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BIO · BIOLOGY

06. Digestion/Nutrition

Official PMDC Solved Past Paper Topical Booklet · High-Yield Examination Series

🕒 48 Solved Questions

📅 2014 to 2024 Archive

🏛️ Boards: BUMHS, DUHS, KMU, MDCAT, NUMS, SZABMU

📊 Weightage: 34% of MDCAT (68 MCQs)

Curated by Ibrahim for fellow bees. Every question in this chapter has been verified against official UHS, NUMS, SZABMU, DUHS, and KMU answer keys. Propolis cognitive autopsies are provided at the end of this booklet to explain core concepts and break down common distractor traps.

OFFICIAL SOLVED EDITION**Q1.**

KMU 2024

Carnivorous plants have evolved mechanisms for trapping and digesting small animals. The product of this digestion is used to supplement the plant's supply of: **[KMU-2024]**

- (A) Carbohydrates
- (B) Lipids
- (C) Nitrites
- (D) Water

Q2.

SZABMU 2024

The leaf is bilobed with midrib and a row of long stiff bristles along the margins of leaf is present in: **[SZABMU-2024]**

- (A) *Drosera intermedia*
- (B) *Dionaea muscipula*
- (C) *Sarracenia purpurea*
- (D) *Nepenthes purpurea*

Q3.

KMU 2024

Which is true about the cells found in gastric glands lining the stomach wall? **[KMU-2024]**

- (A) Chief cells secrete gastrin
- (B) Hormone cells secrete intrinsic factor
- (C) Mucus cells secrete mucin
- (D) Parietal cells secrete pepsinogen

Q4.

KMU 2024

Which hormone stimulates the secretion of gastric juice? **[KMU-2024]**

- (A) Cholecystokinin
- (B) Gastrin
- (C) Insulin
- (D) Secretin

Q5.

SZABMU 2024

Which of the following salivary gland is present behind the jaws? **[SZABMU-2024]**

- (A) Sublingual
- (B) Sub-maxillary
- (C) Maxillary
- (D) Parotid

Q6.

SZABMU 2024

Gall stones are caused by the precipitation of: **[SZABMU-2024]**

- (A) Calcium phosphate
- (B) Calcium
- (C) Cholesterol
- (D) Proteins

Q7.

SZABMU 2024

At the end of ileum, there is ____ sphincter which opens and closes time to time to allow small amount of residue from ileum to enter the large intestine.

[SZABMU-2024]

- (A) Pyloric
- (B) Cardiac
- (C) Ileocolic
- (D) Rectal

Q8.

NUMS 2024

A person with a removed gall bladder experience difficulty in fat digestion due to: **[NUMS-2024]**

- (A) Absence of bile
- (B) Uncontrolled release of bile
- (C) Reduce alkalinity of bile
- (D) Absence of bile pigments

Q9.

SZABMU 2024

The pH of pancreatic juice is: **[SZABMU-2024-Reconduct]**

- (A) 0.8
- (B) 8.0
- (C) 0.7
- (D) 0.07

Q10.

SZABMU 2024

Select the mismatched pair: **[SZABMU-2024-Reconduct]**

- (A) Chief cell → Pepsinogen
- (B) Endocrine cell → Hormone
- (C) Parietal cell → Pepsin
- (D) Mucus cell → Mucus

Q11.

UHS 2023

Feeding by living in or on the other organism (host) belonging to different species is called: **[UHS-2023]**

- (A) Mineral nutrition
- (B) Parasitic nutrition
- (C) Saprophytic nutrition
- (D) Symbiotic nutrition

Q12.

NUMS 2023

Mesenteric veins drains the blood from: **[NUMS-2023]**

- (A) Liver
- (B) Large intestine
- (C) Stomach
- (D) Gall bladder

Q13.

UHS 2023

The enzyme which can work on pH 7 of the medium is? **[UHS-2023]**

- (A) Pepsin
- (B) Sucrase
- (C) Chymotrypsin
- (D) Pancreatic lipase

Q14.

KMU 2023

Trypsinogen can be activated by the action of: **[ETEA-2023]**

- (A) Amylase
- (B) HCl
- (C) Glucokinase
- (D) Enterokinase

Q15.

UHS 2023

Which enzyme is different from others? **[UHS-2023]**

- (A) Pepsin
- (B) Trypsin
- (C) Chymotrypsin
- (D) Lactase

Q16.

SZABMU 2023

Which Proteolytic enzyme is NOT secreted in inactive form? **[SZABMU-2023]**

- (A) Chymotrypsin
- (B) Pepsin
- (C) Trypsin
- (D) Erypsin

Q17.

KMU 2023

The first segment of the small intestine is: **[ETEA-2023]**

- (A) Duodenum
- (B) Jejunum
- (C) Ileum
- (D) Colon

Q18.

KMU 2023

Mastication causes exocrine glands under the tongue and in the back of mouth to secrete a watery liquid called: **[ETEA-2023]**

- (A) Bolus
- (B) Bile
- (C) Pancreatic Juice
- (D) Saliva

Q19.

NUMS 2023

Pepsinogen is converted into its active form pepsin by: [NUMS-2023]

- (A) Proteolytic enzyme action
- (B) Dissolving in mucus
- (C) Hormonal action
- (D) Hydrochloric acid

Q20.

NUMS 2023

Intrinsic factor is secreted by: [NUMS-2023]

- (A) Pancreas
- (B) Liver
- (C) Stomach
- (D) Duodenum

Q21.

NUMS 2023

Digestion of which food component starts in oral cavity? [NUMS-2023]

- (A) Proteins
- (B) Fats
- (C) Carbohydrates
- (D) Vitamins

Q22.

KMU 2022

Which one of the following is not a carnivorous plant? [ETEA-2022]

- (A) Pitcher plant
- (B) Sundew
- (C) Butterworts
- (D) Money plant

Q23.

BUMHS 2022

Lingual lipase is secreted by which gland? [BUMHS-2022]

- (A) Parotid
- (B) Submandibular
- (C) Ebner's gland
- (D) Sub-maxillary gland

Q24.

DUHS 2022

Bolus enters the esophagus/not the trachea due to presence of: [DUHS-2022]

- (A) Roof palate
- (B) Mouth
- (C) Epiglottis
- (D) Buccal cavity

Q25.

NUMS 2022

Enzymatic portion of gastric juice is secreted by which mucosal cell? [NUMS-2022]

- (A) Oxyntic cells
- (B) Chief cells
- (C) Mucus cells
- (D) Endocrine cells

Q26.

SZABMU 2022

The first chemical digestion of proteins takes place in the: [SZABMU-2022]

- (A) Mouth
- (B) Esophagus
- (C) Stomach
- (D) Intestine

Q27.

SZABMU 2022

Select the hormone which increases the activity of parietal and chief cells: [SZABMU-2022]

- (A) Cholecystokinin
- (B) Secretin
- (C) Gastrin
- (D) Acetylcholine

Q28.

UHS 2022

Digested food from intestine is carried to the liver by: [UHS-2022]

- (A) Hepatic artery
- (B) Hepatic vein
- (C) Hepatic portal vein
- (D) Hepatic portal artery

Q29.

SZABMU 2022

Emulsification of large fat globules is facilitated by: [SZABMU-2022]

- (A) Lipase
- (B) Bile salts
- (C) Trypsin
- (D) Chymotrypsin

Q30.

SZABMU 2022

Which of the following is not a component of bile? [SZABMU-2022]

- (A) Digestive enzymes
- (B) Salts
- (C) Mucus
- (D) Lecithin

Q31.

NUMS 2022

Which one is not a function of large intestine?
[NUMS-2022]

- (A) Absorption of electrolytes
- (B) Absorption of water
- (C) Production of vitamin
- (D) Absorption of amino acids

Q32.

MDCAT 2018

The first part of the large intestine is: [MDCAT-2018]

- (A) Caecum
- (B) Colon
- (C) Rectum
- (D) Appendix

Q33.

MDCAT 2017

Food is diverted in the esophagus by: [MDCAT-2017]

- (A) Glottis
- (B) Cheeks
- (C) Tongue
- (D) Epiglottis

Q34.

MDCAT 2017

Salivary amylase begins to digest starch to shorter polysaccharides and then to: [MDCAT-2017]

- (A) Sucrose
- (B) Maltose
- (C) Glucose
- (D) Lactose

Q35.

MDCAT 2017

Type of salivary glands found in human oral cavity:
[MDCAT-2017]

- (A) 3
- (B) 6
- (C) 4
- (D) 2

Q36.

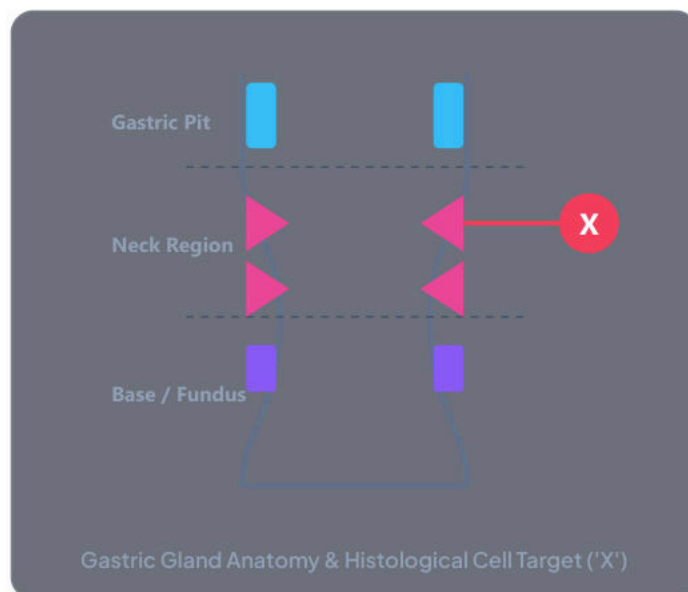
MDCAT 2017

Enzyme pepsin acts on which of the following substrate to produce the respective product?
[MDCAT-2017]

- (A) Substrate: Proteins → Product: Polypeptides
- (B) Substrate: Polypeptide → Product: Dipeptides
- (C) Substrate: Fats → Product: Fatty acids / glycerol
- (D) Substrate: Proteins → Product: Amino acids

Q37.

MDCAT 2017



Following is the structure of gastric glands in stomach wall where 'X' is: [MDCAT-2017]

- (A) Mucosa
- (B) Visceral fat cells
- (C) Mucus cells
- (D) Oxyntic cells

Q38.

MDCAT 2017

All kinds of absorption take place in: [MDCAT-2017]

- (A) Duodenum
- (B) Ileum
- (C) Jejunum
- (D) Colon

Q39.

MDCAT 2017

Appendix is finger like process arise from: [MDCAT-2017]

- (A) Colon
- (B) Caecum
- (C) Rectum
- (D) Small intestine

Q40.

MDCAT 2016

Digestion of ____ starts in oral cavity due to the action of enzyme present in saliva. [MDCAT-2016]

- (A) Starch
- (B) Fatty Acids
- (C) Cellulose
- (D) Polypeptides

Q41.

MDCAT 2016

Protein components of food are digested by the enzymatic secretion of: [MDCAT-2016]

- (A) Goblet Cells
- (B) Zymogen Cells
- (C) Parietal Cells
- (D) Oxyntic Cells

Q42.

MDCAT 2016

Digestive system consists of different layers, the innermost is known as: [MDCAT-2016]

- (A) Submucosa
- (B) Muscularis
- (C) Mucosa
- (D) Serosa

Q43.

MDCAT 2015

The hormone which increases the secretion of pancreatic juice is: [MDCAT-2015]

- (A) Secretin
- (B) Thyroxine
- (C) Gastrin
- (D) Parathormone

Q44.

MDCAT 2015

Trypsinogen is activated to trypsin by: [MDCAT-2015]

- (A) HCl
- (B) Mucus
- (C) Enterokinase
- (D) Gastrin

Q45.

MDCAT 2015

The emulsification of fats is the role of: [MDCAT-2015]

- (A) Saliva
- (B) Gastrin
- (C) Pancreatic juice
- (D) Bile

Q46.

MDCAT 2014

Gastric glands are composed of ____ types of cells. [MDCAT-2014]

- (A) Two
- (B) Four
- (C) Three
- (D) Five

Q47.

MDCAT 2014

HCl in gastric juice is secreted by which one of the following cells? [MDCAT-2014, 2015, 2016, 2017]

- (A) Chief cells
- (B) Mucous cells
- (C) Oxyntic cells
- (D) Kupffer cells

Q48.

MDCAT 2014

In human, *Escherichia coli* is involved in the formation of: [MDCAT-2014]

- (A) Calcium
- (B) Vitamin A
- (C) Vitamin D
- (D) Vitamin K

RAPID 5–COLUMN ANSWER KEY

Official PMDC verified answer keys for 06. Digestion/Nutrition.

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Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD	Q#	KEY	BOARD
1	C	KMU 2024	11	B	UHS 2023	21	C	NUMS 2023	31	D	NUMS 2022	41	B	MDCAT 2016
2	B	SZABMU 2024	12	B	NUMS 2023	22	D	KMU 2022	32	A	MDCAT 2018	42	C	MDCAT 2016
3	C	KMU 2024	13	C	UHS 2023	23	C	BUMHS 2022	33	D	MDCAT 2017	43	A	MDCAT 2015
4	B	KMU 2024	14	D	KMU 2023	24	C	DUHS 2022	34	B	MDCAT 2017	44	C	MDCAT 2015
5	B	SZABMU 2024	15	D	UHS 2023	25	B	NUMS 2022	35	A	MDCAT 2017	45	D	MDCAT 2015
6	C	SZABMU 2024	16	D	SZABMU 2023	26	C	SZABMU 2022	36	A	MDCAT 2017	46	C	MDCAT 2014
7	C	SZABMU 2024	17	A	KMU 2023	27	C	SZABMU 2022	37	D	MDCAT 2017	47	C	MDCAT 2014
8	B	NUMS 2024	18	D	KMU 2023	28	C	UHS 2022	38	C	MDCAT 2017	48	D	MDCAT 2014
9	B	SZABMU 2024	19	D	NUMS 2023	29	B	SZABMU 2022	39	B	MDCAT 2017			
10	C	SZABMU 2024	20	C	NUMS 2023	30	A	SZABMU 2022	40	A	MDCAT 2016			

TOTAL
MCQS

48

CORRECT

INCORRECT

BLANK

ACCURACY

%

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autopsies.

PROPOLIS COGNITIVE ERROR AUTOPSIES

Step-by-step conceptual derivations, formula working, and distractor autopsies for every question.

Question #1 Key: (C)

KMU 2024

Carnivorous plants have evolved mechanisms for trapping and digesting small animals. The product of this diges...

CORE CONCEPT AND DERIVATION

Carnivorous plants typically inhabit bogs and acidic soils that are severely deficient in biologically available nitrogen.

Formula:

N/A

Solution:

- To survive in these poor soils, carnivorous plants trap insects and secrete enzymes to digest their proteins.
- The digestion of animal proteins yields amino acids and various nitrogenous compounds (like nitrates and **nitrites**), which the plant absorbs to fulfill its nitrogen requirement for synthesizing its own proteins and nucleic acids.

Why other options are incorrect:

Carnivorous plants are still fully photosynthetic autotrophs; they manufacture their own carbohydrates and lipids using sunlight and CO_2 . They do not need to eat insects for energy or water.

Question #2 Key: (B)

SZABMU 2024

The leaf is bilobed with midrib and a row of long stiff bristles along the margins of leaf is present in: [SZA...

CORE CONCEPT AND DERIVATION

Different carnivorous plants use entirely different mechanical structures to trap prey.

Formula:

N/A

Solution:

- The description of a "bilobed leaf with a midrib and a row of long stiff bristles (teeth) along the margins" perfectly describes the active snap-trap mechanism.
- This specific morphology belongs to the Venus flytrap, scientifically known as *Dionaea muscipula*.

Why other options are incorrect:

Drosera (sundew) uses sticky mucilage tentacles. *Sarracenia* and *Nepenthes* are pitcher plants that use deep, fluid-filled tubular leaves as passive pitfall traps.

Question #3 Key: (C)

KMU 2024

Which is true about the cells found in gastric glands lining the stomach wall? [KMU-2024]

CORE CONCEPT AND DERIVATION

The gastric gland features a precise division of labor among its cell types to produce the components of gastric juice without digesting the stomach itself.

Formula:

N/A

Solution:

- **Mucus cells** (or mucous neck cells) are located in the upper part of the gland and continuously synthesize and secrete **mucin**.
- Mucin mixes with water to form a thick, alkaline mucus barrier that protects the stomach lining from its own acid and proteases.

Why other options are incorrect:

Chief cells secrete pepsinogen (not gastrin). Hormone (G) cells secrete gastrin (not intrinsic factor). Parietal cells secrete HCl and intrinsic factor (not pepsinogen).

Question #4 Key: (B)

KMU 2024

Which hormone stimulates the secretion of gastric juice? [KMU-2024]

CORE CONCEPT AND DERIVATION

The digestive tract utilizes local endocrine signaling to coordinate the release of digestive fluids precisely when food is present.

Formula:

N/A

Solution:

- The presence of food (especially peptides and amino acids) and stomach distension trigger G-cells in the stomach antrum.
- These cells release the hormone **Gastrin** into the blood.
- Gastrin circulates back and binds to receptors on parietal and chief cells, heavily stimulating them to ramp up the production of HCl and pepsinogen (gastric juice).

Why other options are incorrect:

CCK and Secretin are duodenal hormones that stimulate the pancreas/gallbladder and actually *inhibit* gastric secretion. Insulin regulates blood glucose levels.

Question #5 Key: (B)

SZABMU 2024

Which of the following salivary gland is present behind the jaws? [SZABMU-2024]

CORE CONCEPT AND DERIVATION

The major salivary glands are named anatomically based on their exact location relative to facial and oral structures.

Formula:

N/A

Solution:

- The **Sub-maxillary** glands (also interchangeably called Submandibular glands) are situated beneath the floor of the mouth, wrapping around the inner side and slightly behind the lower jawbone (mandible).

Why other options are incorrect:

The Parotid glands are located prominently in front of and just below the ears. The Sublingual glands are located far forward directly under the tongue. "Maxillary" is not a standard major salivary gland.

Question #6 Key: (C)

SZABMU 2024

Gall stones are caused by the precipitation of: [SZABMU-2024]

CORE CONCEPT AND DERIVATION

Bile contains high concentrations of lipids. If the delicate ratio of bile components shifts, these lipids can fall out of solution and crystallize.

Formula:

N/A

Solution:

- The liver continuously excretes **cholesterol** into bile.
- Bile salts usually act as solvents to keep this cholesterol dissolved.
- If there is a hypersecretion of cholesterol or a deficit in bile salts, the excess **cholesterol** precipitates out, forming hard crystalline masses known as gallstones (cholelithiasis).

Why other options are incorrect:

While some gallstones contain bilirubin or trace calcium, the vast majority (over 80%) are fundamentally composed of precipitated cholesterol. Calcium phosphate stones typically form in the kidneys, not the gallbladder.

Question #7 Key: (C)

SZABMU 2024

At the end of ileum, there is _____ sphincter which opens and closes time to time to allow small amount of resi...

CORE CONCEPT AND DERIVATION

Sphincters act as biological valves throughout the digestive tract to regulate the forward flow of food and prevent backward contamination.

Formula:

N/A

Solution:

- The terminal end of the small intestine is the ileum, and the beginning of the large intestine is the colon (specifically the caecum).
- The smooth muscle ring situated exactly at this junction is accurately termed the **ileocolic sphincter** (or ileocecal valve).
- It opens briefly to drop waste into the colon and closes rapidly to prevent bacteria-rich colonic feces from backflowing into the sterile small intestine.

Why other options are incorrect:

The pyloric sphincter connects the stomach to the duodenum. The cardiac (lower esophageal) sphincter connects the esophagus to the stomach. The rectal (anal) sphincters are at the very end of the digestive tract.

Question #8 Key: (B)

NUMS 2024

A person with a removed gall bladder experience difficulty in fat digestion due to: [NUMS-2024]

CORE CONCEPT AND DERIVATION

The gallbladder is not a manufacturing organ; it is strictly a storage and concentration reservoir for bile produced by the liver.

Formula:

N/A

Solution:

- When the gallbladder is surgically removed (cholecystectomy), the liver still produces bile at a normal rate.
- However, without a storage sac to hold and concentrate it until a fatty meal is eaten, the bile drips continuously and **uncontrolled into the small intestine**.
- When a heavy fat meal arrives, there is no large "surge" of concentrated bile available to efficiently emulsify it, leading to poor fat digestion.

Why other options are incorrect:

Bile is absolutely not absent; the liver still makes it. The alkalinity and pigments remain unchanged. The issue is purely the loss of regulated, concentrated delivery.

Question #9 Key: (B)

SZABMU 2024

The pH of pancreatic juice is: [SZABMU-2024-Reconduct]

CORE CONCEPT AND DERIVATION

Digestive juices vary radically in pH to suit the optimal functioning range of their specific enclosed enzymes.

Formula:

N/A

Solution:

- Gastric chyme entering the duodenum is highly acidic (pH ~2).
- Pancreatic juice contains a massive concentration of bicarbonate ions (HCO_3^-), which makes it distinctly alkaline.
- This alkalinity (with a typical pH around **8.0**) neutralizes the incoming acid and creates the perfect basic environment for pancreatic lipases, amylases, and proteases to operate.

Why other options are incorrect:

Values like 0.7 or 0.8 are extremely acidic—more acidic than battery acid or standard stomach acid—and would instantly denature pancreatic enzymes.

Question #10 Key: (C)

SZABMU 2024

Select the mismatched pair: [SZABMU-2024-Reconduct]

CORE CONCEPT AND DERIVATION

Gastric mucosal glands contain specialized epithelial cell types, each dedicated to secreting specific components of gastric juice:

- **Chief (Zymogenic) cells:** Secrete pepsinogen (the inactive zymogen precursor of pepsin) and gastric lipase.
- **Parietal (Oxyntic) cells:** Secrete hydrochloric acid (HCl) and Castle's intrinsic factor (essential for vitamin B₁₂ absorption).
- **Mucus (Goblet / Neck) cells:** Secrete alkaline protective mucus to shield the gastric lining from autodigestion.
- **Endocrine (G-cells / Enterochromaffin-like cells):** Secrete regulatory hormones like gastrin and histamine.

Solution:

- Chief cell → Pepsinogen: **Correct biological match.**
- Endocrine cell → Hormone (Gastrin): **Correct biological match.**
- Mucus cell → Mucus: **Correct biological match.**
- **Parietal cell → Pepsin: Mismatched pair.** Parietal cells secrete HCl and intrinsic factor; pepsin is derived from chief cell pepsinogen. Hence, Option C is the mismatched pair.

Why other options are incorrect:

Options A, B, and D represent accurate physiological pairings in human gastrointestinal anatomy.

Question #11 Key: (B)

UHS 2023

Feeding by living in or on the other organism (host) belonging to different species is called: [UHS-2023]

CORE CONCEPT AND DERIVATION

Heterotrophic nutrition encompasses various methods of acquiring organic food from other organisms.

Formula:

N/A

Solution:

- When an organism (the parasite) obtains its nutrition directly from the living tissues or fluids of another living organism (the host) of a different species, it is engaging in **Parasitic nutrition.**
- This relationship inherently harms the host while benefiting the parasite.

Why other options are incorrect:

Saprophytic nutrition involves feeding on dead and decaying matter. Symbiotic (specifically mutualistic) nutrition involves a mutually beneficial exchange. Mineral nutrition refers to plants absorbing inorganic ions from soil.

Question #12 Key: (B)

NUMS 2023

Mesenteric veins drains the blood from: [NUMS-2023]

CORE CONCEPT AND DERIVATION

The splanchnic circulation is responsible for carrying blood away from the digestive organs to the liver via the hepatic portal system.

Formula:

N/A

Solution:

- The **inferior mesenteric vein** specifically drains blood from the distal portions of the **Large intestine** (colon and rectum).
- The superior mesenteric vein drains the small intestine and the proximal part of the large intestine.
- Both ultimately converge to form the hepatic portal vein.

Why other options are incorrect:

The stomach is drained primarily by the gastric veins. The gallbladder is drained by the cystic vein. The liver is drained by the hepatic veins directly into the vena cava.

Question #13 Key: (C)

UHS 2023

The enzyme which can work on pH 7 of the medium is? [UHS-2023]

CORE CONCEPT AND DERIVATION

Intestinal protease optimal pH ranges.

Solution: Chymotrypsin is secreted into the small intestine where bicarbonate buffers gastric acid, allowing it to function at a neutral to slightly basic pH of **7.0 to 8.0**.

Question #14 Key: (D)

KMU 2023

Trypsinogen can be activated by the action of: [ETEA-2023]

CORE CONCEPT AND DERIVATION

Zymogens require specific biochemical triggers to expose their active sites, preventing auto-digestion of the secreting glands.

Formula:

N/A

Solution:

- Trypsinogen is produced in the pancreas and secreted into the duodenum.
- The epithelial cells of the duodenum produce an enzyme called **Enterokinase** (enteropeptidase).
- Enterokinase selectively cleaves trypsinogen to form the active protease trypsin, which subsequently activates all other pancreatic zymogens.

Why other options are incorrect:

HCl activates gastric pepsinogen. Amylase digests starch. Glucokinase phosphorylates glucose in glycolysis. None of these activate pancreatic proteases.

Question #15 Key: (D)

UHS 2023

Which enzyme is different from others? [UHS-2023]

CORE CONCEPT AND DERIVATION

Enzymes are classified broadly based on the macromolecule class they hydrolyze (e.g., proteases, carbohydrases, lipases).

Formula:

N/A

Solution:

- Pepsin, Trypsin, and Chymotrypsin all belong to the same functional class: they are **proteases** (protein-digesting enzymes).
- **Lactase**, on the other hand, is a **carbohydrase** (specifically a disaccharidase) that breaks down the sugar lactose into glucose and galactose.
- Thus, lactase is fundamentally different in its substrate target.

Why other options are incorrect:

Options A, B, and C all share the same biochemical target (peptide bonds), leaving D as the odd one out.

Question #16 Key: (D)

SZABMU 2023

Which Proteolytic enzyme is NOT secreted in inactive form? [SZABMU-2023]

CORE CONCEPT AND DERIVATION

Major proteases produced by the stomach and pancreas are secreted as zymogens (inactive) to protect the organs. However, brush-border enzymes are often active immediately.

Formula:

N/A

Solution:

- Pepsin is secreted as inactive pepsinogen.
- Trypsin is secreted as inactive trypsinogen.
- Chymotrypsin is secreted as inactive chymotrypsinogen.
- **Erepsin** (a mixture of peptidases found in intestinal juice) is secreted directly in its **active form** to immediately process small peptides into single amino acids right at the absorption surface.

Why other options are incorrect:

Options A, B, and C are all classic examples of dangerous endopeptidases that absolutely must be secreted as inactive precursors to avoid self-digestion.

Question #17 Key: (A)

KMU 2023

The first segment of the small intestine is: [ETEA-2023]

CORE CONCEPT AND DERIVATION

The small intestine is a long coiled tube anatomically divided into three distinct segments.

Formula:

N/A

Solution:

- Immediately after the stomach's pyloric sphincter, the digestive tract enters a short, C-shaped tube.
- This initial 25 cm segment is called the **Duodenum**.
- It is the site where acidic chyme mixes with bile and pancreatic juices.

Why other options are incorrect:

The Jejunum is the second part, and the Ileum is the final, longest part. The Colon is part of the large intestine.

Question #18 Key: (D)

KMU 2023

Mastication causes exocrine glands under the tongue and in the back of mouth to secrete a watery liquid called...

CORE CONCEPT AND DERIVATION

Mechanical digestion (chewing) physically stimulates nervous reflexes that activate local exocrine glands in the oral cavity.

Formula:

N/A

Solution:

- Mastication (chewing) stimulates the parotid, submandibular, and sublingual glands.
- These glands release a watery fluid composed of water, mucus, lysozyme, and amylase, collectively called **Saliva**.
- Saliva lubricates the food, forming it into a swallowable mass.

Why other options are incorrect:

A Bolus is the chewed mass of food mixed with saliva, not the liquid itself. Bile is produced by the liver. Pancreatic juice is produced by the pancreas.

Question #19 Key: (D)

NUMS 2023

Pepsinogen is converted into its active form pepsin by: [NUMS-2023]

CORE CONCEPT AND DERIVATION

Zymogens require specific environmental conditions or chemical triggers to cleave their inhibitory peptide bonds and become active.

Formula:

N/A

Solution:

- In the stomach, parietal cells secrete a highly concentrated solution of **Hydrochloric acid (HCl)**.
- This extreme acidity (pH ~2) causes a conformational change in the pepsinogen molecule, allowing it to auto-cleave a small peptide fragment from itself.
- This cleavage uncovers the active site, converting the inactive pepsinogen into the active protease pepsin.

Why other options are incorrect:

While active pepsin can activate more pepsinogen (autocatalysis), the initial and primary converter is the highly acidic HCl environment. Hormones (like gastrin) stimulate secretion but do not directly activate the enzyme chemically.

Question #20 Key: (C)

NUMS 2023

Intrinsic factor is secreted by: [NUMS-2023]

CORE CONCEPT AND DERIVATION

Vitamin B12 is a massive molecule that cannot be absorbed through simple diffusion; it requires a specific binding protein to survive the intestinal tract.

Formula:

N/A

Solution:

- The parietal (oxyntic) cells located in the mucosa of the **Stomach** have a dual function.
- Alongside secreting HCl, they synthesize and secrete a glycoprotein called **Intrinsic factor**.
- Intrinsic factor binds to dietary Vitamin B12, protecting it and allowing it to be absorbed much later in the terminal ileum.

Why other options are incorrect:

The pancreas, liver, and duodenum do not produce intrinsic factor. (Lack of intrinsic factor from the stomach leads to pernicious anemia).

Question #21 Key: (C)

NUMS 2023

Digestion of which food component starts in oral cavity? [NUMS-2023]

CORE CONCEPT AND DERIVATION

Enzymatic breakdown is strictly compartmentalized based on the specific enzymes secreted in different regions of the gut.

Formula:

N/A

Solution:

- The oral cavity is equipped with salivary glands that secrete **salivary amylase (ptyalin)**.
- Amylase is an enzyme designed exclusively to break the glycosidic bonds found in **Carbohydrates** (specifically starch and glycogen).
- Therefore, chemical carbohydrate digestion begins the moment food enters the mouth.

Why other options are incorrect:

Protein digestion begins in the stomach via pepsin. Major fat digestion begins in the small intestine via pancreatic lipase (though minimal lingual lipase exists, carbs are the primary target). Vitamins are generally absorbed intact, not digested.

Question #22 Key: (D)

KMU 2022

Which one of the following is not a carnivorous plant? [ETEA-2022]

CORE CONCEPT AND DERIVATION

Carnivorous plants have adapted to grow in nitrogen-deficient soils by trapping and digesting small insects or animals to supplement their nitrogen supply.

Formula:

N/A

Solution:

- Pitcher plants (e.g., *Sarracenia*), Sundew (*Drosera*), and Butterworts (*Pinguicula*) possess specialized leaves to trap and digest prey.
- The Money plant (*Epipremnum aureum*) is a standard autotrophic vine that absorbs all its mineral requirements directly from the soil and does not exhibit any carnivorous adaptations.

Why other options are incorrect:

Options A, B, and C are all well-known examples of true carnivorous plants.

Question #23 Key: (C)

BUMHS 2022

Lingual lipase is secreted by which gland? [BUMHS-2022]

CORE CONCEPT AND DERIVATION

While carbohydrate digestion is the main focus in the mouth, a small amount of lipid digestion also initiates there due to specific minor glands.

Formula:

N/A

Solution:

- **Von Ebner's glands** are minor salivary glands located in a moat-like trough surrounding the circumvallate papillae on the posterior surface of the tongue.
- These glands secrete **lingual lipase**, which begins the digestion of dietary triglycerides into fatty acids and diglycerides.

Why other options are incorrect:

Parotid, submandibular, and sub-maxillary glands primarily secrete saliva rich in water, mucin, and salivary amylase, but not lingual lipase.

Question #24 Key: (C)

DUHS 2022

Bolus enters the esophagus/not the trachea due to presence of: [DUHS-2022]

CORE CONCEPT AND DERIVATION

The swallowing mechanism requires a strict separation of the digestive and respiratory pathways at the pharynx.

Formula:

N/A

Solution:

- The **epiglottis** is a leaf-shaped cartilaginous flap situated at the top of the larynx.
- During swallowing, it acts as a mechanical lid, closing off the glottis (tracheal opening) so the food bolus slides smoothly into the esophagus.

Why other options are incorrect:

The roof of the palate separates the nasal and oral cavities, while the mouth and buccal cavity are spaces where mastication occurs, not the valve controlling the airway.

Question #25 **Key: (B)**

NUMS 2022

Enzymatic portion of gastric juice is secreted by which mucosal cell? [NUMS-2022]

CORE CONCEPT AND DERIVATION

Gastric juice is a mixture of water, mucus, acid, and digestive enzymes.

Formula:

N/A

Solution:

- The primary enzymatic component of gastric juice is pepsinogen (the inactive form of the protease pepsin).
- This enzyme is synthesized and secreted exclusively by the **Chief cells** (zymogenic cells) located at the base of the gastric glands.

Why other options are incorrect:

Oxyntic cells secrete HCl (chemical, not enzymatic). Mucus cells secrete mucin. Endocrine cells secrete hormones (like gastrin) into the blood, not enzymes into the gastric lumen.

Question #26 **Key: (C)**

SZABMU 2022

The first chemical digestion of proteins takes place in the: [SZABMU-2022]

CORE CONCEPT AND DERIVATION

Different macronutrients begin their chemical breakdown in different compartments of the digestive tract.

Formula:

N/A

Solution:

- Carbohydrate digestion begins in the mouth (salivary amylase).
- Protein digestion requires an acidic environment to denature the complex 3D structures and specific proteases (like pepsin) to cleave peptide bonds.
- Therefore, the very first chemical digestion of proteins occurs upon arrival in the **Stomach**.

Why other options are incorrect:

The mouth and esophagus have no protein-digesting enzymes. The intestine continues and completes protein digestion, but does not initiate it.

Question #27 **Key: (C)**

SZABMU 2022

Select the hormone which increases the activity of parietal and chief cells: [SZABMU-2022]

CORE CONCEPT AND DERIVATION

Gastric secretion is tightly regulated by both neural and hormonal mechanisms triggered by the presence of food.

Formula:

N/A

Solution:

- When protein-rich food enters the stomach, specific G-cells in the gastric mucosa are stimulated to release the hormone **Gastrin** into the bloodstream.
- Gastrin circulates back to the stomach wall, potentially stimulating parietal cells to release HCl and chief cells to release pepsinogen, thereby ramping up digestive activity.

Why other options are incorrect:

Secretin and Cholecystokinin (CCK) are intestinal hormones that primarily stimulate the pancreas and gallbladder while *inhibiting* stomach activity. Acetylcholine is a neurotransmitter, not a hormone.

Question #28 **Key: (C)**

UHS 2022

Digested food from intestine is carried to the liver by: [UHS-2022]

CORE CONCEPT AND DERIVATION

Nutrients absorbed into the bloodstream from the gastrointestinal tract must be processed by the liver before entering the general systemic circulation.

Formula:

N/A

Solution:

- The circulatory pathway that directly connects the capillary beds of the intestines to the capillary beds of the liver is the hepatic portal system.
- The **Hepatic portal vein** is the major vessel that collects this nutrient-rich (but deoxygenated) blood from the mesenteric veins and transports it straight into the liver for metabolic processing and detoxification.

Why other options are incorrect:

The hepatic artery brings oxygenated systemic blood to the liver. The hepatic vein carries processed blood away from the liver to the heart. There is no structure called the "hepatic portal artery."

Question #29 Key: (B)

SZABMU 2022

Emulsification of large fat globules is facilitated by: [SZABMU-2022]

CORE CONCEPT AND DERIVATION

Fats are hydrophobic and tend to clump together in the watery environment of the intestine, severely limiting the surface area available for water-soluble enzymes (lipases) to act upon.

Formula:

N/A

Solution:

- **Bile salts** (such as sodium glycocholate and taurocholate) are amphipathic molecules secreted by the liver.
- They act like biological detergents. Their hydrophobic ends bury into the fat droplets, while their hydrophilic ends face outward.
- This mechanical dispersion breaks large fat masses into microscopic droplets (micelles), a process known as emulsification.

Why other options are incorrect:

Lipase is the enzyme that actually chemically digests the fat after it is emulsified. Trypsin and Chymotrypsin are proteases that break down proteins, entirely unrelated to fat.

Question #30 Key: (A)

SZABMU 2022

Which of the following is not a component of bile? [SZABMU-2022]

CORE CONCEPT AND DERIVATION

Bile is an exocrine secretion of the liver critical for fat digestion, but it operates purely on physical (mechanical) principles rather than chemical hydrolysis.

Formula:

N/A

Solution:

- Bile is a complex mixture containing bile salts, cholesterol, bile pigments (bilirubin/biliverdin), lecithin (a phospholipid), and water/mucus.
- Crucially, the liver **does not produce any digestive enzymes** that are secreted into bile.
- Bile prepares fat for digestion, but the actual chemical breakdown is done by lipases from the pancreas.

Why other options are incorrect:

Salts (bile salts) and Lecithin are the primary emulsifying agents in bile. Mucus is present for lubrication and protection.

Question #31 Key: (D)

NUMS 2022

Which one is not a function of large intestine? [NUMS-2022]

CORE CONCEPT AND DERIVATION

Nutrient absorption is highly compartmentalized in the human digestive system.

Formula:

N/A

Solution:

- The primary role of the small intestine is to completely digest and absorb macronutrients (carbohydrates, fats, **amino acids**).
- By the time chyme reaches the large intestine, practically all amino acids and glucose have already been extracted into the bloodstream.
- The large intestine's main role is to absorb remaining water and electrolytes, and house bacteria that produce vitamins (like Vitamin K).

Why other options are incorrect:

Water and electrolyte absorption, alongside hosting vitamin-producing bacteria, are the exact physiological purposes of the large intestine.

Question #32 Key: (A)

MDCAT 2018

The first part of the large intestine is: [MDCAT-2018]

CORE CONCEPT AND DERIVATION

The large intestine (colon) is anatomically divided into sequential segments following the small intestine.

Formula:

N/A

Solution:

- Upon exiting the ileum of the small intestine through the ileocolic sphincter, digested material immediately enters a dilated blind pouch.
- This very first segment of the large intestine is anatomically known as the **Caecum**.

Why other options are incorrect:

The ascending colon continues upward from the caecum. The appendix is an attachment to the caecum. The rectum is the final storage chamber before the anus.

Question #33 Key: (D)

MDCAT 2017

Food is diverted in the esophagus by: [MDCAT-2017]

CORE CONCEPT AND DERIVATION

During the swallowing reflex, the respiratory tract must be temporarily sealed off to prevent food or liquids from entering the lungs.

Formula:

N/A

Solution:

- The **epiglottis** is a flap of elastic cartilage attached to the entrance of the larynx.
- During swallowing, the larynx moves upward, causing the epiglottis to fold flat and cover the glottis (the opening to the trachea).
- This physical barrier safely diverts the food bolus down the esophagus.

Why other options are incorrect:

The glottis is the opening itself (which gets covered), cheeks aid in chewing, and the tongue pushes the bolus backward but does not physically block the airway.

Question #34 Key: (B)

MDCAT 2017

Salivary amylase begins to digest starch to shorter polysaccharides and then to: [MDCAT-2017]

CORE CONCEPT AND DERIVATION

Amylase specifically targets alpha-1,4-glycosidic linkages in starch molecules.

Formula:

N/A

Solution:

- When salivary amylase acts on starch (a large polymer of glucose), it cleaves it into smaller fragments like dextrins, and eventually into the disaccharide **maltose**.
- Complete breakdown to single glucose monomers requires the enzyme maltase, which is located later in the small intestine.

Why other options are incorrect:

Sucrose is table sugar (glucose + fructose), lactose is milk sugar (glucose + galactose), and glucose is the final monomeric product, which amylase cannot produce on its own.

Question #35 Key: (A)

MDCAT 2017

Type of salivary glands found in human oral cavity: [MDCAT-2017]

CORE CONCEPT AND DERIVATION

Saliva is produced by specialized exocrine glands located in and around the oral cavity.

Formula:

N/A

Solution:

- Humans possess exactly **3** major pairs of salivary glands.
- They are: 1) Parotid glands (in front of the ears), 2) Submandibular / Sub-maxillary glands (under the jaw), and 3) Sublingual glands (under the tongue).

Why other options are incorrect:

The numbers 2, 4, and 6 do not represent the correct count of distinct major salivary gland types in human anatomy.

Question #36 Key: (A)

MDCAT 2017

Enzyme pepsin acts on which of the following substrate to produce the respective product? [MDCAT-2017]

CORE CONCEPT AND DERIVATION

Pepsin is an endopeptidase that operates in the highly acidic environment of the stomach to begin the chemical breakdown of dietary proteins.

Formula:

N/A

Solution:

- Pepsin acts on large, intact **Proteins**.
- It cleaves internal peptide bonds, reducing these massive protein molecules into smaller fragments known as **Polypeptides** and peptones.
- It does not complete the digestion down to individual amino acids.

Why other options are incorrect:

Complete breakdown to dipeptides and free amino acids requires pancreatic enzymes (like trypsin/chymotrypsin) and intestinal brush border peptidases. Fats are digested by lipases, not pepsin.

Question #37 Key: (D)

MDCAT 2017

Gastric Pit Neck Region Base / Fundus X Gastric Gland Anatomy & Histological Cell Target ('X') Following is th...

CORE CONCEPT AND DERIVATION

The gastric gland is a pit-like structure with specific cell types occupying distinct anatomical zones within the gland.

Formula:

N/A

Solution:

- In standard histological diagrams of the gastric gland, the larger, often bulged cells located prominently in the neck and upper body of the gland are the Parietal cells.
- These cells are alternatively and properly referred to as **Oxyntic cells**, responsible for secreting Hydrochloric Acid (HCl).

Why other options are incorrect:

Mucus cells are strictly located at the very top (surface and upper neck). Visceral fat cells are not present within the epithelial lining. Mucosa is the name of the entire tissue layer, not a specific cell.

Question #38 Key: (C)

MDCAT 2017

All kinds of absorption take place in: [MDCAT-2017]

CORE CONCEPT AND DERIVATION

The small intestine is the primary site of nutrient absorption, but different segments have varying degrees of absorptive capacity.

Formula:

N/A

Solution:

- The **Jejunum** is the middle section of the small intestine.
- It is highly specialized with a massive surface area (villi and microvilli) and is the principal site where *almost all* types of nutrients (carbohydrates, proteins, lipids, vitamins) undergo their most active absorption into the bloodstream and lacteals.

Why other options are incorrect:

The duodenum is primarily focused on final chemical digestion. The ileum absorbs specific remnants like Vitamin B12 and bile salts. The colon absorbs mainly water and electrolytes.

Question #39 Key: (B)

MDCAT 2017

Appendix is finger like process arise from: [MDCAT-2017]

CORE CONCEPT AND DERIVATION

The human vermiform appendix is a narrow, blind-ended tube connected to the gastrointestinal tract.

Formula:

N/A

Solution:

- The large intestine begins with a pouch-like structure located in the lower right quadrant of the abdomen.
- This starting pouch is called the **Caecum**.
- The appendix extends directly downward from the inferior border of the caecum.

Why other options are incorrect:

The colon is the elongated portion that follows the caecum. The rectum is the terminal end of the large intestine. The small intestine connects to the caecum via the ileocecal valve, but does not give rise to the appendix.

Question #40 Key: (A)

MDCAT 2016

Digestion of ____ starts in oral cavity due to the action of enzyme present in saliva. [MDCAT-2016]

CORE CONCEPT AND DERIVATION

The chemical digestion of carbohydrates begins in the mouth, facilitated by the enzyme salivary amylase (ptyalin).

Formula:

N/A

Solution:

- Salivary glands secrete saliva, which contains the enzyme **salivary amylase**.
- This enzyme specifically targets the glycosidic bonds in complex carbohydrates like **starch** and glycogen, breaking them down into shorter polysaccharides and maltose.

Why other options are incorrect:

Fatty acids do not require digestion (they are already simple), cellulose is entirely indigestible by human enzymes, and polypeptide digestion begins in the stomach via pepsin, not the oral cavity.

Question #41 Key: (B)

MDCAT 2016

Protein components of food are digested by the enzymatic secretion of: [MDCAT-2016]

CORE CONCEPT AND DERIVATION

Protein digestion in the stomach requires a specific protease enzyme.

Formula:

N/A

Solution:

- The principal enzyme for protein digestion in the stomach is pepsin.
- Pepsin is synthesized and secreted in an inactive precursor form called pepsinogen by the **Zymogen cells** (also known as Chief cells or peptic cells).
- Once secreted, it is activated by the acidic environment created by HCl.

Why other options are incorrect:

Goblet cells secrete mucus. Parietal/Oxyntic cells secrete HCl. None of these secrete the actual protein-digesting enzymes.

Question #42 Key: (C)

MDCAT 2016

Digestive system consists of different layers, the innermost is known as: [MDCAT-2016]

CORE CONCEPT AND DERIVATION

The wall of the gastrointestinal tract (alimentary canal) is structurally organized into four distinct histological layers from the outside in.

Formula:

N/A

Solution:

- The outermost layer is the Serosa.
- Moving inward, the next layer is the Muscularis (smooth muscle).
- Inside that is the Submucosa (connective tissue and vessels).
- The absolute innermost layer lining the lumen is the **Mucosa**, which contains the absorptive and secretory epithelial cells.

Why other options are incorrect:

Submucosa, muscularis, and serosa represent the middle and outer protective/motile layers, not the innermost absorptive lining.

Question #43 Key: (A)

MDCAT 2015

The hormone which increases the secretion of pancreatic juice is: [MDCAT-2015]

CORE CONCEPT AND DERIVATION

When acidic chyme exits the stomach and enters the small intestine, the intestinal environment must be rapidly neutralized.

Formula:

N/A

Solution:

- The acidic pH stimulates the S-cells of the duodenal mucosa to release the hormone **Secretin**.
- Secretin travels via the blood to the pancreas, where it vigorously stimulates the secretion of pancreatic juice rich in bicarbonate ions (HCO_3^-).
- This neutralizes the acid, providing the optimal alkaline pH for intestinal enzymes.

Why other options are incorrect:

Gastrin stimulates the stomach. Thyroxine regulates basal metabolic rate. Parathormone regulates blood calcium levels. None of these target the exocrine pancreas.

Question #44 Key: (C)

MDCAT 2015

Trypsinogen is activated to trypsin by: [MDCAT-2015]

CORE CONCEPT AND DERIVATION

Pancreatic proteases are secreted in inactive zymogen forms to prevent the pancreas from digesting itself. They require a highly specific activator in the duodenum.

Formula:

N/A

Solution:

- Trypsinogen is an inactive pancreatic enzyme.
- Upon entering the duodenum, it encounters **Enterokinase** (also called enteropeptidase), an enzyme embedded in the brush border of the intestinal mucosa.
- Enterokinase specifically cleaves a peptide segment from trypsinogen, transforming it into the active enzyme trypsin.

Why other options are incorrect:

HCl activates pepsinogen in the stomach, not trypsinogen. Mucus is protective. Gastrin is a stomach hormone.

Question #45 Key: (D)

MDCAT 2015

The emulsification of fats is the role of: [MDCAT-2015]

CORE CONCEPT AND DERIVATION

Lipid digestion requires mechanical dispersion to increase surface area prior to enzymatic hydrolysis.

Formula:

N/A

Solution:

- **Bile** is a yellowish-green fluid produced by the liver and stored in the gallbladder.
- It contains no digestive enzymes itself, but is exceptionally rich in bile salts and phospholipids.
- These components physically break down large lipid globules into an emulsion of tiny droplets, making them highly accessible to pancreatic lipases.

Why other options are incorrect:

Saliva initiates carbohydrate digestion. Gastrin is a hormone. Pancreatic juice provides the enzymes for chemical digestion, but relies on bile to do the physical emulsification first.

Question #46 Key: (C)

MDCAT 2014

Gastric glands are composed of ____ types of cells. [MDCAT-2014]

CORE CONCEPT AND DERIVATION

Gastric glands are tubular structures in the stomach lining responsible for secreting gastric juice.

Formula:

N/A

Solution:

- According to standard regional textbooks, the gastric gland consists of **three** major types of secretory cells:
- 1. Mucous cells (secrete protective mucus).
- 2. Parietal or Oxyntic cells (secrete HCl and intrinsic factor).
- 3. Chief or Zymogen cells (secrete pepsinogen).

Why other options are incorrect:

While advanced histology notes a fourth type (enteroendocrine/G-cells), standard biology curricula predominantly categorize them strictly into three principal exocrine cell types.

Question #47 Key: (C)

MDCAT 2014

HCl in gastric juice is secreted by which one of the following cells? [MDCAT-2014, 2015, 2016, 2017]

CORE CONCEPT AND DERIVATION

The highly acidic environment of the stomach (pH ~2) is necessary to activate pepsinogen and denature dietary proteins.

Formula:

N/A

Solution:

- **Oxyntic cells**, also universally known as parietal cells, are located in the stomach lining.
- They actively pump hydrogen ions (H^+) and chloride ions (Cl^-) into the lumen, forming Hydrochloric Acid (HCl).

Why other options are incorrect:

Chief cells secrete pepsinogen. Mucous cells secrete mucus. Kupffer cells are specialized macrophages located in the liver, completely unrelated to gastric secretion.

Question #48 Key: (D)

MDCAT 2014

In human, *Escherichia coli* is involved in the formation of: [MDCAT-2014]

CORE CONCEPT AND DERIVATION

The human large intestine hosts a massive microbiome of symbiotic bacteria that assist in physiological processes.

Formula:

N/A

Solution:

- *Escherichia coli* (*E. coli*) and other commensal bacteria reside in the colon.
- They ferment undigested carbohydrates and, importantly, synthesize certain essential vitamins that humans cannot produce on their own.
- The most critical of these microbially synthesized compounds is **Vitamin K**, which is vital for blood coagulation processes.

Why other options are incorrect:

Calcium is a mineral absorbed from diet. Vitamin D is synthesized in the skin under UV light or obtained via diet. Vitamin A is derived from dietary carotenes. *E. coli* does not synthesize these.