BIOLOGY

NEET

CRASH COURSE

DIGESTION AND ABSORPTION

SMART ACHIEVERS

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DIGESTION AND ABSORPTION

1. The digestive system of humans consists of an alimentary canal and associated digestive glands.
2. The alimentary canal consists of the mouth, buccal cavity, pharynx, oesophagus, stomach, small intestine, large intestine, rectum and the anus.
3. The accessory digestive glands include the salivary glands, the liver (with gall bladder) and the pancreas.
4. The teeth involve in the mastication of the food, the tongue tastes the food and manipulates it for proper mastication by mixing with the saliva.
5. Saliva contains a starch digestive enzyme; salivary amylase/ptyalin that digests the starch and converts it into maltose (disaccharide).
6. The food then passes into the pharynx and enters the oesophagus in the form of bolus, which is further carried down through the oesophagus by peristalsis into the stomach.
7. In stomach mainly protein digestion takes place and also absorption of simple sugars, alcohol and medicine.
8. The mucosa of stomach has gastric glands. Gastric glands have three major types of cells namely :
   (i) Mucus neck cells which secrete mucus.
   (ii) Peptic or chief cells which secrete the proenzyme pepsinogen.
   (iii) Parietal or oxyntic cells which secrete HCl and intrinsic factor, (responsible for the absorption of B_{12}.)
9. Small amounts of lipases are also secreted by intrinsic glands.
10. The chyme (food) enters into the duodenum portion of the small intestine and is acted on by the pancreatic juice, bile and finally by the enzymes in the succus entericus, so that the digestion of carbohydrates, proteins and fats is completed.
11. Pancreatic juice contains inactive enzymes -trypsinogen, chymotrypsinogen, procarboxypeptidases, amylases, lipases and nucieases.
12. Trypsinogen is activated by an enzyme, enterokinase, secreted by intestinal juice into active trypsin, which in turn activates the other enzymes of pancreatic juice.
13. Bile released into the duodenum contains the bile pigments, bile salts, cholesterol, phospholipids but no enzymes. It helps in emulsification of fats.
14. The intestinal mucosal epithelium secretes succus entericus/intestinal juice.
15. This juice contains a variety of enzymes like maltase, dipeptidases, lipases, nucleosidases etc.
16. The mucus along with the bicarbonates from the pancreas protects the intestinal mucus from acid as well as provides an alkaline medium (pH 7-8) for enzymatic activities. Submucosal glands (Brunner's glands) also help in this.
17. Food then enters jejunum and ileum portions of the small intestine.
18. Carbohydrates are digested and converted into monosaccharides like glucose.
19. Proteins are finally broken down into amino acids.
20. The fats are converted to fatty acids and glycerol.
21. The digested end products are absorbed into the body through the epithelial lining of the intestinal villi. Except fatty acids, all other digested food is absorbed in blood.
22. The undigested food (faeces) enters into the caecum of the large intestine through ileo-caecal valve, which prevents the back flow of the faecal matter.
23. Most of the water is absorbed in the large intestine.
24. The undigested food becomes semi-solid in nature and then enters into the rectum, anal canal and is finally egested out through the anus.

EXERCISE

Q.1 The hardest substance of vertebrate body is
(1) Keratin (2) Enamel (3) Dentine (4) Chondrin

Q.2 Digestive enzymes are
(1) Hydrolase (2) Oxido-reductase (3) Transferase (4) None of these

Q.3 Taste buds for bitter taste are found on tongue at
(1) Tip (2) On basal surface (3) Posterior part (4) Lateral sides

Q.4 In rabbit, the digestion of cellulose takes place in
(1) Colon (2) lleum (3) Caecum (4) Rectum

Q.5 The length of the alimentary canal is more in herbivorous animals than the carnivorous because
(1) Herbivorous diet contains more fat to digest
(2) Herbivorous diet contains more proteins to digest
(3) Herbivorous diet contains more carbohydrates particularly cellulose which takes more time to digest
(4) Herbivorous diet contains more vitamins to digest

Q.6 HCl is secreted by
(1) Zymogen cells (2) Oxyntic cells (3) Kupffer cells (4) Mucous cells

Q.7 The mucosal lining of the oesophagus of mammals is made up of
(1) Simple columnar epithelium (2) Stratified cuboidal epithelium
(3) Simple cuboidal epithelium (4) Stratified columnar epithelium

Q.8 Narrower distal end of stomach is called
(1) Cardiac (2) Duodenum (3) Pharynx (4) Pylorus

Q.9 Pepsinogen is secreted by
(1) Chief cells (2) Parietal cells (3) Gastric glands (4) Intestinal cells

Q.10 Crypt of Lieberkuhn is example for
(1)Simple tubular gland (2) Coiled tubular gland
(3) Compound alveolar gland (4) Compound tubular gland

Q.11 A good source of lipase is
(1) Saliva (2) Pancreatic juice (3) Bile (4) Gastric juice

Q.12 Fat digeston is facilitated by
(1) Bile juice (2) Pancreatic juice (3) Gastric juice (4) None of these

Q.13 Pancreatic juice contains
(1) Trypsin, lipase, maltase (2) Pepsin, tryspin, maltase
(3) Trypsin, chymotrypsin, amylase, lipase (4) Trypsin, pepsin, amylase

Q.14 Enzyme released from kidney is
(1) Rennin (2) Uricase (3) Pepsin (4) None of these

Q.15 pH of gastric juice is -
(1) 2 (2) 4 (3) 6 (4) 8

Q.16 Which of the following is the chracteristic of mammalian liver is -
(1) Kupffer's cells and leucocytes (2) Leucocytes and canaliculae
(3) Glisson's capsules and kupffer cells (4) Glisson's capsules and leucocytes

Q.17 Rennin acts on milk proteins and converts
(1) Caseinogen into casein (2) Casein into paracasein
(3) Caseinogen into paracasein (4) Paracasein into caseinogen

Q.18 The number of salivary glands in man is -
(1) Two pairs (2) Three pairs (3) Four pairs (4) Five pairs

Q.19 Deamination occurs in liver to
(1) Get rid of urea from blood (2) Synthesis amino acids
(3) Make use of excess amino acid (4) Convert proteins to urea and uric acid

Q.20 Which word best describes the action of bile on fats
(1) Neutralisation (2) Digests (3) Emulsification (4) Absorbs

Q.21 Kupffer cells are present in
(1) Liver (2) Lungs (3) Spleen (4) Gall bladder

Q.22 Match the type of cells listed under column I with the secretions given under column II. Choose the answer which gives the correct combination of the alphabets of the two columns

Column I (Type of cells)	**Column II** (Secretions)
(A) Beta cells	(p) Lysozyme
(B) Mast cells	(q) Histamine
(C) Paneth cells	(r) Insulin
(D) Acinar cells	(s) Pancreatic enzymes

(1) A = r ; B = s ; C = p ; D = q (2) A = s ; B = q ; C = p ; D = r
(3) A = r ; B = q ; C = p ; D = s (4) A = q ; B = r , C = p , D = s

Q.23 Lysozymes are found in -
(1) Saliva (2) Tears
(3) Saliva and tears both (4) Mitochondria

Q.24 The largest gland in the human body is
(1) Liver (2) Brain (3) Pancreas (4) Thyroid

Q.25 Lactase is found in
(1) Saliva (2) Bile (3) Pancreatic juice (4) Intestinal juice

Q.26 Trysinogen is an inactive enzyme secreted by the pancreas. It is activated by
(1) Pepsin of stomach (2) Chymotrypsin (3) Bile (4) Enterokinase

Q.27 Chylomicrons are -
(1) Undigested proteins
(2) Undigested carbohydrates
(3) Fat droplets coated with glycerol and protein
(4) Fat droplets coated with phospholipids

Q.28 Emulsification of fats is brought about by -
(1) Bile pigments (2) bile salts (3) Pancreatic juice (4) HCl

Q.29 Some proteolytic enzymes are
(1) Trypsin, peptidase, pepsin (2) Amylopsin, steapsin, ptyalin
(3) Amylopsin, lipase, zymase (4) Urease, zymase, dehydrogenase

Q.30 Pepsin acts on
(1) Fats (2) Proteins (3) Carbohydrates (4) Glucose

Q.31 The food that enters intestine from stomach is called -
(1) Chyle (2) Chyme (3) Fundus (4) None of these

Q.32 Milk protein is acted upon by a gastric enzyme
(1) Casein (2) Rennin (3) Pepsin (4) Caseinogen

Q.33 Digestion of protein is necessary due to
(1) Proteins are not absorbed as such (2) Proteins are large molecules
(3) Proteins have complex structure (4) Proteins are made up of amino acids

Q.34 Match list I with list II and choose the correct option

List I	**List II**
(A) Salivary amylase	(p) Proteins
(B) Bile salts	(q) Milk proteins
(C) Rennin	(r) Starch
(D) Pepsin	(s) Lipids
(E) Steapsin	(t) Emulsification of fats

(1) A - (t) ; (B) - (s) ; (C) - (p) ; (D) - (q) ; (E) - (r)
(2) A - (q) ; (B) - (r) ; (C) - (s) ; (D) - (t) ; (E) - (p)
(3) A - (q) ; (B) - (s) ; (C) - (r) ; (D) - (p) ; (E) - (t)
(4) A - (r) ; (B) - (t) ; (C) - (q) ; (D) - (p) ; (E) - (s)

Q.35 Starch and cellulose are compounds of many units of
(1) Amino acids (2) Glycerol (3) Simple sugars (4) Fatty acids

Q.36 Digestion of protein takes place in
(1) Duodenum and stomach (2) Stomach and oesophagus
(3) Small and large intestine (4) Intestine and rectum

Q.37 Vitamin D is synthesised by one of the following with the help of sunlight
(1) Skin (2) Gall bladder (3) Brain (4) Pancreas

Q.38 Which of the following vitamin is needed for the coagulation of blood
or
Necessary vitamin for blood clotting is -
(1) B (2) C (3) K (4) E

Q.39 Fat soluble vitamins are
(1) Vitamin A, B and C (2) Vitamin A, B and D
(3) Vitamin A,D ,E and K (4) Vitamin C and D

Q.40 Which reserve food a starving man first consumes
(1) Fat (2) Protein (3) Glycogen (4) Vitamin

Q.41 Pellagra is caused due to the deficiency of
(1) Thiamine (2) Ascorbic acid (3) Niacin (B_5) (4) Calciferol

Q.42 Iodine deficiency causes
(1) Kwashiorkor (2) Anaemia (3) Marasmus (4) Goitre

Q.43 Digestion is the breaking down of large food molecules into smaller ones. The main purpose of this is to -
(1) Make the food soluble
(2) Enable the digestive enzymes to be used up
(3) Provide many different types of molecules for absorption
(4) Make the passage of food along the gut easier

Q.44 Which of the following is not a source of vitamin A
(1) Carrot (2) Mango (3) Apple (4) Yeast

Q.45 Dietary fibers are composed of :
(1) Cellulose (2) Amylase (3) Proteins (4) Unsaturated fats

Q.46 FAD is a coenzyme derived from
(1) Riboflavin (2) Vitamin-B_{12} (3) Thiamine (4) Niacin

Q.47 Vitamin B_6 is also called -
(1) thiamine (2) pantothenic acid (3) pyridoxine (4) retinol

AIIMS Special

Instructions for following questions (Q.48 to Q.64).

(1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
(2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
(3) If Assertion is true statement but Reason is false, then mark (3).
(4) If both Assertion and Reason are false statements, then mark (4).

Q.48 **Assertion :** Gastrectomy causes iron deficiency anaemia.
Reason : Hydrochloric acid secreted by oxyntic cells converts ferric into ferrous and iron is absorbed as ferrous ions.

Q.49 **Assertion :** Cholagogues are substances that cause contraction of gall bladder.
Reason : These substances cause release of CCK-PZ from duodenum.

Q.50 **Assertion :** Aptyalism patients have higher than normal incidences of dental caries.
Reason : Aptyalism is caused by the action of Parasympathetic nervous system.

Q.51 **Assertion :** In humans, duct of wirsung from pancreas combines with bile duct before opening into duodenum.
Reason : Blockage in duct of wirsung will prevent the endocrine function of pancreas.

Q.52 **Assertion :** In acute constipation , purgatives containing magnesium salts are generally used.
Reason : The osmotic effect of Mg^{2+} in the intestinal lumen prevents water reabsorption from intestine. Mg^{2+} increases the solute concentration in the intestinal lumen because Mg^{2+} is absorbed very slowly.

Q.53 **Assertion :** Tonsils are located near the of the alimentary and respiratory tract
Reason : Tonsils produces digestive enzymes

Q.54 **Assertion :** Mucous glands occur throughout the alimentary canal
Reason : Mucous substances facilitate movement of food through the alimentary canal

Q.55 **Assertion :** Vitamins are essential for healthy life.
Reason : Vitamins regulate metabolism.

Q.56 **Assertion :** In human, maximum digestion occurs in duodenum.
Reason : Amupla of vater opens in duodenum.

Q.57 **Assertion :** Chief cells of gastric gland secrete intrinsic castle's factor.
Reason : This factor help in vita. B12 absorption.

Q.58 **Assertion :** Emulsification is necessary for the digestion of fat.
Reason : After fats are emulsified, the action of enzyme amylase gets significantly increase.

Q.59 **Assertion :** Abomassum of alimentary canal of reminant animals harbour numerous bacteria & protozoa.
Reason : Bacteria & protozoa help in the secretion of gastric juice in abomassum.

Q.60 **Assertion :** Vitamin 'C' occurs only in animal tissue.
Reason : The vegetarian patients are suggested to take carrot & green vegetables when they suffer from Vita. 'C' deficiency.

Q.61 **Assertion :** Pancreatic amylase digest protein to amino acids.
Reason : Pancreatic amylase the peptide bond of protein.

Q.62 **Assertion :** Digestion is necessary for the absorption of all macro elements.
Reason : Digestion makes large complex molecule to simple smaller molecule which can be easily absorbed.

Q.63 **Assertion :** Rumen is regarged as the true stomach in ruminant animal.
Reason : Fermentation of protein takes place in Rumen.

Q.64 **Assertion :** Carbohydrates are more suitable for the production of energy in the body than protein and fats.
Reason : Carbohydrate can be stored in epithelial tissue as glycogen for use in the production of energy, whenever necessary.

ANSWER KEY

Q.1	2	Q.2	1	Q.3	3	Q.4	3	Q.5	3	Q.6	2	Q.7	2
Q.8	4	Q.9	2	Q.10	1	Q.11	2	Q.12	1	Q.13	3	Q.14	1
Q.15	1	Q.16	3	Q.17	2	Q.18	2	Q.19	3	Q.20	3	Q.21	1
Q.22	3	Q.23	3	Q.24	1	Q.25	4	Q.26	4	Q.27	3	Q.28	2
Q.29	1	Q.30	2	Q.31	2	Q.32	2	Q.33	1	Q.34	4	Q.35	3
Q.36	1	Q.37	1	Q.38	3	Q.39	3	Q.40	3	Q.41	3	Q.42	4
Q.43	3	Q.44	4	Q.45	1	Q.46	1	Q.47	3	Q.48	1	Q.49	1
Q.50	3	Q.51	3	Q.52	1	Q.53	3	Q.54	1	Q.55	1	Q.56	2
Q.57	1	Q.58	3	Q.59	4	Q.60	4	Q.61	4	Q.62	3	Q.63	4
Q.64	3												