

Very Short Answer Type Questions

[1 mark]

Q. 1. Why is energy required by an organism even during sleep?

Ans. This is because even when an organism is asleep, various biological processes keep on occurring in its body which requires energy.

Q. 2. Give the energy transformation that takes place in the process of photosynthesis.

Ans. Solar energy is converted into chemical energy during photosynthesis.

Q.3. What is chlorophyll?

Ans. Chlorophyll is a green coloured pigment found in the green leaves or green parts of the plant which traps solar energy for photosynthesis. Chlorophyll is present in cell organelles called chloroplasts.

Q. 4. Name the various factors which affect the rate of photosynthesis.

Ans. The factors which affect the rate of photosynthesis are light, water, temperature and carbon dioxide.

Q. 5. Define photolysis.

Ans. The phenomenon of breaking down of water molecule using solar energy absorbed by chlorophyll molecules is known as photolysis.

Q. 6. Define light reaction.

Ans. A chemical reaction, which take place only in the presence of light, is called light reaction or light dependent reaction. It takes place in grana of chloroplast.

Q. 7. Define dark reaction.

Ans. A chemical reaction, which can take place even in the absence of light, is called a dark reaction or light independent reaction. It takes place in stroma of chloroplast.

Q. 8. What are peristaltic movements?

Ans. The contraction and expansion movements of the walls of foodpipe are called peristaltic movements. This movement pushes the food in forward direction in the alimentary canal.

Q. 9. Which is the largest gland in the human body?

Ans. Liver

Q. 10. Give an example of an organism whose digestion is intracellular.

Ans. Amoeba

Q. 11. Name the various cells through which water moves upward to reach the leaves.

Ans. water absorbed by root hairs moves through epidermis → root cortex → endodermis → root xylem (ie., tracheids and vessels) → stem xylem → xylem in the leaf.

Q. 12. What will happen to a plant if its xylem is removed?

Ans. The xylem tissue transports water and minerals from the soil to the leaves of a plant for photosynthesis. If xylem is removed, upward movement of water will stop leading to wilting of leaves and ultimately causes death of a plant.

Q. 13. In which chamber of heart is oxygenated and deoxygenated blood found?

Ans. Oxygenated blood: It is found in left auricle and left ventricle.

Deoxygenated blood: It is found in right auricle and right ventricle.

Q. 14. What makes red blood corpuscles red?

Ans. Haemoglobin

Q. 15. What is the main function of kidneys in humans?

Ans. Kidneys excrete water and dissolve metabolic wastes, e.g., urea and other dissolved solids like uric acid, creatinine and inorganic salts.

Q. 16. In which part of nephron is water reabsorbed?

Ans. Proximal and distal convoluted tubules.

Q. 17. In which region of kidney Malpighian corpuscles are found?

Ans. In the outer (cortex) part of kidney.

Q. 18. What process in plants is known as transpiration?

Ans. The release of water vapours in the atmosphere through the pores present on plant leaves, i.e., stomata, is called transpiration.

Q. 19. What is urethra?

Ans. The urine collected into the urinary bladder passes through a muscular tube which is called urethra.

Q. 20. Which is the major nitrogenous waste product in human beings? How is it removed from the body?

Ans. The major nitrogenous waste product in human beings is urea. Urea is removed/ eliminated from the body through urine.

Q. 21. Name the membrane covering the lungs.

Ans. Pleura

Q. 22. What is osmoregulation?

Ans. Osmoregulation is the maintenance of optimum concentration of water and salts in the body fluids.

Q. 23 In which form

(i) oxygen is carried to the tissues?

(i) CO₂ moves out of the blood?

Ans.(i) Oxyhaemoglobin

(ii) Carboxyhaemoglobin and as carbonic acid (CO₂ dissolved in blood plasma).

Q. 24. Why do the walls of trachea not collapse when there is less air in it?

Ans. Tracheal walls do not collapse when there is less air in it because it is supported by rings of cartilage.

Q, 25. Which part of root is involved in the exchange of respiratory gases in plants?

Ans. Root hairs are involved in the exchange of respiratory gases in plants.

Q. 26. Name two organisms in which food material is broken down outside the body and absorbed.

Ans. Yeast, mushroom.

Q. 27. What prevents backflow of blood inside the heart during contraction?

Ans. Valves in heart prevent backflow of blood inside the heart during contraction.

Q. 28. Which is the first enzyme to mix with food in the digestive system?

Ans. Salivary amylase

Q. 29. Why does lack of oxygen in muscles often lead to cramps among cricketers?

Ans. This is due to the conversion of pyruvate to lactic acid in the absence of oxygen.

Q. 30. Where is pyruvic acid converted into lactic acid during deficiency of oxygen in tissues of human beings?

Ans. Golgi body

Q. 31. Where does the oxygen come from when it is liberated during photosynthesis?

Ans. Oxygen liberated during photosynthesis comes from water.

Q. 32. What is the internal (cellular) energy reserve in autotrophs?

Ans. Starch

Q.33. In which forms do most plants absorb nitrogen?

Ans. Nitrates and nitrites

Q. 34. If salivary amylase is lacking in the saliva, which event in the mouth cavity will be affected?

Ans. Starch breaking down into sugars.

Q. 35. What protects the inner lining of stomach from hydrochloric acid?

Ans. The inner lining of stomach is protected from hydrochloric acid by mucus.

Q. 36. What is chyme?

Ans. The slightly digested food, enters into the stomach through the alimentary canal. In the stomach, this food is churned along with gastric juices converting this food into a semi-solid paste called chyme.

Q. 37. Name the enzyme which is present in infants but may be absent in adults.

Ans. Renin

Short Answer Type Questions – I

[2 marks]

Q. 1 What is compensation point?

Ans. When the rate of photosynthesis is equal to rate of respiration, it is called as compensation point. The rate of liberation of O₂ during photosynthesis is equal to the rate of liberation of CO₂ during respiration. Thus, there is no net uptake of gases from the environment. Compensation point is usually reached at dusk and dawn and on a cloudy day.

Q. 2. What happens to visible light of the sun when it falls on chlorophyll?

Ans. Visible light of the sun consists of seven colours-violet, indigo, blue, green, yellow, orange and red. Out of these lights of different wavelengths, chlorophyll absorbs mainly blue, violet, red and orange lights but does not absorb the green light. It is due to the reflection of green light by chlorophyll of the plants that the plants look green in colour.

Q. 3. How does water affect the rate of photosynthesis in plants?

Ans. Water controls the opening and closing of stomata. The deficiency of water causes stomata to open very little or it may even remain closed. Therefore, CO₂ (required as a raw material for photosynthesis) cannot enter into the leaves and thus lack of water slows down the rate of photosynthesis.

Q. 4. What is peptic ulcer? How is peptic ulcer caused?

Ans. An ulcer on the inner membrane lining of the stomach is called peptic ulcer. Peptic ulcer is caused by the high acidity of gastric juice secretions.

Q. 5. How does respiration occur in the leaves?

Ans. Leaves have tiny openings on their lower surface called stomata. The exchange of gases takes place through the stomata by the process of diffusion.

Q. 6. What is ascent of sap?

Ans. Absorbed water from the soil also contains dissolved minerals (nitrates, phosphates, etc.) and hence it is called sap. This sap moves upwards due to the 'transpiration pull' developed in the xylem elements. Thus, transportation of sap from roots to the leaves at the top is called ascent of sap.

Q. 7. What is transpiration pull?

Ans. Water in the mesophyll cells of leaves (cells located below the stomata) is in contact with water or sap in xylem of leaf petiole, stem and root. This water evaporates by the process of transpiration. Thus, due to transpiration water is pulled upward which creates an upward suction force called 'transpiration pull'.

Q. 8. What is root pressure?

Ans. It is a pressure developed in the xylem due to metabolic activity of the root cells. It is a hydrostatic pressure developed in the root system that pumps the water or sap in the root xylem.

Q. 9. What is the role of intercostal muscles in respiration and where are these found?

Ans. Intercostal muscles are found in between the ribs. Their contraction and relaxation changes the volume of thoracic cavity so that air can enter and leave the lungs.

Q. 10. State the function of Bowman's capsule and glomerulus.

Ans. Bowman's capsule and glomerulus have semipermeable walls. The glomerulus, is a tuft of capillaries contained in Bowman's capsule. The water and dissolved substances (wastes and useful) are filtered into the Bowman's capsule and from here they are filtered into the tubule. Thus, both the structures act as filtering apparatus.

Q. 11. What happens to glucose which enters the nephron along with the filtrate?

Ans. Glucose along with filtrate runs down through the long renal tubule by the action of cilia. Glucose amino acids, salts, etc., are reabsorbed by the tubular cells and then secreted into the capillary blood cells by diffusion.

Q. 12. Write down the functions of lymph nodes.

Ans. Functions of lymph nodes are:

- (i) Lymph nodes produce and maintain the lymphocytes of blood. These are only found in the mammals.
- (ii) Lymph nodes filter the blood and remove poisonous and foreign substances, e.g., bacteria debris, etc.

Q. 13. Why is cigarette smoking injurious to health?

Ans. During smoking, the cigarette fumes make the walls of alveoli very thin which causes rupturing of alveoli. This reduces the surface area for gaseous exchange in lungs. To make up for the reduced gaseous exchange, the heart has to pump more blood. This over-burdening of the heart may cause heart failure.

Q. 14. State the function of epiglottis.

Ans. At the top of the trachea (or wind pipe) there is a flap of cartilage called epiglottis. The function of epiglottis is to cover the mouth of trachea (or wind pipe) when we swallow food so that the food may not enter the trachea (or wind pipe).

Q. 15. Why are white blood corpuscles called soldiers of the body?

Ans. White blood corpuscles engulf (phagocytose) the foreign matter (bacteria, dust and other foreign material) entering the body, and are hence called soldiers. They produce antibodies against antigens, and antitoxins against toxins.

Q. 16 Name the parts of the body responsible for excretion in

(i) Amoeba

(ii) Earthworm.

Ans. (i) Amoeba: Contractile vacuole

(ii) Earthworm: Nephridia

Q. 17. What happens to the rate of breathing during vigorous exercise and why?

Ans. During vigorous exercise, our body requires more energy and for this purpose more oxygen is needed, so the rate of breathing is increased. Oxygen intake rate increases by about 20 to 25 times.

Q.18. How do the guard cells regulate opening and closing of stomatal pores?

Ans. The swelling of guard cells due to absorption of water causes opening of stomatal pores while shrinking of guard cells closes the pores. Opening and closing of stomata occurs due to turgor changes in guard cells. When guard cells are turgid, stomatal pore is open while in flaccid conditions, the stomatal aperture closes.

Q. 19. Two green plants are kept separately in oxygen-free containers, one in the dark and the other in continuous light. Which one will live longer? Give reasons.

Ans. Plant kept in continuous light will live longer. Because it will be able to produce oxygen required for its respiration by the process of photosynthesis

Q. 20. In each of the following situations what happens to the rate of photosynthesis?

(i) Cloudy days

(ii) No rainfall in the area

(iii) Good manuring in the area

(iv) Stomata get blocked due to dust

Ans. (i) Decreases

(ii) Decreases

(iii) Increases

(iv) Decreases

Q. 21. Name the energy currency in the living organisms. When and where is it produced?

Ans. Adenosine triphosphate (ATP) produced during respiration in living organisms and also during photosynthesis in plants.

Q. 22. Match the terms in column (A) with those in column (B):

Column A	Column B
(i) Trypsin	(a) Pancreas
(ii) Amylase	(b) Liver
(iii) Bile	(c) Gastric glands
(iv) Pepsin	(d) Saliva

Ans. (i) – (a); (ii) – (d);
(iii) – (b); (iv) – (c)

Q. 23. Explain the statement, "Bile does not contain any enzyme but it is essential for digestion."

Ans. Bile does not contain any enzyme but it is essential for digestion because bile is alkaline and contain salts which helps to emulsify the fat present in the food. So, the bile perform two functions:

- (a) The food coming from the stomach is acidic and has to be made alkaline for the pancreatic enzymes to act.
- (b) The bile salts breakdown the fat present in the food into smaller globules. This increases the efficiency of enzymes in the small intestine to digest the food effectively.

Short Answer Type Questions – II

[3 marks]

Q. 1. What are the adaptations of leaf for photosynthesis?

- Ans.** (a) Leaves provide large surface area for maximum light absorption.
(b) Leaves are arranged at right angles to the light source in a way that causes overlapping.
(c) The extensive network of veins enables quick transport of substances to and from the mesophyll cells.
(d) Presence of numerous stomata for gaseous exchange.
(e) The chloroplasts are more in number on the upper surface of leaves.

Q. 2. Mention the major events during photosynthesis.

Ans. The major events during photosynthesis are:

- (a) absorption of light energy by chlorophyll
- (b) conversion of light energy to chemical energy
- (c) splitting of H₂O into H₂, O₂ and energy
- (d) reduction of CO₂ to carbohydrates

Q. 3. Study the given diagram:

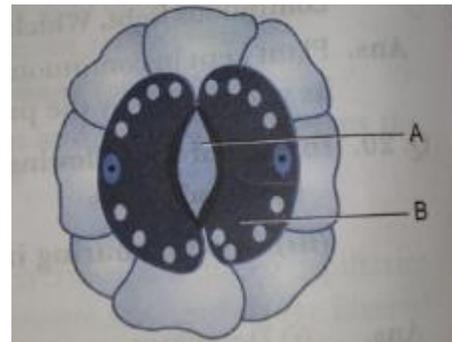
Name the parts 'A' and 'B' and state one function of each.

Ans. A → Stomatal pore

Function: Massive amounts of gaseous exchange takes place in the leaves through these pores for the purpose of photosynthesis.

B → Guard cell

Function: The opening and closing of the stomatal pore is a function of the guard cell.



Q. 4. What substances are contained in the gastric juice? What are their functions?

Ans. Gastric juice contains three substances: hydrochloric acid, enzyme pepsin and mucus. Their functions are:

- (i) Hydrochloric acid in the stomach is used to make the medium acidic to facilitate the action of the enzyme pepsin and to kill germs if any.
- (ii) Enzyme pepsin digests proteins to convert them into peptones.
- (iii) The mucus helps to protect the stomach wall from its own secretions of hydrochloric acid.

Q. 5. What are the various processes that take place in the duodenum?

Ans. processes that take place in the duodenum are:

- (i) Bile emulsifies the fat molecules present in the food into small globules.
- (ii) The pancreatic enzyme trypsin starts digesting the proteins and the pancreatic amylase breaks down the starch.
- (iii) Bile juice secreted by the liver and bicarbonate ions are secreted by the duodenal wall which makes the medium alkaline.

Q. 6. How does respiration occur in the roots of the plant?

Ans. Air is present in between the particles of the soil. The roots take the oxygen by the process of diffusion. Oxygen first diffuses into the root hairs and reaches all other cells of the root for respiration. CO₂ produced in the cells moves out through the root hairs by the the process of diffusion. For respiration, in older roots, where root hair is not present, the exchange of gases takes place through lenticels (tiny openings in the protective layer) by the process of diffusion.

Q. 7. (i) Explain why the rate of photosynthesis in plants is low both at lower and higher temperatures.

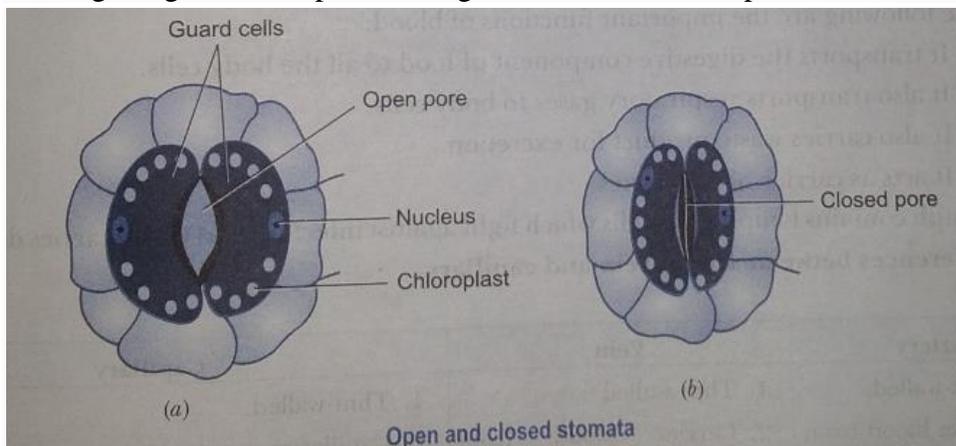
(ii) Is green light most or least useful in photosynthesis and why?

Ans. (i) Photosynthesis is an enzymatic process. The enzymes function within an optimum range of temperature which is neither very low nor very high. At low temperature the activity of enzymes is lowered due to which the rate of photosynthesis is also low. Again when the temperature is very high, the activity of enzymes decreases which leads to low rate of photosynthesis.

(ii) Green light is least useful in photosynthesis, because chlorophyll does not absorb green light.

Q. 8. How does respiration occur in the stem of the plant?

Ans. In the stem of herbaceous plants, stomatas are present. So, the exchange of gases takes place through stomata by the process of diffusion. In the woody and hard stems of big plants, the exchange of gases takes place through lenticels which are present on the bark of the stem.



Q.9. Give reasons:

(i) Plants look green.

(ii) The respiratory surface of earthworm is its skin.

(iii) Nutrition is necessary for an organism.

(iv) We boil the leaf in alcohol when we are testing it for starch.

Ans. (i) The leaves of plants contain green pigments called chlorophyll which is necessary for photosynthesis. Plants reflect green light of sunlight, so they look green.

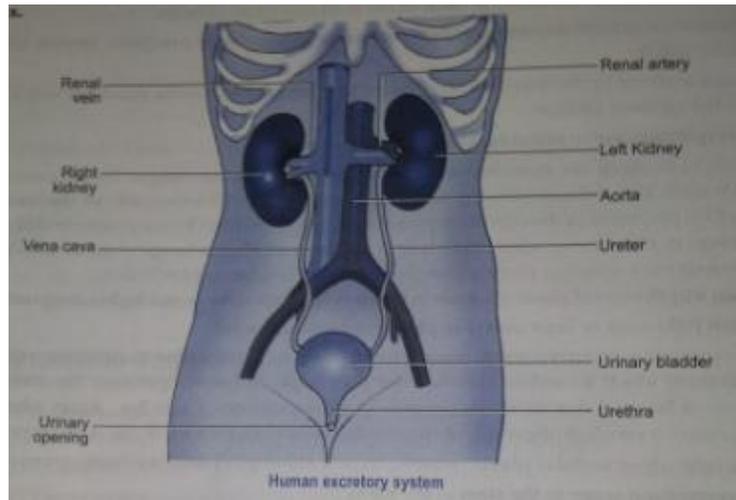
(ii) The skin of earthworm is quite thin and moist and has rich blood supply. So, it respire through its skin.

(iii) An organism requires nutrients like carbohydrates, fats, protein, minerals and vitamins for the growth, reproduction and metabolic activities, so nutrition is necessary for an organism.

(iv) We boil the leaf in alcohol to remove chlorophyll from green leaf.

Q. 10. Draw and label the parts of the human excretory system.

Ans.



Q. 11. State the function of the following components of transport system:

(i) Blood (ii) Lymph

Ans. (i) The following are the important functions of blood:

(a) It transports the digestive component of food to all the body cells.

(b) It also transports respiratory gases to body cells.

(c) It also carries waste product for excretion.

(d) It acts as carrier of hormones.

(ii) Lymph contains lymphocyte cells which fight against infection and it also carries digested fat.

Q. 12. State differences between artery, vein and capillary.

Ans.

Artery	Vein	Capillary
1. Thick-walled. 2. Carries blood from the heart to other parts of the body. 3. Situated deeper under the skin.	1. Thin-walled. 2. Carries blood from different organs to the heart. 3. Situated just under the skin.	1. Thin-walled. 2. Capillaries are involved in the exchange of food material, respiratory gases, and body wastes. 3. Occur at the terminals of artery and vein.

Q. 13. Is 'nutrition' a necessity for an organism? Discuss.

Ans. Food is required for the following purposes:

- (i) It provides energy for the various metabolic processes in the body.
- (i) It is essential for the growth of new cells and repair or replacement of worn out cells.
- (ii) It is needed to develop resistance against various diseases.

Long Answer Type Questions

[5 Marks]

Q. 1. What is the different between autotrophic nutrition and heterotrophic nutrition?

Ans.

Autotrophic nutrition	Heterotrophic nutrition
<p>1. The organisms that make their own food from simple inorganic substances are called autotrophs, e.g., most green plants. Therefore, autotrophic nutrition refers to the process of nourishing, namely photosynthesis, that they adopt for growth and maintenance.</p> <p>2. The raw materials required for preparation of food are CO_2 and H_2O.</p> <p>3. Chlorophyll and sunlight are essential for photosynthesis and thus nutrition to occur.</p>	<p>1. The organisms which cannot make their own food and depend directly or indirectly on autotrophs for their survival are called heterotrophs, e.g., animals and fungi. Heterotrophic nutrition refers to the process of nourishing, namely by obtaining food from other organisms, for their own growth and maintenance.</p> <p>2. Heterotrophs are directly or indirectly dependent on autotrophs.</p> <p>3. Chlorophyll and sunlight are not required.</p>

Q. 2. Describe the glands involved in the digestive system.

Ans.

S.No.	Organ	Gland	Secretion	Enzymes	Substrate	End Product
1.	Mouth	Salivary	Saliva	Salivary amylase	Starch	Maltose
2.	Stomach	Gastric	Gastric juice	1. Pepsin 2. Lipase	Proteins Lipids	Peptones Glycerides
3.	Duodenum	1. Liver 2. Pancreas	Bile juice Pancreatic juice	No enzyme 1. Amylase 2. Trypsin 3. Lipase	Fat Starch Protein Fats (emulsified)	Emulsification of fats (alkaline medium) Maltose Peptones, and Peptides fatty acids and glycerol

4.	Small intestine	Intestinal glands	Intestinal juice or Succus entericus	1. Erepsin 2. Enzyme for sugar digestion 3. Lipase	Peptones, and Peptides Sugar Triglycerides	Amino acids Glucose Monoglycerides and fatty acids
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Q. 3. What are the common features between all the respiratory organs? Explain the mechanism of gaseous exchange between tissues and blood.

Ans. Common features between all the respiratory organs are:

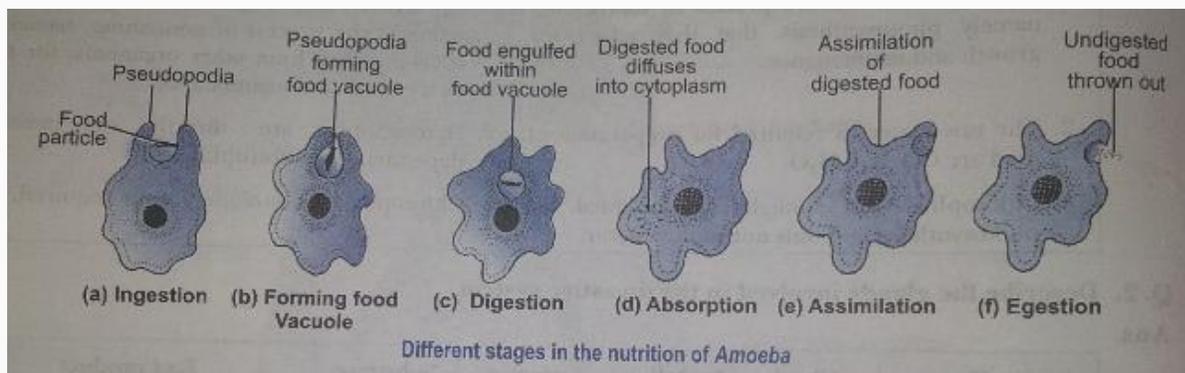
- (i) All the respiratory organs have large surface areas to get enough oxygen.
- (ii) All the respiratory organs are thin-walled for easy diffusion of gases and substances.
- (iii) All the respiratory organs (like skin, lungs, gills) have a rich supply of blood for transporting respiratory gases.

The mechanism of gaseous exchange between tissues and blood is as follows:

- (i) The blood reaching the tissues has higher concentration of oxygen than in the cell so it gets diffused into the cells.
- (ii) The carbon dioxide, which is formed in the cells, gets accumulated in higher concentration as compared in the blood, so it easily diffuses into the blood.
- (iii) The blood with CO₂ takes this gas to the lungs, from where it is expelled out during exhalation.

Q. 4. Explain the nutrition process in an Amoeba.

Ans. The mode of nutrition in Amoeba is holozoic.



The various steps involved in the process of nutrition are:

- (i) Ingestion: Amoeba ingests food with the help of its finger-like extensions, called pseudopodia.

When a food particle approaches Amoeba, it forms pseudopodia around it and forms a food vacuole inside the Amoeba.

- (ii) Digestion: Various enzymes from the cytoplasm enter into the food vacuole and break them down into simple soluble molecules.
- (iii) Absorption: The simple soluble food is absorbed by cytoplasm of amoeba from food vacuoles through the process of diffusion.
- (iv) Assimilation: Amoeba cell obtains energy from the absorbed food through respiration. This energy is utilised by Amoeba for its growth and repair of the body.
- (v) Egestion: When a considerable amount of undigested food gets collected inside Amoeba, its cell membrane ruptures and throws out the undigested food.

Q.5. Give the role of liver in the human beings.

Ans. Liver is the largest gland in human beings.

Its main functions are as follows:

- (i) It secretes bile juice which makes the medium of the food alkaline and also emulsifies fat.
- (ii) It stores the excess of glucose in the form of glycogen.
- (iii) old worn-out RBCs are broken down in liver cells. Their haemoglobin is changed into bile pigments.
- (iv) The ammonia is produced as a result of metabolism of amino acids. It is highly toxic. The ammonia combines with CO_2 and is converted into urea (less toxic).
- (v) It stores vitamins, iron and copper.
- (vi) It produces fibrinogen and helps in blood-clotting.
- (vii) It produces heparin which does not allow the clotting of blood inside the blood vessels.
- (viii) It regulates the volume of blood to some extent.
- (ix) RBCs are produced at the foetus stage by the liver.

Q. 6. Distinguish between breathing and respiration.

Ans.

Breathing	Respiration
1. The process of obtaining oxygen and releasing carbon dioxide is called breathing.	1. The process of releasing energy from food is called respiration.
2. It is a physical process.	2. It is a biochemical process.
3. It takes place in the lungs.	3. It takes place in the lungs as well as in mitochondria.
4. It utilised energy from the food.	4. It released energy from the oxidation of simple food.

Q. 7. (i) Describe aerobic respiration.

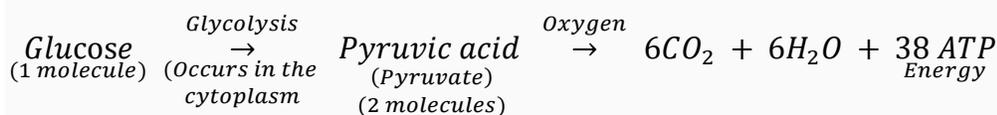
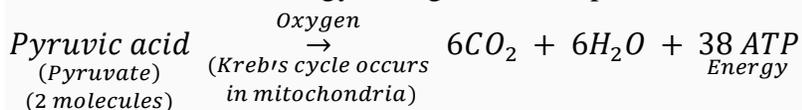
(ii) Describe the process of anaerobic respiration.

Ans. (i) The respiration which needs oxygen or occurs in the presence of oxygen is called aerobic respiration. During this type of respiration, glucose is broken down into carbon dioxide and water with the release of considerable amount of energy. The energy is stored in the form of ATP.

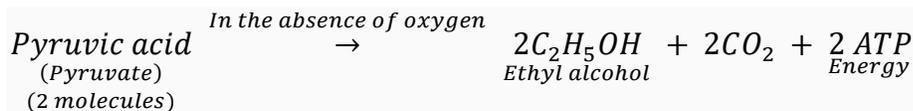
It consists of two steps:

(a) Glycolysis: The conversion of glucose into pyruvate (or pyruvic acid) is called glycolysis. It occurs in the cytoplasm

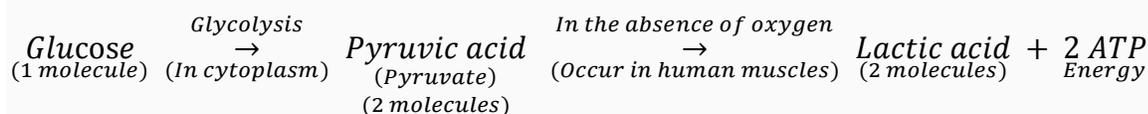
(b) Krebs's Cycle: It is the process of converting pyruvate into CO₂ and H₂O along with the release of considerable amount of energy. It occurs in the mitochondria. One molecule of glucose liberates 38 ATP of energy during aerobic respiration.



(ii) The respiration which takes place in the absence of oxygen is called anaerobic respiration. During this respiration glucose is broken down into ethyl alcohol and CO₂ with release of very small amount of energy. In anaerobic respiration, one molecule like yeast, etc.



In human beings, the energy is obtained by aerobic respiration but sometimes anaerobic respiration occurs in muscles during vigorous exercise when oxygen gets consumed faster than its supply by the blood. During the anaerobic respiration in the muscles the glucose is converted into lactic acid with the release of 2 ATP of energy.

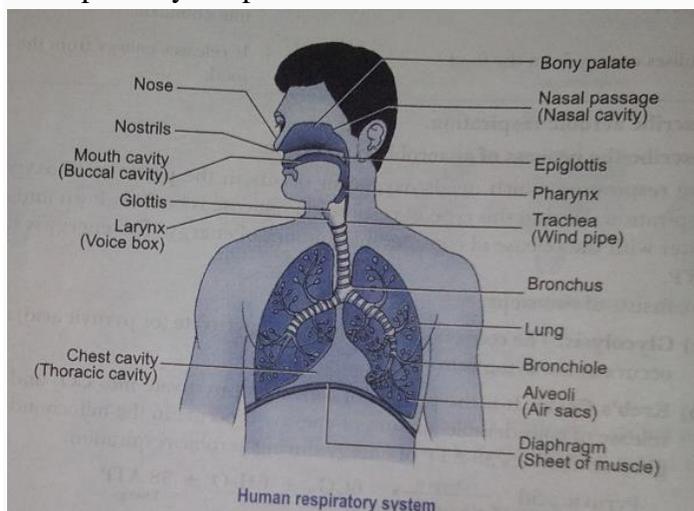


Q. 8. Explain process of breathing in man.

Ans. Human respiratory system: The human respiratory system begins from nose cavities called nostrils. The air from cavity enters into the pharynx and then into the trachea (or wind pipe). The trachea runs down the neck and divides into two tubes called bronchi. Each bronchi is connected to a lung. In the lungs each bronchi divides into a large number of thin tubes called bronchioles. The bronchioles have a tiny air sac at their ends called alveoli. It is in the alveoli where exchange of gases takes place.

Mechanism of breathing:

(i) When we breathe in air, the diaphragm contracts which results in the increase in volume of chest cavity. Due to this expansion of chest cavity, the air pressure in the lungs decreases. Thus, air from outside rushes into the lungs through nostrils, trachea and bronchi. Therefore, air sacs of lungs get filled with air when we breathe in. The exchange of gases between alveoli and blood takes place by the process of diffusion.

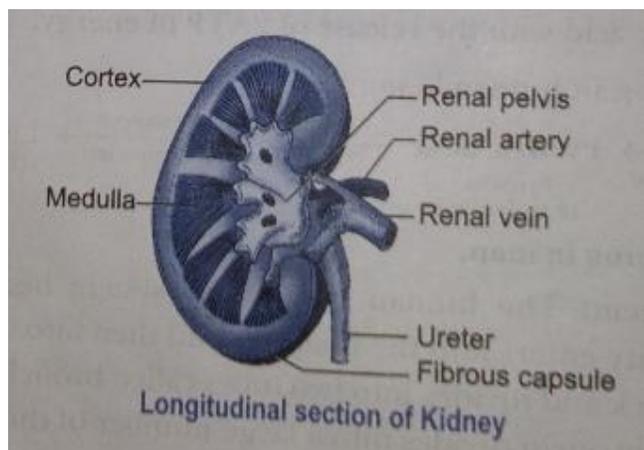


(ii) Now, the air present in air sacs of the lungs is rich in CO_2 . When we breathe out air, the diaphragm relaxes which results in the decrease in volume of chest cavity. The contraction pushes the air from the lungs into the trachea, nostrils and then out of the body into air. Breathing in air is called inhalation and breathing out air is called exhalation.

Mechanism of gaseous exchange during respiration: The oxygen is carried by blood to all the parts of the body. As the blood passes through the tissues of the body, the oxygen from the blood diffuses into the cell, whereas the CO_2 which is produced during respiration diffuses into the blood and is carried to the lungs.

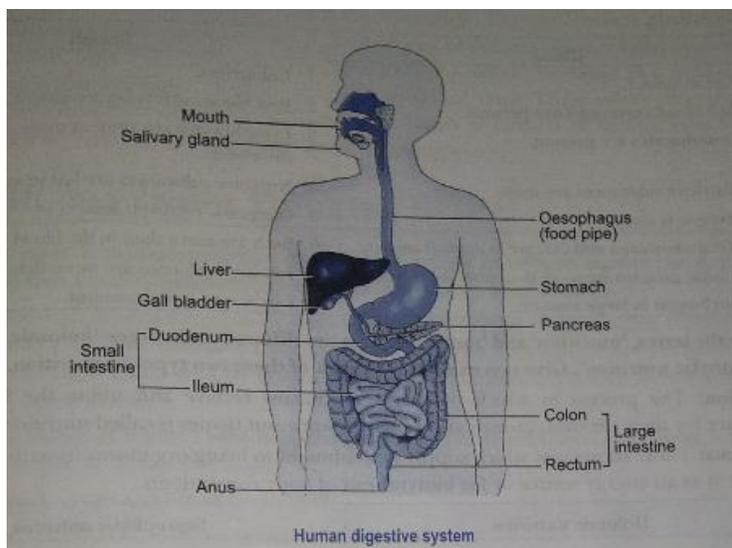
Q. 9. Describe the structure of human kidney.

Ans. Kidneys are bean-shaped and located at the back of abdomen, one on either side of backbone. Its inner concave surface has a depression called hilum through which renal artery enters and renal vein leaves the kidney. Kidney has two regions: outer cortex and inner medulla. Each kidney has a large number of filtering units called nephrons.



Q. 10. Describe the process of digestion of food in human beings.

Ans.



The various processes involved in the digestion of human beings are:

(i) Ingestion: Through the help of mouth human beings ingest food.

(ii) Digestion: The teeth helps in physical digestion of food. In mouth there are salivary glands, which secretes saliva, in which salivary amylase enzyme is present which digest the starch present in food into maltose sugar, i.e., the digestion of carbohydrate starts from mouth itself. Mouth opens into a small funnel-shaped area called pharynx which leads to a long tube called **oesophagus**, whose wall is highly muscular. When the slightly digested food enters into oesophagus the contraction and expansion movement of its wall, takes place, which is known as peristaltic **movement**. This movement helps the food to move towards the stomach. Usually, in oesophagus there is no digestion of food. From the oesophagus the food enters into the stomach. In the stomach there is secretion of gastric juices which is a mixture of hydrochloric acid, pepsin (protein digesting enzyme) and mucus. Now, the partially digested food enters from stomach into the small intestine's wider part which is known as **duodenum** and the remaining part of the small intestine is termed as **ileum**. The duodenum, receives secretions of two glands, i.e, liver and pancreas. Liver secretes bile pigments and pancreas secretes pancreatic juice which digests the proteins, carbohydrates and emulsified fats. Here the digestive enzymes are **amylase, maltase** and **invertase** for digesting the carbohydrates, trypsin for proteins and lipase for fats. Thus, food is completely digested in ileum part of small intestine.

(iii) Absorption: Now, the food enters from duodenum into ileum part of small intestine where millions of finger-like projections known as villi are present which absorb the food.

(iv) Assimilation: The blood carries the digested and dissolved food to all parts of the body, where it is assimilated into the cells which is used for obtaining energy as well as for growth and repair of the body.

(v) Egestion: The undigested food enters into the large intestine's wider part, where water is absorbed from the undigested food and the food becomes solid. Now, this solid undigested food enters the last part of large intestine known as rectum through which it moves out from the body.

Q. 11. Different between blood and lymph.

Ans.

Blood	Lymph
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<ol style="list-style-type: none"> 1. Red in colour. 2. Red blood corpuscles are present. 3. Lymphocytes are present. 4. Nutritive substances are more. 5. Oxygen is more. 6. Metabolic wastes and CO₂ are in normal amount. 7. Soluble proteins are more than insoluble proteins. 8. Fibrinogen in large amount. 	<ol style="list-style-type: none"> 1. Colourless 2. Red blood corpuscles are absent. 3. Lymphocytes are present more in number than the blood. 4. Nutritive substances are less in amount. 5. Oxygen is relatively less. 6. Both are more than in the blood. 7. Insoluble proteins are more than soluble ones. 8. Fibrinogen in less amount.
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Q. 12. Define the terms, 'nutrition' and 'nutrients'. List two differences between 'holozoic nutrition' and 'saprophytic nutrition'. Give two examples of each of these two types of nutrition.

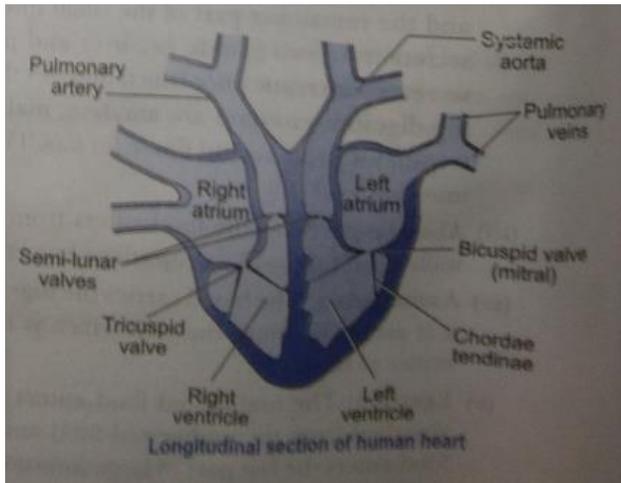
Ans. Nutrition: The process by which the living organisms receive and utilise the food materials necessary for their survival, growth and repair of worn-out tissues is called nutrition.

Nutrients: Those substances which supply nourishment to living organisms from its surroundings and use it as an energy source or for biosynthesis of body constituents.

Holozoic nutrition	Saprophytic nutrition
<ol style="list-style-type: none"> 1. In this type of nutrition solid and complex organic food is directly taken into the body. 2. This type of nutrition takes place in 5 steps namely ingestion, digestion, absorption, assimilation and egestion. 3. Example: <i>Amoeba</i>, different vertebrates. 	<ol style="list-style-type: none"> 1. In saprophytic nutrition, the organism obtains nutrients from the dead and decaying organic matter. The food is digested outside the body of the organism and then absorbed. 2. Saprophytic nutrition takes place by absorption of break-down products. 3. Example: Bacteria, fungi, <i>Rhizopus</i>, yeast.

Q. 13. Describe internal structure of a human heart.

Ans. The two auricles or atria are thin-walled and are separated from each other by a thin inter-atrial septum. The right atrium receives venous (deoxygenated blood having very little O₂) from the entire body through a superior and inferior vena cava. The left



smaller atrium receives oxygenated blood from the lungs through four pulmonary veins. The two auricles (atria) are separated from the ventricles by two apertures guarded by membranous valves. The valve separating right atrium from right ventricle is called right atrio-ventricular valve or tricuspid valve made up of three flaps. The valve separating left atrium from left ventricle is called left atrio-ventricular valve or mitral valve, formed of two flaps. These valves are valves attached with fine cords with the papillary muscles of the ventricular wall. These valves only allow flow from auricles into ventricles and not in opposite direction.

Both the ventricles are separated from each other by a thick inter-ventricular septum. The wall of left ventricle is much thicker than that of right ventricle. The left ventricle pushes blood into aorta which supplies blood to entire body. The opening of aorta is also guarded by a valve formed of 3 semilunar flaps. The right ventricle pumps venous blood into lungs by a pulmonary artery. Its opening is also guarded by a valve, having 3 semilunar flaps. These valves allow the flow of blood from ventricles into the aorta and not back. Heart is formed of cardiac muscle fibres, which rhythmically contract the heart without feeling fatigue.

HOTS (Higher Order Thinking Skills)

Q.1. If a plant is releasing carbon dioxide and taking in oxygen during the day, does it mean that there is no photosynthesis occurring? Justify your answer.

Ans. Release of CO₂ and intake of O₂ gives evidence that either photosynthesis is not taking place or its rate is too low. Normally during day time, the rate of photosynthesis is much more than the rate of respiration. So, CO₂ produced during respiration is used up for photosynthesis hence CO₂ is not released.

Q.2. The leaves of a plant first prepare food A by photosynthesis then food A gets converted into food B. What are A and B?

Ans. Food A → glucose, Food B → starch

Q.3. Why do fishes die when taken out of water?

Ans. Fishes respire with the help of gills. Gills are richly supplied with blood capillaries and can readily absorb oxygen dissolved in water. Since fishes cannot absorb gaseous oxygen they die soon after they are taken out of water.

Q.4. What would happen if green plants disappeared from the Earth?

Ans. Green plants are the sources of energy for all organisms. If all green plants disappear from the Earth, all the herbivores will die due to starvation and so will the carnivores.

Q.5. Why is small intestine in herbivores longer than in carnivores?

Ans. Digestion of cellulose takes a longer time. Hence, herbivores eating grass need a longer small intestine to allow complete digestion of cellulose. Carnivorous animals cannot digest cellulose, hence they have a shorter intestine.

Q.6. What will happen if mucus is not secreted by the gastric glands?

Ans. Gastric glands in stomach release hydrochloric acid, enzyme pepsin and mucus. Mucus protects the inner lining of stomach from the action of hydrochloric acid and enzyme pepsin. If mucus is not released, it will lead to erosion of inner lining of stomach, leading to acidity and ulcers.

Q.7. Why is the rate of breathing in aquatic organisms much faster than in terrestrial organisms?

Ans. Aquatic organisms like fishes obtain oxygen from water present in dissolved state through their gills. Since the amount of dissolved oxygen is fairly low compared to the amount of oxygen in the air, the rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms.

Q.8. Why do veins have thin walls as compared to arteries?

Ans. Arteries carry blood from the heart to various organs of the body under high pressure so they have thick and elastic walls. Veins collect the blood from different organs and bring it

back to the heart. The blood is no longer under pressure so the walls are thin with valves to ensure that blood flows only in one direction.

Q.9. Why and how does water enter continuously into the root xylem?

Ans. Cells of root are in close contact with soil and so actively take up ions. The ion concentration increases inside the root and hence osmotic pressure increases the movement of water from soil into the root which occurs continuously.

Q.10. Why is more concentrated yellowish urine excreted in summers?

Ans. In summers consumption of water is increased and in spite of that excretory amount of urine is less. Because most of the water is excreted in the form of sweat which is evaporated soon due to high environmental temperature. It keeps our body cool and hence concentrated yellowish urine is excreted.

Q.11. Leaves of a healthy potted plant were coated with vaseline to block the stomata. Will this plant remain healthy for long? State three reasons for your answer.

Ans. If waxy coating is made on the surface of leaf, loss of water in the form of water vapour does not take place. Even the gaseous exchange will not take place. So, photosynthesis will either be reduced or will not take place.

The plant will not remain healthy for long because:

- (a) Exchange of gases will not take place.
- (b) Photosynthesis will either be reduced or will not take place due to lack of CO₂.
- (c) Transpiration will not take place, so there will be no mechanism of cooling in hot weather.

Value Based Questions

Q. 1. Aanchal loves to eat chips, burgers and chocolates. Her parents always discourage her to eat junk food.

Answer the following questions based on the situation mentioned above.

- (i) Why do you think Aanchal's parents do not let her eat junk food?**
- (ii) What values are they promoting?**
- (iii) How can children be persuaded to eat healthy food?**

Ans. (i) (a) Junk food makes the person obese.

(b) He/She may suffer from loss of appetite.

(c) He/She may develop the problems related to his/her physical or mental growth.

(d) It leads to wastage of money.

(ii) Awareness regarding health, caring, loving nature.

(iii) Inform them about advantages of eating healthy food and the health problems posed by junk food.

Q. 2. Rahul wants to build up his body very quickly without following right exercise regime and balanced diet. Instead he started eating readymade food supplements.

Answer the following questions based on the situation mentioned above.

- (i) In your opinion did Rahul take the right step?**
- (ii) What are the harmful effects of taking artificial health supplement without consulting a physician.**
- (iii) What values are being ignored by Rahul?**

Ans. (i) No, the step taken by Rahul was not right.

(ii) It can lead to addiction and can affect the health adversely.

(ii) Concern for health, prudence.

Q. 3. Om, Rohit and Kishore always remain in a hurry. One day, during lunch hour Om and Rohit started gulping food quickly. Kishore told them to eat slowly. But they didn't listen to him and went out to play. Om suddenly developed stomach ache while playing.

Answer the following questions based on the situation mentioned above.

- (i) What according to you might have gone wrong with him?**
- (ii) What advice would you give to him?**
- (iii) What values are promoted by Kishore?**

Ans. (i) Om developed stomach ache as he had not chewed his food properly. Chewing food properly helps in proper breakdown of food and mixing it with saliva. Large food pieces if enter the stomach might cause damage.

(ii) Chew your food properly for healthy digestion.

(iii) Caring, health conscious and aware.

Q. 4. It is said, 'Excess of everything is bad'.

Examine the following situations in the light of above statement.

- (a) A plant is watered 4-5 times a day excessively.**
- (b) A person overeats for more than 6 months.**
- (c) A student watches television for 6 hours a day regularly.**

Answer the following questions based on the above information:

- (i) Which life sustaining values are getting neglected in the above situations?**
- (ii) What are the adverse effects of activity (c) above? How can the adverse effect of this activity (c) be minimised?**
- (iii) Suggestive one more similar situation from everyday which should be avoided.**

Ans. (i) Respect for nature of life processes.

(ii) Damage to eyesight, environmental degradation due to excessive use of electricity, minimising the time for watching television.

(iii) Overuse of electronic gadgets/oversleeping/excessive intake of medicines for minor problems.

Q. 5. Meena who is studying in Class-X gets tired very soon and her skin colour is turning pale, her haemoglobin content in the blood is also low. She is really confused about this situation. She goes to the doctor and he gives her a diet plan along with some medicines.

Answer the following questions based on the above information:

- (i) Which disease is she suffering from?**
- (ii) What kind of diet should she take to overcome this problem?**
- (iii) What values were neglected by Meena that resulted in the present condition?**

Ans. (i) Meena is suffering from anaemia.

(ii) She should take fruits and vegetables (spinach) which is rich in iron. Iron is an essential component of haemoglobin and is required for its proper functioning.

(iii) Respect for health, taking care of diet.

Q. 6. Sohan went to his town, Agra, 200 km away from Delhi with his father in a car. On the way there was lot of traffic jam. Sohan, after reaching his town, felt nauseated and had a headache because he had inhaled lots of toxic polluted gases.

Answer the following questions based on the above information:

- (i) Which system/part of his body has been affected?**
- (ii) What steps could be taken to reduce air pollution?**
- (iii) What values are exhibited by people?**

Ans. (i) Respiratory system/lungs are affected.

(ii) (a) Factories should treat harmful wastes and filter it before releasing it in the environment.

(b) Less polluting fuels like CNG should be used in vehicles.

(c) Regular pollution check and proper service and maintenance should be done for private

vehicles.

(iii) No regard for environment, disregard for health.