digestive system.

HUMAN DIGESTIVE SYSTEM

Q.3 Describe the main region of human digestive system. Also discuss their functions.

Ans. Key Points: Parts of Alimentary Canal | Oral Cavity | Oesophagus Stomach

Small Intestine | Large Intestine

10401003

Parts of Alimentary Canal

The human digestive system consists of a long tube and some helper (accessory) organs. The tube is called the alimentary canal. It starts at the mouth and ends at the anus. Alimentary canal consists of;

- **Oral cavity:** Involves in digestion of carbohydrates.
- **Oesophagus:** Responsible for the transport of food.
- **Stomach:** Involves in storage of food, also involves in partial digestion of proteins.
- **Small intestine:** Most of the digestion and absorption of food occurs in small intestine.
- **Large intestine:** Egestion of waste food takes place in large intestine, absorption of water and vitamins also occur here.

The accessory organs (glands) consist of;

- Salivary glands
- Liver
- Pancreas

The salivary glands, liver, and pancreas send their juices into the alimentary canal and aid in digestion.

Q.4 Explain the role of oral cavity in the digestive system.

10401004

Ans. Key Points: Oral Cavity | Mechanical Digestion | Chemical Digestion | Swallowing

(a) Oral Cavity: The space behind mouth is called **oral cavity** or **mouth cavity**. It contains **taste buds** on the surface of tongue for the taste of food.

S.Q: What is the role of Tongue in digestion?

10401004a

Ans. During this grinding, tongue keeps the food between the teeth.

(b) Functions

(i) Mechanical Digestion: The **mechanical digestion** of food begins in oral cavity. During mechanical digestion, the teeth cut and grind food into smaller pieces.

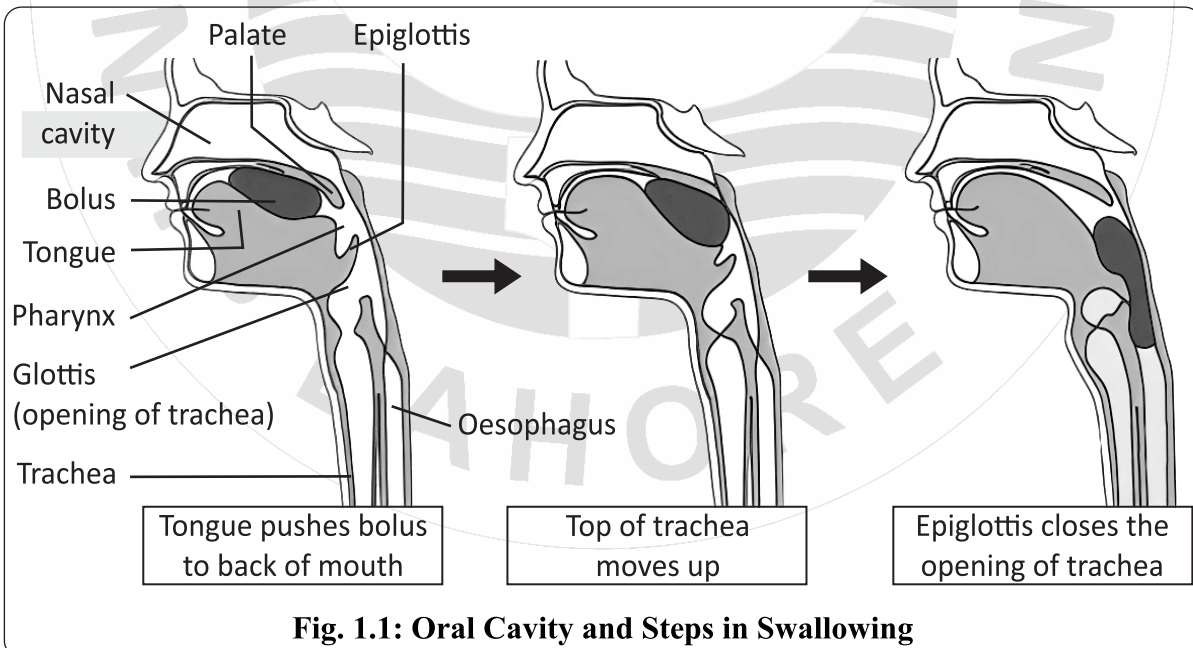


Fig. 1.1: Oral Cavity and Steps in Swallowing

(ii) Chemical Digestion: In oral cavity, **partial chemical digestion** of carbohydrates is done by three pairs of **salivary glands**.

- These glands are attached with oral cavity and secrete **saliva** - a mixture of water, mucus, and a digestive enzyme called salivary **amylase**.

- Water and mucous moisten the food pieces.
- Salivary amylase breaks down the starch present in food into maltose.

(iii) Swallowing

- After the physical and partial chemical digestion, the food mass in oral cavity is called **bolus**.
- It is swallowed by pushing it into the pharynx.
- For swallowing, the tongue moves the bolus to the back of the oral cavity. The swallowed food enters the pharynx.
- During swallowing, the palate (roof of oral cavity) moves upward to close the opening of the nasal cavity.

S.Q: What do you know about starch and maltose?

10401004b

Ans. Starch is a polysaccharide (made up of many sugar molecules). Maltose is a disaccharide (made of two sugar molecules).

Q.5 Describe the role of pharynx and also discuss peristalsis.

10401005

Ans. Key Points: Pharynx | Oesophagus | Peristalsis

1. Pharynx

(a) **Introduction:** Pharynx is a short tube-like part after oral cavity. It connects oral cavity to oesophagus and also connects nose to windpipe (trachea).

(b) Functions

- The process of chemical digestion that started in oral cavity continues here.
- An important function of pharynx is to prevent the entry of food particles into lungs.
- It is done with the help of an elastic cartilage tissue called **epiglottis**.
- When swallowed food passes through pharynx, the top of trachea (windpipe) is pushed up against epiglottis.
- In this way, the opening of trachea (glottis) closes and the swallowed food passes over it.

2. Oesophagus

(a) **Introduction:** Oesophagus is a long tube (about 25 cm or 9.84 inches long). It connects the pharynx to the stomach.

(b) Functions

- When food enters oesophagus, successive waves of contraction are generated in its muscular walls.
- These waves of contractions move food along the oesophagus to the stomach.
- These waves of muscular contraction are called **peristalsis**.

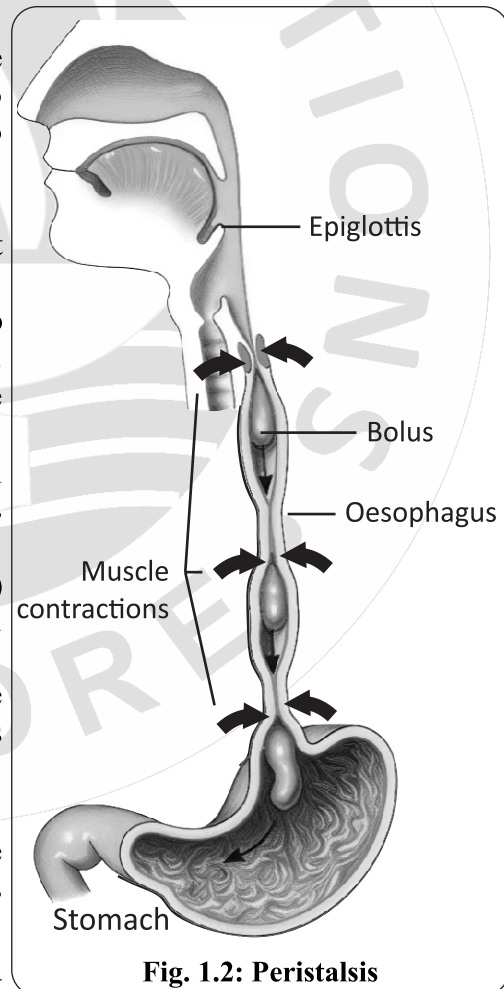


Fig. 1.2: Peristalsis

Q.6 Explain the structure and functions of stomach.

10401006

Ans. Key Points: Stomach | Structure | Functions (Chemical and Mechanical Digestion)

Stomach

- Shape and Location:** J-shaped stomach is located in the upper left side of the abdominal cavity, below the diaphragm.
- Structure**

Cardiac End and Pyloric End: The part of stomach immediately after oesophagus is called **cardiac end** while the part before small intestine is called **pyloric end**.

Cardiac Sphincter: At the junction of the oesophagus and stomach, there is sphincter (ring of muscles) called **cardiac sphincter** (lower oesophageal sphincter). It prevents food from flowing back from stomach into the oesophagus.

Pyloric Sphincter: Similarly, **pyloric sphincter** is present between stomach and small intestine.

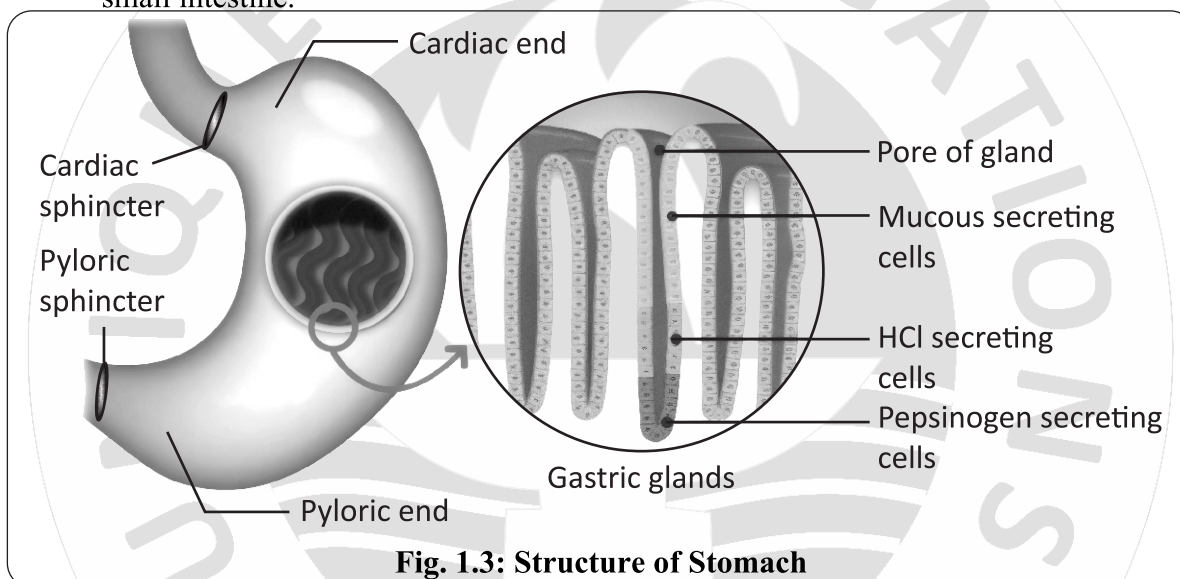


Fig. 1.3: Structure of Stomach

3. Functions

- (a) **Process of digestion in Stomach:** Stomach is responsible for the mechanical and partial chemical digestion of food. It also stores food. The walls of stomach are made of thick smooth muscles. When food arrives in stomach, these muscles contract rigorously. Their contractions help in the churning (breaking down) of food into smaller particles. Heat is also produced due to this churning. This heat helps to melt the lipids.

S.Q: How is inner lining of stomach protected from its own acid?

10401006a

Ans. The stomach's HCl is so strong it can dissolve metal, but your stomach is protected by the thick mucus lining that keeps it safe from its own acids.

- (b) **Gastric Juice:** Many small **gastric glands** present in the inner walls of stomach secrete **gastric juice**. It contains hydrochloric acid, an inactive enzyme pepsinogen, and mucus.
- HCl:** Hydrochloric acid converts **pepsinogen** into an active enzyme **pepsin**. Hydrochloric acid also kills pathogenic bacteria present in food.
 - Pepsin:** Pepsin breaks large proteins into shorter chains of amino acids called **peptides**.



- **Mucus:** The mucus forms a protective layer on the inner walls of stomach. Here, it neutralizes the HCl. So, pepsinogen cannot be activated here and the walls are protected from breakdown.

4. Chyme Formation

Food usually remains in stomach for three to four hours. Due to the actions in stomach, the food becomes a soup-like mixture called chyme.

5. Entry of Chyme into small intestine

The pyloric sphincter controls the flow of chyme. Each time the pyloric sphincter opens, about 5 to 15 ml of chyme moves into the small intestine.

Q.7 Describe the process of digestion in small intestine.

10401007

Ans. Key Points: Small Intestine | Digestion in small intestine | Pancreatic Juice

Small Intestine

1. **Length:** Small intestine is highly coiled tube and is nearly 7 m (about 23 ft) long.
2. **Parts:** It has three parts:
 - (a) **Duodenum** is the first part. It is about 25 cm (about 10 inches) long.
 - (b) **Jejunum** is the middle part. It is about 2.5 m (about 8 feet) long.
 - (c) **Ileum** is the last part. It is about 4 m (about 13 feet) long.

3. Digestion in small intestine

In duodenum, secretions of liver and pancreas act on food.

(a) **Bile**

- The secretion of liver i.e. bile enters duodenum through common bile duct.
- Bile contains salts which are produced in the liver. These bile salts break large fats into small droplets.
- Bile also contains pigments that are formed when RBCs are broken in liver. These pigments are removed from the body with faeces.
- In this way, a milky fluid is formed in which fat droplets are kept separate.

(b) **Pancreatic Juice / Justify the importance of Pancreas**

- The secretion of pancreas i.e., pancreatic juice enters duodenum through pancreatic duct, which joins the common bile duct before entering duodenum.
- Pancreatic juice contains many enzymes e.g., trypsin, pancreatic amylase and lipase. These enzymes digest proteins, carbohydrates and lipids respectively.
- Pancreatic juice also contains sodium bicarbonate that neutralizes the acidity of chyme.
- The glands present in the walls of small intestine also secrete enzymes for the complete digestion of all types of food.

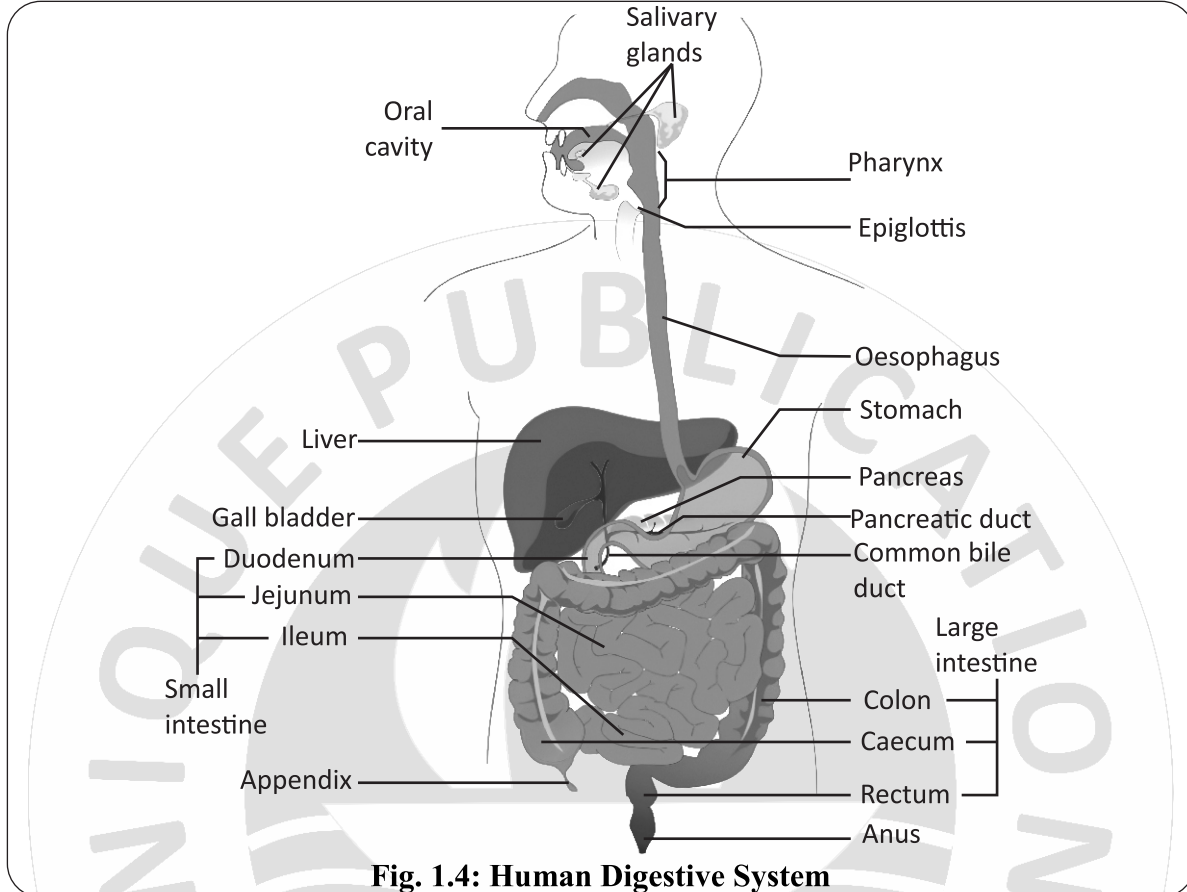


Fig. 1.4: Human Digestive System

Q.8 Describe absorption of food in small intestine.

10401007a

Ans. Key Point: Absorption of Food

- 1. Introduction:** After the complete digestion of food, the end products i.e., amino acids, simple sugars, glycerol, and fatty acids etc. move from alimentary canal into the circulatory system.
- 2. Villi:** The inner walls of small intestine are highly folded. Moreover, these folds have millions of finger-like projections called **villi** (singular; villus).
- 3. Functions of Villi:** The folds and villi provide a large surface area for the absorption of food. Food molecules are absorbed through this surface through diffusion and active transport.
- 4. Structure of Villus:** The wall of a villus is made of a single layer of cells. Inside the villus, there are blood capillaries and a lymph vessel called lacteal.
- 5. Absorption of Fatty Acids and Glycerol:** The glycerol and fatty acids present in small intestine enter the lacteals of villi. The lacteals carry them to the main lymph vessels, which empty into the blood vessels near the heart.
- 6. Absorption of Sugar and Amino Acids:** Amino acids and simple sugars enter the blood capillaries of villi. These capillaries join to make hepatic portal vein which carries the amino acids and sugars to liver. From liver, the hepatic vein carries these nutrients to heart and then to all parts of the body.

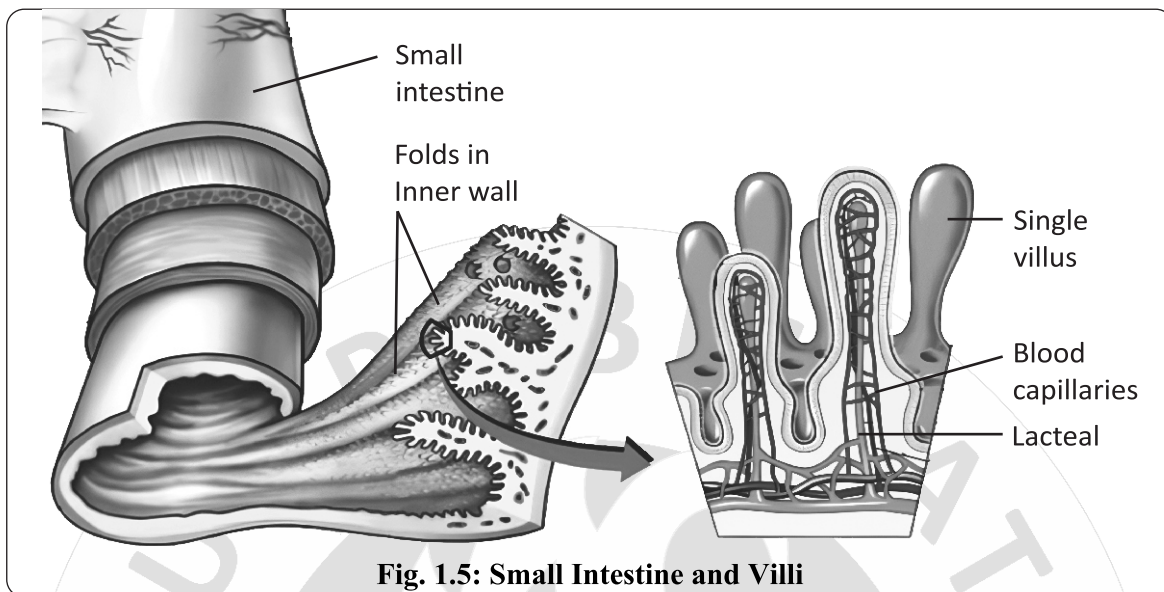


Fig. 1.5: Small Intestine and Villi

Table. 1.1: The action of enzymes in the regions of alimentary canal

Region	Enzyme	Substrate	Product
Oral Cavity	Salivary Amylase	Starch	Maltose
Stomach	Pepsin	Proteins	Peptides
Small Intestine	Pancreatic Amylase	Starch	Maltose
	Trypsin	Proteins	Peptides
	Chymotrypsin	Proteins	Peptides
	Peptidase	Peptides	Amino acids and peptides
	Lipase	Fats	Fatty acids and glycerol
	Nucleases	Nucleic acids	Nucleotides
	Maltase	Maltose	Glucose
	Sucrase	Sucrose	Glucose and Fructose
	Lactase	Lactose	Glucose and Galactose
	Dipeptidases	Dipeptides	Amino acids

Q.9 Write the note on structure and functions of large intestine. 10401008

Ans. Key Points: Parts of Large Intestine | Egestion

1. Large Intestine

(a) Introduction: After the absorption of digested food material and some water, the remaining undigested material and water move to the large intestine by peristalsis. Absorption of more water occurs from large intestine.

S.Q: What do you know about appendix? 10401008a

Ans. There is a small finger-like **appendix** at the blind end of caecum. It may seem like an unimportant organ (vestigial organ), but it actually plays a role in your immune system!

Infection in appendix causes severe pain. If infected appendix is not removed surgically, it can burst and infection may spread in abdomen.

- (b) **Parts of Large Intestine:** Large intestine has 3 parts:
- Caecum** (a pouch that forms junction with small intestine).
 - Colon.**
 - Rectum.**
- (c) **Egestion:** Due to it, the undigested material solidifies and is now called **faeces**. The faeces contain the undigested material, large number of bacteria, broken cells of alimentary canal, bile pigments and water. Faeces are temporarily stored in the rectum. During egestion, faeces are expelled out through anus.

Q.10 Describe the importance of liver / Write a note on the role of liver. 10401008b

Ans. Key Points: Location of Liver | Gall-bladder | Bile | Function of Liver

1. Role of Liver

- (a) **Location and Weight:** Liver is a large organ located to the right of the stomach. In an adult human, it weighs about 1.5 kg.
- (b) **Gall-bladder:** There is a sac-like organ, called **gall bladder**, on the ventral side of liver.
- (c) **Bile:** Liver secretes bile, which is stored in gall bladder. The common bile duct carries bile from gall bladder into duodenum. Bile does not contain enzymes but it has salts which break fats into small droplets. Bile salts also keep fat droplets separate from one another. It helps the enzymes to attack on lipids.
- (d) **Functions of Liver:** Liver also performs many other functions in the body. For example,
- Stores glucose as glycogen and breaks glycogen to glucose when required.
 - Stores fat-soluble vitamins.
 - Deamination:** Breaks amino acids. In this process, harmful ammonia is produced.
 - Detoxification:** Converts ammonia into less toxic urea for excretion through urine. Breaks toxic substances e.g., alcohol.
 - Breaks the RBCs which have completed their life spans.
 - Prepares vitamin-A from carotene.
 - Produces heat in cold temperatures by speeding up metabolism.

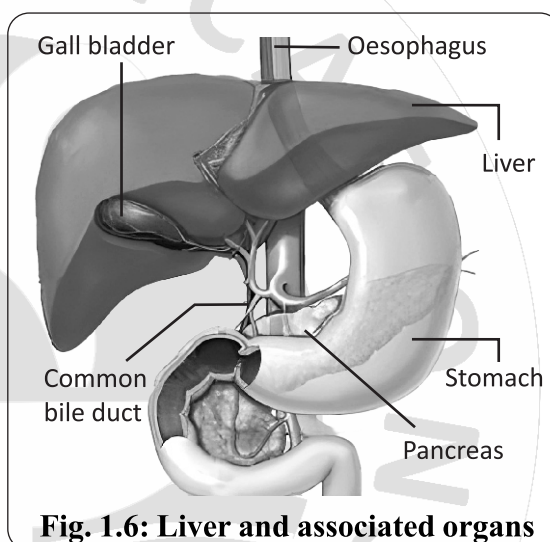


Fig. 1.6: Liver and associated organs

DISORDERS OF THE DIGESTIVE SYSTEM

Q.11 Write a note on disorders of digestive system. / Write symptoms, causes, treatment and prevention of the following disorders of digestive system.

(i) **Diarrhoea** (ii) **Constipation** (iii) **Ulcers** 10401009

Ans. Key Points: Diarrhoea: Causes, Symptoms, Treatment | Constipation: Causes, Symptoms, Treatment | Ulcers: Causes, Symptoms, Treatment

1. Diarrhoea

Diarrhoea is characterized by frequent, loose, or watery stools. Diarrhoea can lead to dehydration, especially in children and the adults.

- (a) **Signs and Symptoms:** Frequent, loose, or watery stools, abdominal cramps or pain, bloating, and dehydration (thirst, dry mouth, dark urine).
- (b) **Causes:** Infections (bacterial, viral, or parasitic), food allergies, stress, certain medications (e.g., antibiotics).
- (c) **Treatment:** Drinking plenty of fluids, eating a balanced diet, using anti diarrheal medications, taking antibiotics or other treatments (in severe cases).
- (d) **Prevention:** Washing hands regularly, especially before eating or after using the bathroom, avoiding contaminated food or water, avoid stress.

2. Constipation

Constipation is a condition in which faeces are not eliminated from the body at regular intervals.

- (a) **Signs and Symptoms:** Infrequent or difficult bowel movements (less than 3 times a week), hard and dry stools, abdominal discomfort or bloating.
- (b) **Causes:** Lack of fibre in diet, dehydration, lack of physical activity, certain medicines (e.g., painkillers, iron supplements), and other diseases (e.g., diabetes).
- (c) **Treatment:** Increasing fibre intake (fruits, vegetables, whole grains), drinking plenty of water, regular exercise, use medicines called laxatives.
- (d) **Prevention:** Eating a high-fibre diet, drinking plenty of fluids.

3. Ulcers

Peptic ulcers are sores that develop in the walls of alimentary canal.

(a) Types of Ulcers

- (i) Ulcer usually develops in the walls of stomach and is called **gastric ulcer**.
- (ii) However, ulcers may also develop in duodenum (**duodenal ulcer**).
- (iii) The ulcer of oesophagus is called **oesophageal ulcer**.

- (b) **Signs and Symptoms:** Burning stomach pain, rush of saliva after regurgitation, loss of appetite, weight loss, blood vomiting (in severe cases).

- (c) **Causes:** Infection due to *Helicobacter pylori* bacteria, long-term use of nonsteroidal anti-inflammatory drugs (NSAIDs), excessive alcohol consumption, smoking, stress (though not a direct cause, it can make symptoms worse).

- (d) **Treatment:** Antibiotics to clear *H. pylori* infection, other medicines called antacids and proton pump inhibitors are also used to cure ulcer.

- (e) **Prevention:** Avoiding excessive use of painkillers (NSAIDs), avoiding spicy foods, eating a balanced diet.

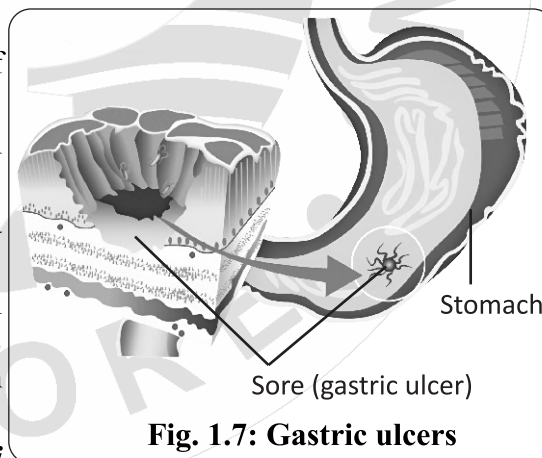


Fig. 1.7: Gastric ulcers



MULTIPLE CHOICE QUESTIONS (EXERCISE)

- A. Select the correct answers for the following questions.**
- The three portions of the small intestine in the correct order are:** 10401010
 (a) Duodenum, jejunum, ileum
 (b) Ileum, duodenum, jejunum
 (c) Colon, caecum, rectum
 (d) Caecum, colon, rectum
 - The wavelike movement of muscles that pushes food through the digestive system is called:** 10401011
 (a) Chemical digestion
 (b) Mechanical digestion
 (c) Peristalsis
 (d) Absorption
 - The part of the digestive system where no digestion takes place is:** 10401012
 (a) Oral cavity (b) Oesophagus
 (c) Stomach (d) Duodenum
 - Which group of enzymes breaks up starches and other carbohydrates?** 10401013
 (a) Proteases (b) Lipases
 (c) Amylases (d) Pepsin
 - The pancreas produces digestive enzymes and releases them into:** 10401014
 (a) Colon (b) Gall bladder
 (c) Liver (d) Duodenum
 - In stomach, pepsinogen is converted into pepsin by the action of:** 10401015
 (a) Bile salts (d) Hormones
 (c) HCl (d) Bicarbonate
 - In which part are the carbohydrates, lipids and proteins digested?** 10401016
 (a) Oral cavity (b) Stomach
 (c) Small intestine (d) Large intestine
 - The enzyme trypsin is found in:** 10401017
 (a) Pancreatic juice (b) Bile
 (c) Gastric juice (d) Saliva
 - The common bile duct carries bile from gall bladder to:** 10401018
 (a) Stomach (b) Duodenum
 (c) Colon (d) Pancreas
 - Why the small intestine has many folds and contains villi and microvilli?** 10401019
 (a) To slow down the passage of food.
 (b) To promote food absorption.
 (c) To prevent the backflow of chyme.
 (d) To produce enzymes.

SLO BASED MULTIPLE CHOICE QUESTIONS

Nutrition and its importance

- Using the absorbed nutrients in cells and tissues is called:** 10401020
 (a) Absorption (b) Digestion
 (c) Assimilation (d) Egestion
- Heterotrophic Nutrition takes place in:** 10401021
 (a) Plants (b) Algae
 (c) Animals (d) Monera
- The food we eat consists of:** 10401022
 (a) Monomers
 (b) Polymers
 (c) Sugars and Amino acids
 (d) Fatty acids and glycerols

Human Digestive System

- Caecum, colon and rectum are the parts of:** 10401023
 (a) Stomach (b) Small intestine
 (c) Large intestine (d) None of these
- Faeces are temporarily stored in:** 10401024
 (a) Caecum (b) Colon
 (c) Rectum (d) Jejunum
- The length of duodenum is:** 10401025
 (a) 2.4 meters (b) 20-25 cm
 (c) 3.5 meters (d) 20 cm

17. Length of Jejunum is: 10401026

- (a) 2.5 meters (b) 10 inch
(c) 3.5 meters (d) 20 cm

18. Cardiac sphincter is found between: 10401027

- (a) Stomach and small intestine
(b) Stomach and oesophagus
(c) Small and large intestine
(d) Stomach and large intestine

19. In an adult, the length of oesophagus usually: 10401028

- (a) 15 cm (b) 25 cm
(c) 35 cm (d) 45 cm

20. Villi located in: 10401029

- (a) Oral cavity (b) Oesophagus
(c) Stomach (d) Small intestine

21. Digestion of carbohydrates starts in: 10401030

- (a) Oral cavity (b) Esophegus
(c) Stomach (d) Intestine

22. Pancreas gives its exocrine secretions in: 10401031

- (a) Stomach (b) Colon
(c) Liver (d) Duodenum

23. Saliva consists of: 10401032

- (a) Water, mucous, pepsin, NaHCO_3
(b) Mucous, HCl, water, NaHCO_3
(c) Pepsin, HCl, NaHCO_3 , water
(d) Water, mucous, NaHCO_3 , amylase

24. Saliva is alkaline and contains an enzyme: 10401033

- (a) Pepsin (b) Lipase
(c) Salivary amylase (d) Trypsin

25. The amylase acts on: 10401034

- (a) Protein (b) Starch
(c) Glucose (d) Lipids

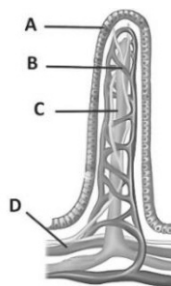
26. The function of the pepsin is to convert the protein into: 10401035

- (a) Amino acids (b) Lipids
(c) Simple sugar (d) Peptides

27. In stomach pepsinogen is converted into: 10401036

- (a) Pepsin (b) Bicarbonate
(c) HCl (d) Gastrin

28. The diagram shows a section through a villus of small intestine. Which labelled part can have maximum lipids? 10401037



29. The secretion of liver is: 10401038

- (a) Pepsin (b) Bile
(c) Rennin (d) Lipase

30. The walls of villus are only: 10401039

- (a) Two cell thick
(b) Three cell thick
(c) Single cell thick
(d) Many cell thick

Disorders of the Digestive System

31. Ulcers occur in: 10401040

- (a) Stomach (b) Duodenum
(c) Oesophagus (d) All of these

32. When large intestine fails to absorb water from the undigested part of the food, it results in: 10401041

- (a) Constipation (b) Diarrhoea
(c) Appendicitis (d) Vomiting

33. Burning, stomach pain, rush of saliva after regurgitation, loss of appetite, weight loss and blood vomiting (in reverse cases) are symptoms of: 10401042

- (a) Diarrhoea (b) Ulcers
(c) Constipation (d) Indigestion

34. Eating a high-fibre diet and drinking plenty of fluids help in preventing: 10401043

- (a) Ulcers (b) Constipation
(c) Gastroenteritis (d) Appendicitis

35. In which of the following condition hard stool is observed by the patient? 10401044

- (a) Constipation (b) Diarrhoea
(c) Appendicitis (d) Vomiting



ANSWER KEY

1.	a	2.	c	3.	b	4.	c	5.	d
6.	c	7.	c	8.	a	9.	b	10.	b
11.	c	12.	c	13.	b	14.	c	15.	c
16.	b	17.	a	18.	b	19.	b	20.	d
21.	a	22.	d	23.	d	24.	c	25.	b
26.	d	27.	a	28.	c	29.	b	30.	c
31.	d	32.	b	33.	b	34.	b	35.	a

SHORT ANSWER QUESTIONS (EXERCISE)

B. Write Short Answers.

1. State the role of salivary glands in digestion. 10401045

Ans. (i) In oral cavity, **partial chemical digestion** of carbohydrates is done by three pairs of **salivary glands**.

(ii) These glands are attached with oral cavity and secrete **saliva** - a mixture of water, mucus, and a digestive enzyme called **salivary amylase**.

(iii) Water and mucous moisten the food pieces.

(iv) Salivary amylase breaks down the starch present in food into maltose.

2. What do the terms **swallowing and peristalsis** mean? 10401046

Ans. After the physical and partial chemical digestion, the food mass in oral cavity is called bolus.

(a) Swallowing

(i) Food (Bolus) is swallowed by pushing it into the pharynx.

(ii) For swallowing, the tongue moves the bolus to the back of the oral cavity. The swallowed food enters the pharynx.

(iii) During swallowing, the palate (roof of oral cavity) moves upward to close the opening of the nasal cavity.

(b) Peristalsis

When food enters oesophagus, successive waves of contraction are generated in its muscular walls. These waves of contractions move food along the oesophagus to the stomach. These waves of muscular contraction are called peristalsis.

3. What are the functions of HCl in gastric juice? 10401047

Ans. (i) HCl in gastric juice converts pepsinogen into an active enzyme pepsin. Pepsin breaks large proteins into shorter chains of amino acids called peptides.

(ii) Hydrochloric acid also kills pathogenic bacteria present in food.

4. State the role of pancreatic juice in digestion of food. 10401048

Ans. Secretion of pancreas i.e., pancreatic juice enters duodenum through pancreatic duct, which joins the common bile duct before entering duodenum.

(i) Pancreatic juice contains many enzymes e.g., trypsin, pancreatic amylase and lipase.

(ii) These enzymes digest proteins, carbohydrates and lipids respectively.

(iii) Pancreatic juice also contains sodium bicarbonate that neutralizes the acidity of chyme.

5. Write a brief note on the structure of villi. 10401049

Ans. The inner walls of small intestine are highly folded. Moreover, these folds have millions of finger-like projections called villi (singular; villus). Villi increase the surface area for absorption of food.

6. What are the causes and symptoms of ulcers? 10401050

Ans.

(a) **Introduction:** Peptic ulcers are sores that develop in the walls of alimentary canal.

**(b) Types of Ulcers**

- (i) Ulcer usually develops in the walls of stomach and is called **gastric ulcer**.
- (ii) However, ulcers may also develop in duodenum (**duodenal ulcer**).
- (iii) The ulcer of oesophagus is called **oesophageal ulcer**.
- (c) **Signs and Symptoms:** Burning stomach pain, rush of saliva after regurgitation, loss of appetite, weight loss, blood vomiting (in severe cases).
- (d) **Causes:** Infection due to *Helicobacter pylori* bacteria, long-term use of

nonsteroidal anti-inflammatory drugs (NSAIDs), excessive alcohol consumption, smoking, stress (though not a direct cause, it can make symptoms worse).

- (e) **Treatment:** Antibiotics to clear *H. pylori* infection, other medicines called antacids and proton pump inhibitors are also used to cure ulcer.

Prevention: Avoiding excessive use of painkillers (NSAIDs), avoiding spicy foods, eating a balanced diet.

SLO BASED SHORT ANSWER QUESTIONS

Nutrition and its importance

7. How would you define nutrition?

10401051

Ans. Nutrition is how organisms get and use nutrients. It helps them to grow, stay healthy and repair.

8. Differentiate between digestion and absorption of food.

10401052

Ans.

Digestion	Absorption
<p>i. Breaking food into smaller parts the body can absorb.</p> <p>ii. This process happens inside our digestive system (oral cavity, stomach, and small intestine)</p>	<p>i. Moving nutrients from the digested food into the blood or lymph.</p> <p>ii. This takes place through villi (small intestine).</p>

Human Digestive System

9. What would happen if pancreatic juice did not reach to your small intestine?

10401053

Ans. If pancreatic juice is not secreted by pancreas into the small intestine no completion of digestion of food take place.

10. Why pepsin is unable to perform its enzymatic activity in small intestine?

10401054

Ans. Pepsin is an enzyme that functions optimally in the acidic environment of the stomach. When it reaches the small intestine, the alkaline pH (created by the pancreas) and bicarbonate secretion inactivates pepsin. Protein digestion in the small intestine is then taken over by other enzymes such as pancreatic enzymes.

11. Which parts of digestive system can come in contact with bile?

10401055

Ans. The gall bladder stores and concentrates bile from the liver, and then releases it into the duodenum in the small intestine to help in digestion of fats.

12. Some cells of the stomach secrete mucus for protection of stomach wall. Suggest what the stomach wall need to be protected against.

10401056

Ans. Gastric mucus is a gel-mucous barrier secreted by epithelial cells and glandular cells in the stomach wall. It acts as part of a barrier that protects the stomach wall from the acid and digestive enzymes within the stomach lumen.



13. Following table shows the names of the enzymes found in alimentary canal. Complete the table by writing names of substrate and product for each enzyme. 10401057

Name of enzyme	Substrate	Product
Protease		
Amylase		
Lipase		

Ans.

Name of enzyme	Substrate	Product
Protease	Protein	Amino acids
Amylase	Starch	Maltose and Glucose
Lipase	Lipids/fats	Fatty acids and glycerol

14. Differentiate between mechanical and chemical digestion. 10401058

Ans.

Mechanical digestion	Chemical digestion
(i) Mechanical digestion breaks down food physically into smaller pieces.	(i) Chemical digestion uses enzymes to breakdown food molecules into smaller, absorbable molecules.
(ii) Enzymes are not involved.	(ii) Examples: Amylase (Oral cavity and intestine)
(iii) Examples: Chewing, stomach churning	

15. Differentiate between bolus and chyme. 10401059

Ans.

Bolus	Chyme
(i) After the process of chewing, lubrication and partial digestion, the pieces of bread and mutton are rolled up by tongue into small, slippery, spherical mass called bolus.	(i) Semi-solid mass of partly digested food by gastric secretions and which passes from stomach into small intestine.
(ii) It is alkaline.	(ii) It is acidic.
(iii) It is formed in oral cavity.	(iii) It is formed in stomach.
(iv) It is formed by tongue and grinding action of teeth.	(iv) It is formed by churning and gastric secretions.

16. What is cardiac sphincter? 10401060

Ans. Stomach has two sphincters (openings which are guarded by muscles). The cardiac sphincter is between stomach and oesophagus.

17. What do you know about colon? 10401061

Ans. Large intestine has 3 parts, caecum, colon and rectum. Colon is the second part of it, from colon water, electrolyte and vitamins are absorbed into the blood.

18. What do you know about duodenum? 10401062

Ans. Duodenum is part of small intestine and is about 20-25cm long. Bile duct from gall bladder, hepatic duct from liver and pancreatic duct from pancreas empties its secretions, in the duodenum.

19. What is amylase? 10401063

Ans. Saliva contains an enzyme salivary amylase, which aids in the partial digestion of starch.



20. What is composition of gastric juice?

Where is it secreted? 10401064

Ans. When food enters stomach, the gastric gland found in the stomach wall are

stimulated to secrete gastric juice. It is composed chiefly of mucous, HCl and a protein digesting enzyme pepsinogen.

Disorders of the Digestive System

21. Differentiate between diarrhoea and constipation.

10401065

Ans.

Diarrhoea	Constipation
Diarrhoea is characterized by frequent, loose, or watery stools. Diarrhoea can lead to dehydration, especially in children and the adults.	Constipation is a condition in which faeces are not eliminated from the body at regular intervals.
Signs and Symptoms <ul style="list-style-type: none"> • Frequent, loose, or watery stools • Abdominal cramps or pain • Bloating • Dehydration (thirst, dry mouth, dark urine). 	Signs and Symptoms <ul style="list-style-type: none"> • Infrequent or difficult bowel movements (less than 3 times a week) • Hard and dry stools • Abdominal discomfort • Bloating
Causes: Infections (bacterial, viral, or parasitic), food allergies, stress, certain medications (e.g., antibiotics).	Causes: Lack of fibre in diet, dehydration, lack of physical activity, certain medicines (e.g., painkillers, iron supplements), other diseases (e.g., diabetes).

22. What is Ulcer? Write its causes.

Ans. 10401066

(a) Introduction: Peptic ulcers are sores that develop in the walls of alimentary canal.

(b) Types of Ulcers

(i) Ulcer usually develops in the walls of stomach and is called **gastric ulcer**.

(ii) However, ulcers may also develop in duodenum (**duodenal ulcer**).

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(c) Signs and Symptoms: Burning stomach pain, rush of saliva after regurgitation, loss of appetite, weight loss, blood vomiting (in severe cases).

(d) Causes: Infection due to *Helicobacter pylori* bacteria, long-term use of nonsteroidal anti-inflammatory drugs (NSAIDs), excessive alcohol consumption, smoking, stress (though not a direct cause, it can make symptoms worse).

INQUISITIVE QUESTIONS (EXERCISE)

1. Why someone with liver disease have troubles in digesting fats? 10401067

Ans. Someone with liver disease has trouble in digesting fats primarily because the damaged liver cannot produce or secrete sufficient bile which is essential for breaking down dietary fats in the intestine.

2. Why is it important to maintain a healthy balance of gut bacteria?

10401068

Ans. Maintaining a healthy gut bacteria balance is crucial because:

- These microbes aid digestion, produce essential vitamins, train immune system, fight Pathogens.



- They influence mood and mental health by producing neurotransmitters.
- An imbalance can trigger inflammation leading to digestive issues, allergies and systematic health problems.

3. How can a malfunction in the cardiac sphincter lead to acid reflux? 10401069

Ans. A malfunction in the cardiac sphincter can lead to acid reflux because the

sphincter in the muscle that acts as a valve between the oesophagus and the stomach. When it malfunctions, stomach contents including acid can flow backward into the oesophagus.

4. Why is it necessary to store bile in the gallbladder before it is released?

10401070

Ans. Bile is stored and concentrated in the gallbladder before release to ensure it is potent enough to effectively digest fats.