

5 Life Processes

Fastrack Revision

► **Life Processes:** Various functions that are carried out by living beings which are necessary to maintain and continue life are called life processes. Life processes in living beings include nutrition, respiration, transportation of substances and excretion.

► **Nutrition:** It is the process of intake of nutrients from outside to the inside of the body of living organisms, providing energy necessary to grow, develop and prevent damage.

Types of Nutrition: There are two types of nutrition:

► **Autotrophic Nutrition:** It is the mode of nutrition performed by green plants, some bacteria, etc., for manufacturing their own food from inorganic sources, *i.e.*, CO_2 and water. These organisms are called autotrophs.

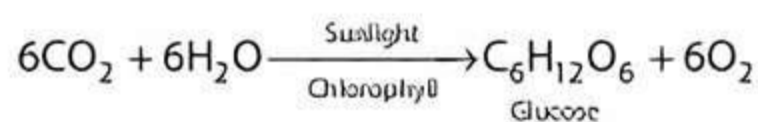
► **Heterotrophic Nutrition:** The mode of nutrition in which an organism takes food from another organism. Heterotrophs cannot synthesize their own food but are dependent on autotrophs for their nutrition. It can be divided into three types as follows:

• **Saprotrophic Nutrition:** It is the mode where nutrition is derived from the breakdown of complex molecules in dead and decaying organic matter. *e.g.*, Bacteria, fungi such as mushroom etc.

• **Holozoic Nutrition:** It is the mode of nutrition where complex molecules are taken in and broken into simpler forms, *e.g.*, *Amoeba*, cow, goat, humans, etc.

• **Parasitic Nutrition:** In this mode, the organisms derive nutrition from the host's body they live on or inside, *e.g.*, ticks, lice, leech, *Cuscuta* (Amarbel) in plants etc.

► **Photosynthesis:** It is the process by which green plants synthesize organic food such as carbohydrates from carbon dioxide and water in the presence of sunlight and chlorophyll. Photosynthesis occurs in three stages, *i.e.*, absorption of light energy by chlorophyll, conversion of light into chemical energy and splitting of water molecules into hydrogen and oxygen and reduction of carbon dioxide to carbohydrates. The whole process can be shown by the following equation:

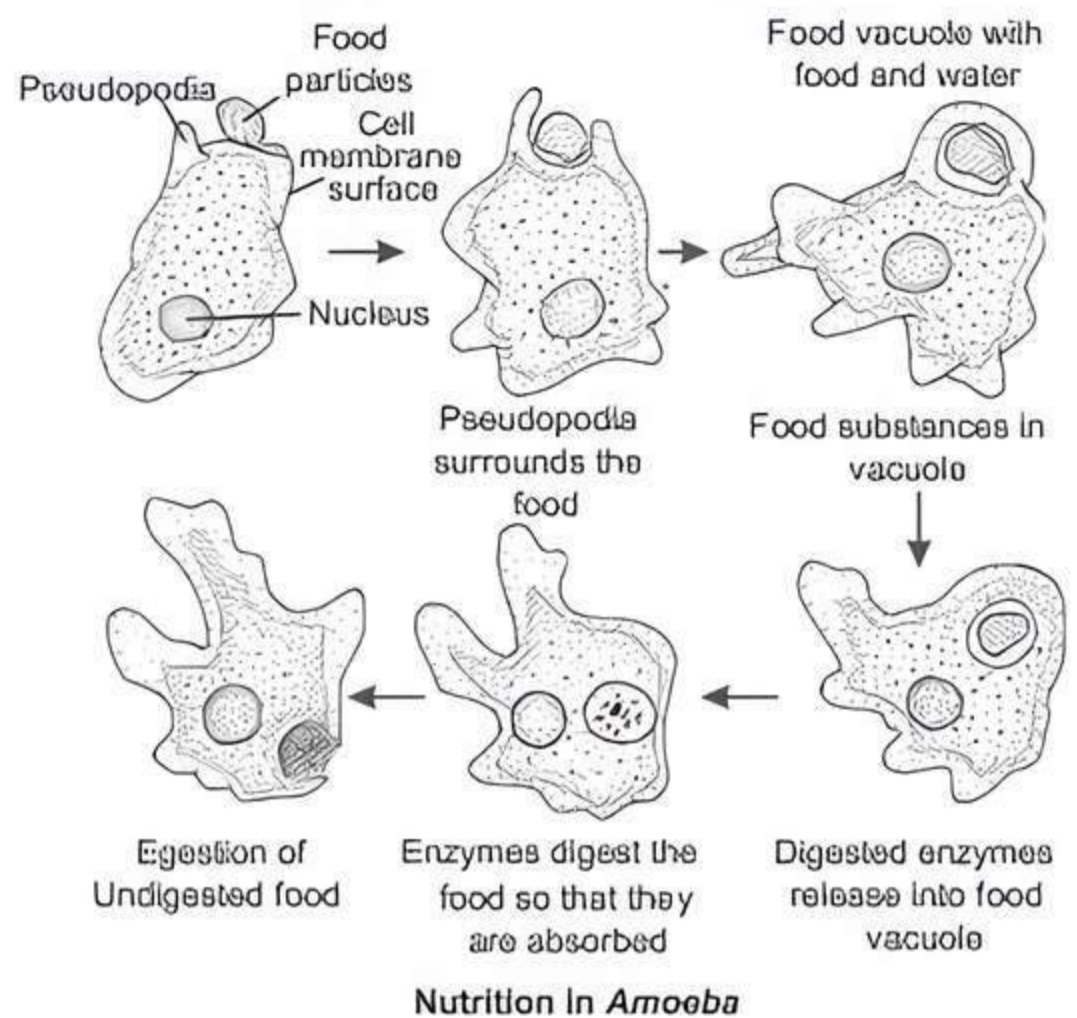


Excess carbohydrates (glucose) produced during photosynthesis are stored in the form of starch in plants. It serves as internal energy reserve and is used whenever required by the plant.

► **Chloroplasts:** They are the site of photosynthesis and are present in leaves of a plant. They contain a green coloured pigment called chlorophyll that traps solar energy from Sun.

► **Stomata:** These are tiny pores present on the surface of the leaves. Massive amount of gaseous exchange for the purpose of photosynthesis and transpiration takes place through stomata. The opening and closing of stomata is a function of the guard cells.

► **Nutrition in Amoeba:** *Amoeba* is a unicellular animal which follows holozoic mode of nutrition. It lacks special organs for nutrition. It takes in food using pseudopodia (finger-like extensions) which fuse over the food particle forming a food vacuole. Inside the food vacuole, complex substances are broken down into simpler ones which then diffuse into the cytoplasm. The remaining undigested food is moved to the surface of the cell and is then thrown out.



► **Nutrition in Humans:** It involves breakdown of complex substances ingested from outside by different parts of alimentary canal.

► **Human Digestive System:** It consists of alimentary canal, *i.e.*, a tube-like structure consisting of mouth, pharynx, oesophagus, stomach, small intestine and large intestine.

► **Digestive Glands:** These include salivary, gastric, intestinal glands along with pancreas and liver.

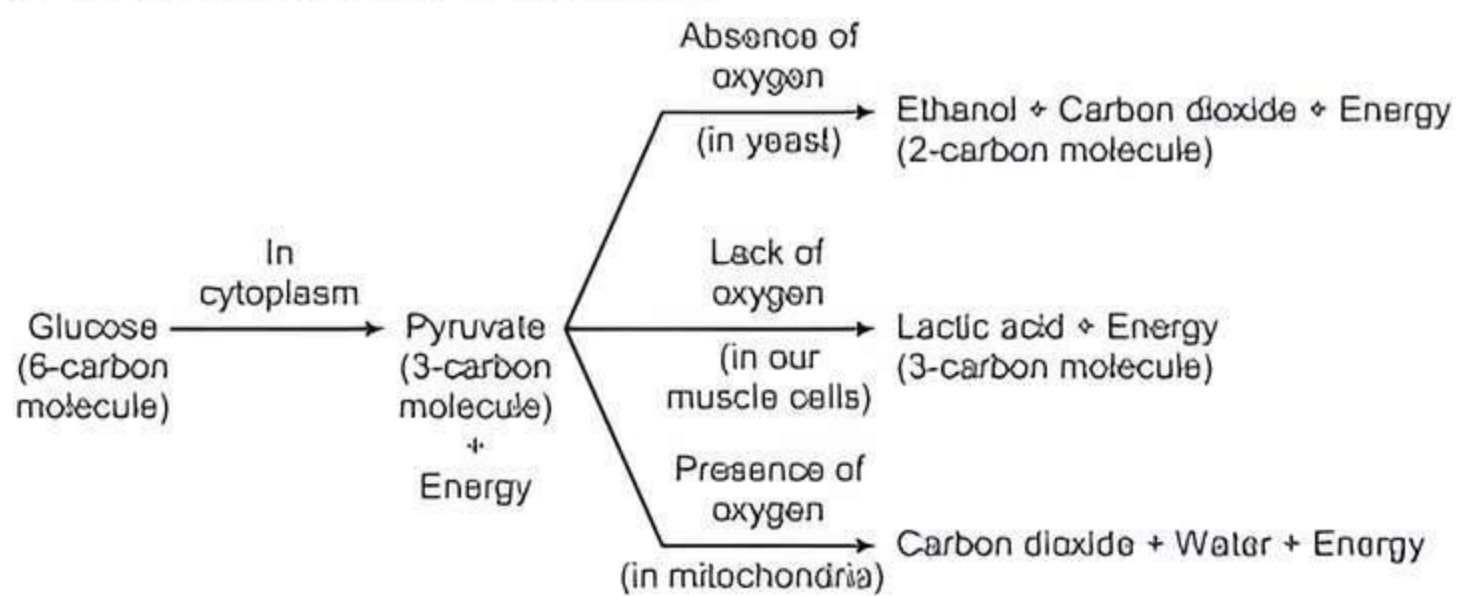
► **Salivary Glands (In Mouth):** These secrete saliva containing salivary amylase which helps in breakdown of starch into simple sugar.

► **Gastric Glands:** These are present in the wall of the stomach and release pepsin, HCl and mucus.

► **Liver:** It is the largest gland of our body that secretes bile juice for emulsification of fats, which is stored in gall bladder.

- ▶ **Pancreas:** It secretes pancreatic juice containing trypsin, for digesting proteins and lipase for breaking down emulsified fats.
- ▶ **Intestinal Glands:** These are present in walls of small intestine and secrete intestinal juice. The enzymes present in it finally convert the proteins to amino acids, complex carbohydrates into glucose and fats into fatty acids and glycerol.
- ▶ **Role of Villi:**
 - ▶ They increase the surface area for absorption of food.
 - ▶ They are richly supplied with blood vessels which takes the absorbed food to each and every cell of the body, where it is utilised for obtaining energy, building up new tissues and the repair of old tissues.

- ▶ **Respiration:** The process by which food (glucose) is broken down to provide energy in the form of ATP (Adenosine Triphosphate). Respiration is of two types: aerobic and anaerobic respiration.
 - ▶ **Aerobic Respiration:** It is complete breakdown of food occurring in the presence of oxygen. It releases large amount of energy, as ATP.
 - ▶ **Anaerobic Respiration:** It is incomplete breakdown of food occurring in the absence of oxygen, releasing small amount of energy. It can be alcoholic fermentation, *i.e.*, glucose breaks into ethanol and CO₂ or lactic acid fermentation, *i.e.*, glucose breaks into lactic acid.



Breakdown of glucose by various pathways

- ▶ **Respiration in Plants:** The energy produced in plants by respiration is utilised in growth and various life functions. Gaseous exchange in roots occurs by diffusion from air present in soil particles to the roots. Gaseous exchange in stems occurs through small pores present in the stems called as lenticels. Gaseous exchange in leaves occurs through diffusion of oxygen through stomata into the cells of the leaf.
- ▶ **Respiration in Animals:** It may occur through their skin or through specific respiratory organs. These organs have structures that increase the surface area which is in contact with the oxygen rich atmosphere.
- ▶ **Respiration in Aquatic Organisms:** Fish and other aquatic organisms use gills to take up oxygen dissolved in water.
 - ▶ Fish exchange gases by pulling oxygen rich water through their mouths and pumping it over their gills, where the dissolved oxygen is taken up by blood flowing in blood vessels.
 - ▶ The rate of breathing in aquatic organisms is much faster than in terrestrial organisms because the amount of dissolved oxygen is fairly low as compared to the amount of oxygen in air.
- ▶ **Respiration in Terrestrial Organisms:** These organisms use atmospheric oxygen for respiration.
- ▶ **Respiration in Human Beings:** It involves inhalation and exhalation, *i.e.*, taking air (oxygen) into the lungs and giving out air (carbon dioxide) from the lungs.
- ▶ **Human Respiratory System:** It consists of nostrils, pharynx, larynx, trachea, bronchi and bronchioles, alveoli and the lungs.
- ▶ **Lungs:** These are the primary organs for respiration, present in the thoracic cavity.

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In lungs, millions of balloon like structures called alveoli are present, which have a rich supply of blood vessels and help in exchange of gases.

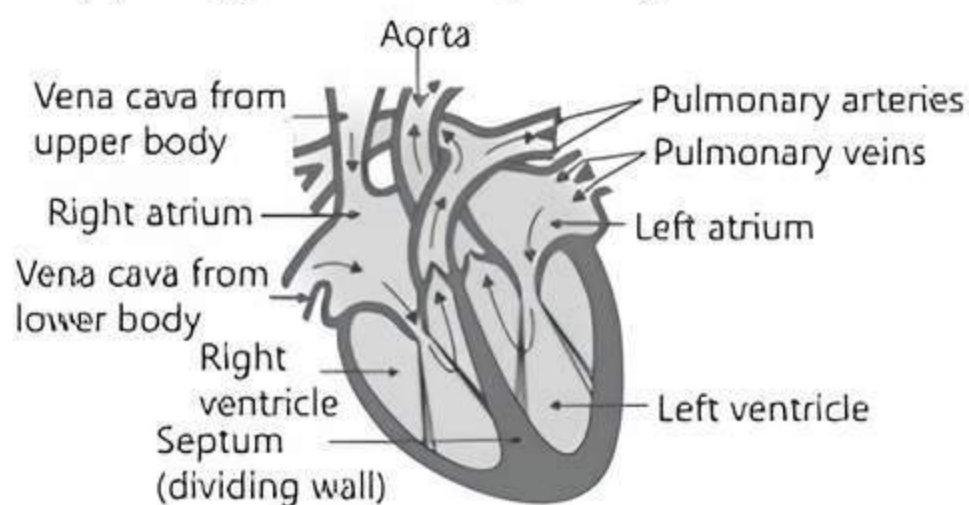
- ▶ **Ribs:** These are 12 pairs of bones, which help in respiration by movement of intercostal muscles attached to them.
- ▶ **Diaphragm:** It is a muscular partition between thorax and abdomen. It forms the base of chest cavity and helps in breathing.
- ▶ **Gaseous Exchange in Humans:** The blood brings carbon dioxide from the rest of the body for release into the alveoli and the oxygen in the alveolar air is taken up by blood in the alveolar blood vessels to be transported to all the cells in the body.
- ▶ **Haemoglobin:** It is the respiratory pigment present in Red Blood Cells (RBCs) which takes up the oxygen from the air in lungs and carries it to different tissues.
- ▶ **Transportation in Animals:** The life process facilitating the movement of food, water and oxygen from one part of the body to other *via* circulatory system.
- ▶ **Human Circulatory System:** It is responsible for transport of various substances and is composed of heart, arteries, veins, capillaries and blood.
- ▶ **Blood:** It is a specialised connective tissue consisting of plasma and formed elements (*i.e.*, RBC, WBC and platelets). It helps in transport of nutrients, gases, waste products, etc., and regulates body temperature and pH, etc.

Types of Blood Vessels

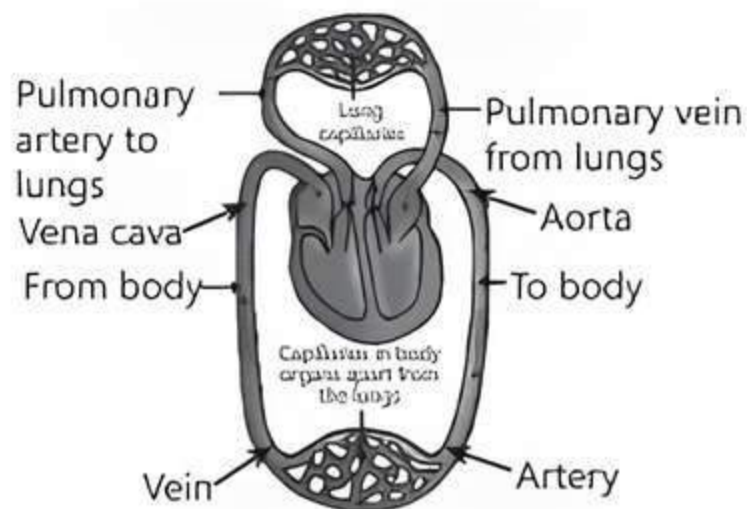
- ▶ **Arteries:** They carry oxygenated blood from the heart to various organs of the body. They have thick, elastic walls.
- ▶ **Veins:** They collect deoxygenated blood from various organs and bring it back to the heart. They have thin walls and valves.



- ▶ **Capillaries:** These are the smallest vessels which help in exchange of material between the blood and surrounding cells.
- ▶ **Blood Circulation:** In humans, double circulation occurs, *i.e.*, blood passes through the heart twice in one cycle. It has two components:
 - (i) Systemic Circulation:** The pathway of blood from the heart to the rest of the body and back to the heart.
 - (ii) Pulmonary Circulation:** The pathway of blood from the heart to the lungs and back to the heart.
- ▶ **Lymph:** It is similar to plasma but colourless with less proteins. It carries digested and absorbed fat from intestine and drains back excess fluid into the blood.
- ▶ **Blood Circulation through Heart:** Lungs → Pulmonary vein (Oxygenated blood) → Left atrium → Left ventricle → Main artery (Aorta) → Body organs → Main vein (Vena cava) → Right atrium → Right ventricle → Pulmonary artery (Deoxygenated blood) → Lungs



Sectional View of the Human Heart



Schematic representation of transport and exchange of oxygen and carbon dioxide

- ▶ **Transportation in Plants:** Plants have specialised tissues for transportation of substances. There are two types of vascular tissues in plants:
 - ▶ **Xylem** transports water and minerals obtained from the soil. It is composed of tracheids, xylem vessels, xylem parenchyma and xylem fibre.
 - ▶ **Phloem** transports products of photosynthesis from the leaves to other parts of plant, *i.e.*, translocation. It is composed of sieve tubes, companion cells, phloem parenchyma and phloem fibres.
- ▶ **Transpiration:** It is the loss of water vapour from aerial parts of plant *i.e.*, stomata and lenticels. The pressure exerted by transpiration on the walls of xylem is called transpiration pull causing upward movement of water and minerals. It also helps in temperature regulation.
- ▶ **Transport of Water:** It occurs due to transpiration pull and root pressure.
- ▶ **Transport of Food:** The transport of soluble products of photosynthesis from the leaves to other parts of plant is called translocation. It is a form of active transport and

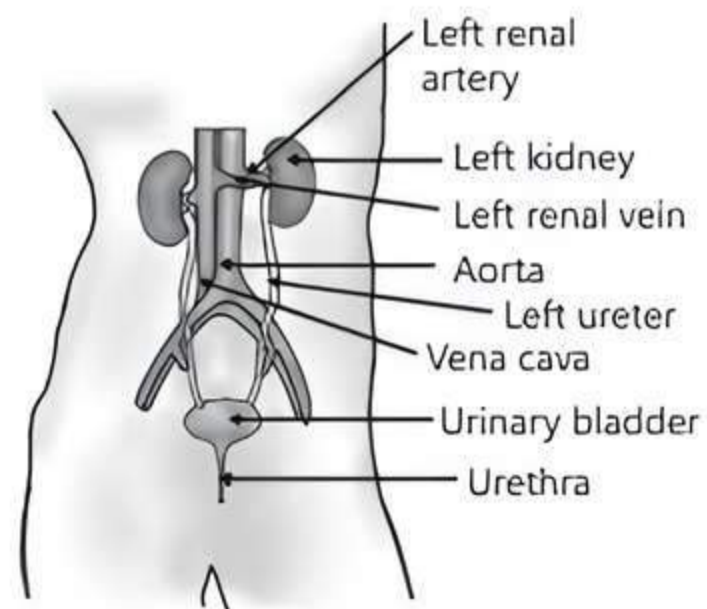
flow of substances takes place in both directions *i.e.*, it is a two-way traffic in phloem.

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The phloem also transports amino acids and other substances to the storage organs of roots, fruits and seeds and to growing organs.

- ▶ **Excretion in Animals:** It is a biological process for the removal of harmful metabolic wastes from the body. In **unicellular organisms**, wastes are excreted *via* diffusion while **multicellular organisms** have specialised organs for excretion.
- ▶ **Human Excretory System:** It removes nitrogenous waste products from the body. It includes a pair of kidneys, a pair of ureters, a urinary bladder and a urethra. The nephron is the basic structural and functional unit of the kidney.



Excretory system in human beings

- ▶ **Formation of urine** occurs to filter out waste products from the blood. It involves three stages *i.e.*, ultrafiltration in glomerulus, selective reabsorption of useful substances such as glucose, amino acids, etc., in tubular part and tubular secretion and active secretion of ions, medicines, drugs, etc., from blood into urine.
- ▶ **Urine** is the end product formed that contains urea, uric acid, ammonium salts and urochrome pigment imparts yellow colour to urine.
- ▶ **Removal of Urine:** Urine remains stored in the urinary bladder until the pressure expands too much. We can control the urge to urinate.
- ▶ **Kidney disorders** occur when one or both kidneys stop functioning or malfunction.
- ▶ **Excretion in Plants:** It occurs to remove the wastes produced by them during their life processes.
 - ▶ **Gaseous waste products** are carbon dioxide during respiration and oxygen during photosynthesis which are excreted out through **stomata** and **lenticels**.
 - ▶ **Liquid waste products** are excess water, gums *i.e.*, degradation product of internal tissues, resins, etc., which are excreted by transpiration *via* stomata or hydathodes (guttation).
 - ▶ **Solid waste products** are stored waste substances in cell vacuoles and tissues with dead cell. These wastes are removed by **dropping of leaves**, peeling of bark and felling of fruits.
 - ▶ Some of the plant wastes are useful products for human beings, *e.g.*, essential oils, gums (used to make adhesives), resins, natural rubber (tyre industry) and tannin (for leather treatment), etc.



Practice Exercise

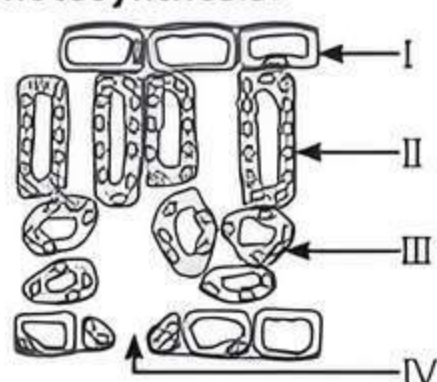


Multiple Choice Questions

Q 1. One of the events that does not occur during photosynthesis is: (CBSE 2023)

- a. chlorophyll absorbs solar energy
- b. carbon dioxide is released during the process
- c. oxygen is released during the process
- d. carbon dioxide is absorbed during the process

Q 2. In the following diagram, identify the cells through which massive amounts of gaseous exchange takes place for photosynthesis: (CBSE 2023)



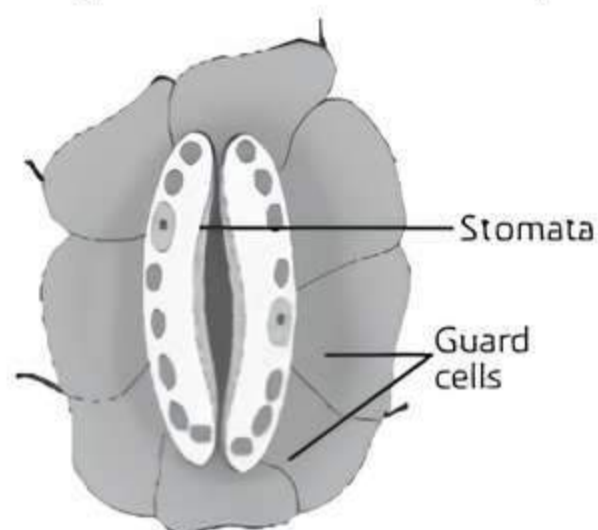
- a. I
- b. IV
- c. III
- d. II

Q 3. Opening and closing of stomata is due to:

(CBSE 2023)

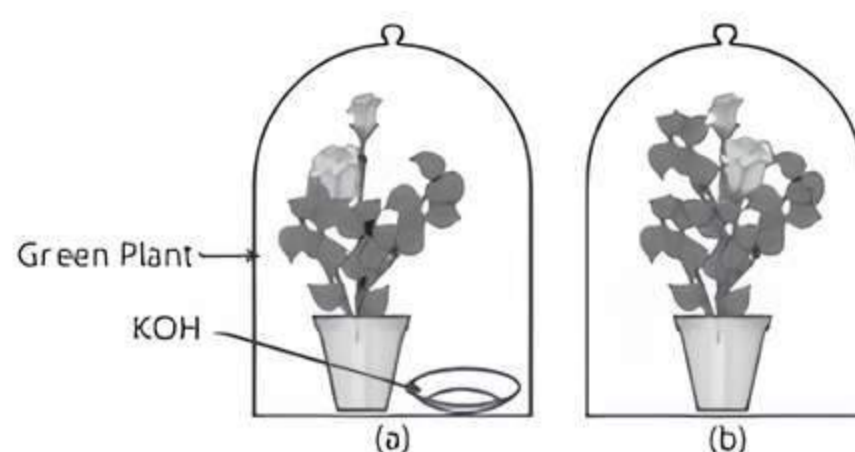
- a. high pressure of gases inside the cells
- b. movement of water in and out of guard cells
- c. stimulus of light in the guard cells
- d. diffusion of CO₂ in and out of the guard cells

Q 4. Which one of the following conditions is true for the state of stomata of a green leaf shown in the given diagram? (CBSE 2021 Term-1)



- a. Large amount of water flows into the guard cells
- b. Gaseous exchange is occurring in large amount
- c. Large amount of water flows out from the guard cells
- d. Large amount of sugar collects in the guard cells

Q 5. A student was asked to write a stepwise procedure to demonstrate that carbon dioxide is necessary for photosynthesis. He wrote the following steps. The wrongly worded step is: (CBSE 2021 Term-1)



- a. Both potted plants are kept in dark room for at least three days
- b. bottom of the bell jars is sealed to make them air tight
- c. Both potted plants are kept in sunlight after the starch test
- d. a leaf from both the plants is taken to test the presence of starch

Q 6. Generally food is broken and absorbed within the body of organisms. In which of the following organisms is it done outside the body?

(CBSE SQP 2023-24)

- a. Amoeba
- b. Mushroom
- c. Paramecium
- d. Lice

Q 7. The correct statements with reference to single celled organisms are:

- (i) Complex substances are not broken down into simpler substances.
- (ii) Simple diffusion is sufficient to meet the requirement of exchange of gases.
- (iii) Specialised tissues perform different functions in the organism.
- (iv) Entire surface of the organism is in contact with the environment for taking in food.

(CBSE 2021 Term-1)

- a. (i) and (iii)
- b. (ii) and (iii)
- c. (ii) and (iv)
- d. (i) and (iv)

Q 8. If salivary amylase is lacking in the saliva, which of the following events in the mouth cavity will be affected?

- a. Proteins breaking down into amino acids
- b. Starch breaking down into sugars
- c. Fats breaking down into fatty acids and glycerol
- d. Absorption of vitamins

Q 9. Sphincter muscles are present at the exit of:

(CBSE 2023)

- a. stomach and small intestine
- b. stomach and anus
- c. small intestine and large intestine
- d. oesophagus and stomach

Q 10. Which of the following is the correct statement regarding bile?

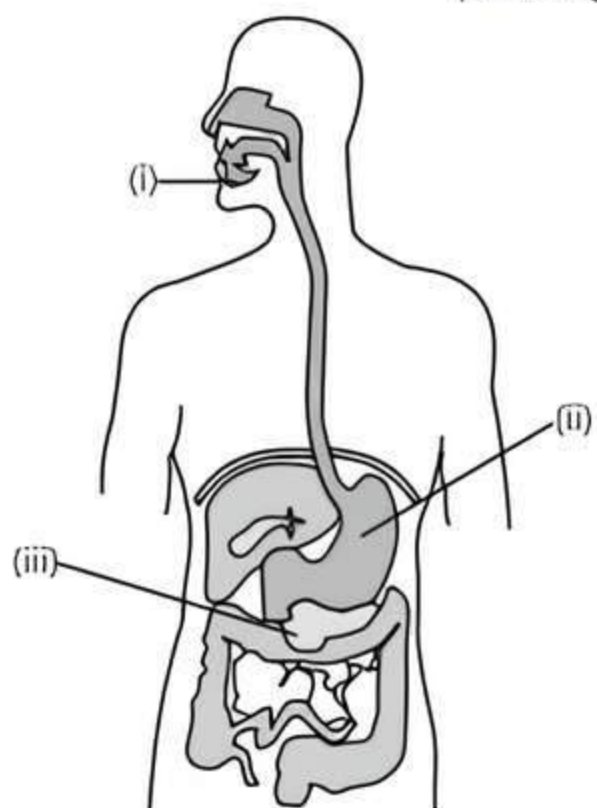
- a. Secreted by bile duct and stored in liver
- b. Secreted by gall bladder and stored in liver
- c. Secreted by liver and stored in bile duct
- d. Secreted by liver and stored in gall bladder

Q 11. Choose the function of the pancreatic juice from the following:

- Trypsin digests proteins and lipase digest carbohydrates
- Trypsin digests emulsified fats and lipase digest proteins
- Trypsin and lipase digest fats
- Trypsin digests proteins and lipase digest emulsified fats

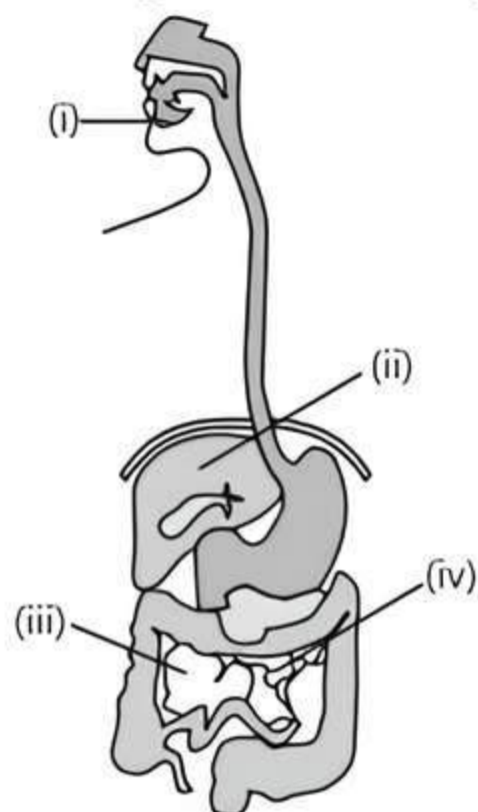
Q 12. Identify the option that indicates the correct enzyme that is secreted in location (i), (ii) and (iii).

(CBSE SQP 2021 Term-1)



- (i)-lipase, (ii)-trypsin, (iii)-pepsin
- (i)-amylase, (ii)-pepsin, (iii)-trypsin
- (i)-trypsin, (ii)-amylase, (iii)-carboxylase
- (i)-permease, (ii)-carboxylase, (iii)-oxidase

Q 13. Observe the diagram of human digestive system.



Match the labelling referred in column I and correlate with the function in column II.

(CBSE SQP 2021 Term-1)

Column I		Column II
(i)	(a)	The length of this depends of food the organism eats.
(ii)	(b)	Initial phase of starch digestion.
(iii)	(c)	Increases the efficiency of lipase enzyme action.

(iv)	(d)	This is the site of the complete digestion of carbohydrates, proteins and fats.
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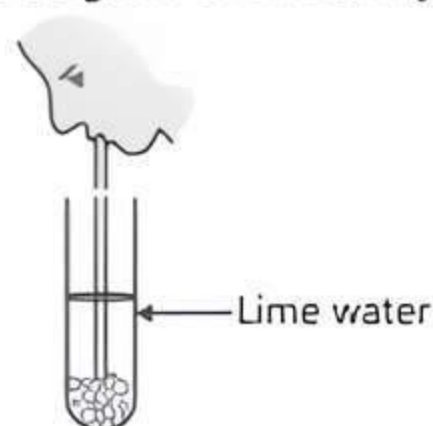
- (i)-(a), (ii)-(b), (iii)-(c), (iv)-(d)
- (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)
- (i)-(b), (ii)-(d), (iii)-(c), (iv)-(a)
- (i)-(d), (ii)-(a), (iii)-(b), (iv)-(c)

Q 14. A sportsman, after a long break of his routine exercise, suffered muscular cramps during a heavy exercise session. This happened due to:

(CBSE SQP 2023-24)

- lack of carbon dioxide and formation of pyruvate
- presence of oxygen and formation of ethanol
- lack of oxygen and formation of lactic acid
- lack of oxygen and formation of carbon dioxide

Q 15. Observe the diagram of an activity given below:



What does it help to conclude, when the person exhales into the test-tube?

(CBSE 2021 Term-1)

- Percentage of carbon dioxide is more in inhaled air
- Fermentation occurs in the presence of oxygen
- Percentage of carbon dioxide is more in the exhaled air
- Fermentation occurs in the presence of carbon dioxide

Q 16. Anaerobic process:

(CBSE 2020)

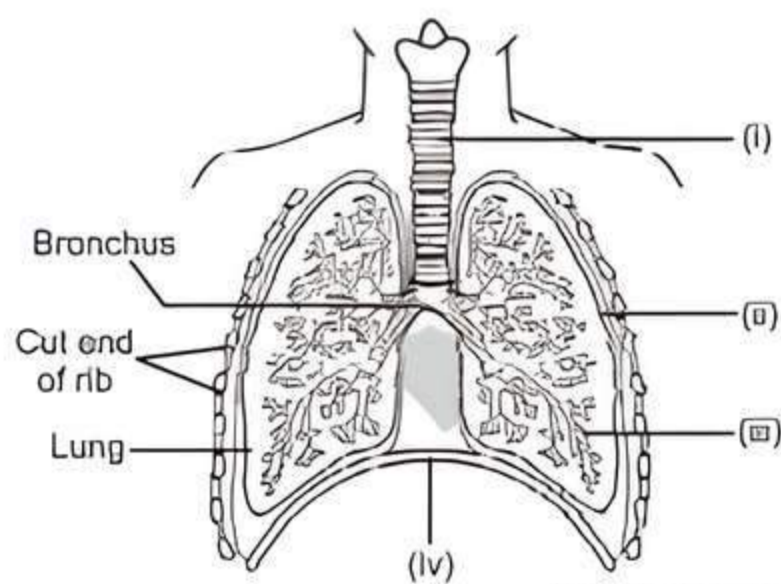
- takes place in yeast during fermentation
- takes place in the presence of oxygen
- produces only energy in the muscles of human beings
- produces ethanol, oxygen and energy

Q 17. Which of the following statement(s) is/are true about respiration?

- During inhalation, ribs move inward and diaphragm is raised.
- In the alveoli, exchange of gases takes place i.e., oxygen from alveolar air diffuses into blood and carbon dioxide from blood into alveolar air.
- Haemoglobin has greater affinity for carbon dioxide than oxygen.
- Alveoli increase surface area for exchange of gases.

- (i) and (iv)
- (ii) and (iii)
- (i) and (iii)
- (ii) and (iv)

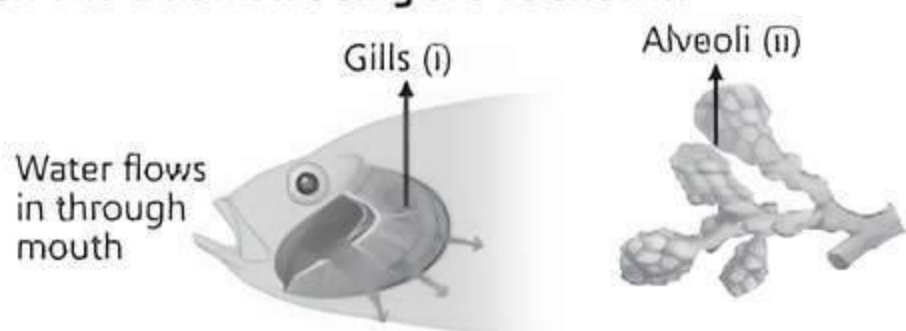
Q 18. Study the diagram carefully of the human respiratory system with labels (i), (ii), (iii) and (iv). Select the option which gives correct identification and main function and/or characteristic.



(CBSE SQP 2021 Term-1)

- (i) Trachea: It is supported by bony rings for conducting inspired air
- (ii) Ribs: When we breathe out, ribs are lifted
- (iii) Alveoli: Thin-walled sac like structures for exchange of gases
- (iv) Diaphragm: It is pulled up when we breathe in

Q 19. Respiratory structures of two different animals : a fish and a human being are as shown:



Observe (i) and (ii) and select one characteristic that holds true for both of them. (CBSE 2021 Term-1)

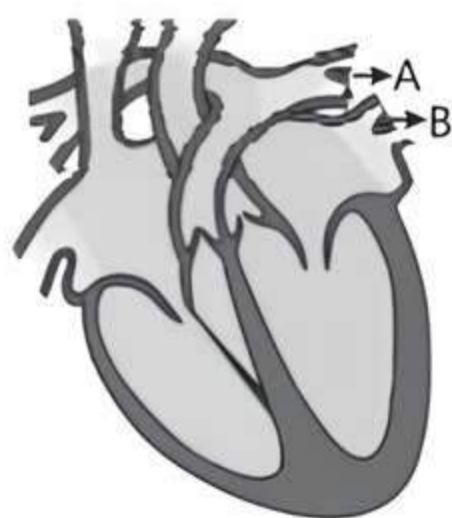
- Both are placed internally in the body of animal
- Both have thin and moist surface for gaseous exchange
- Both are poorly supplied with blood vessels to conserve energy
- In both the blood returns to the heart after being oxygenated

Q 20. In which of the following groups of organisms, blood flows through the heart only once during one cycle of passage through the body?

(CBSE SQP 2021 Term-1)

- Rabbit, parrot, turtle
- Frog, crocodile, pigeon
- Whale, labeo, penguin
- Shark, dog fish, sting ray

Q 21. Consider the following statements in connection with the functions of the blood vessels marked A and B in the diagram of a human heart as shown.



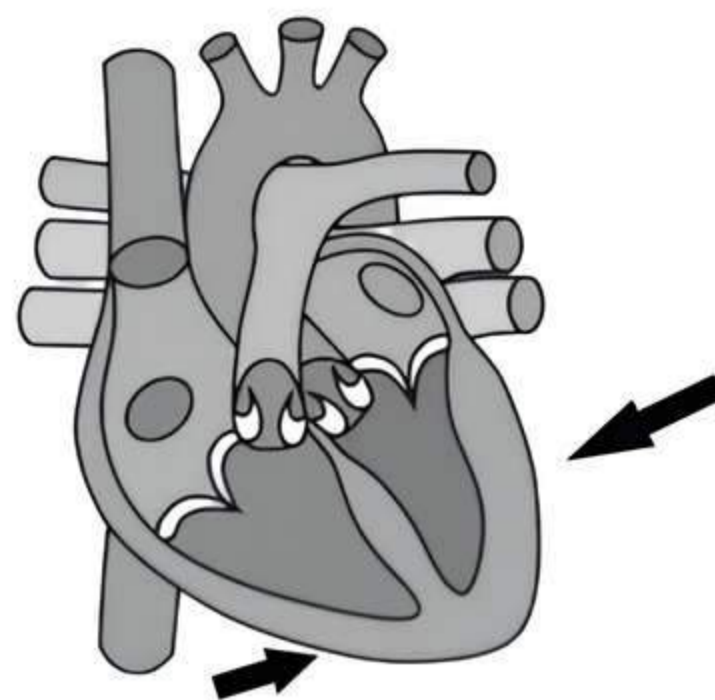
- Blood vessel A** – It carries carbon dioxide rich blood to the lungs
- Blood vessel B** – It carries oxygen rich blood from the lungs
- Blood vessel B** – Left atrium relaxes as it receives blood from this blood vessel
- Blood vessel A** – Right atrium has thick muscular wall as it has to pump blood to this blood vessel

The correct statements are: (CBSE 2021 Term-1)

- (i) and (ii)
- (ii) and (iii)
- (ii), (iii) and (iv)
- (i), (ii) and (iii)

Q 22. Identify the phase of circulation which is represented in the diagram of heart given below. Arrows indicate contraction of the chambers shown.

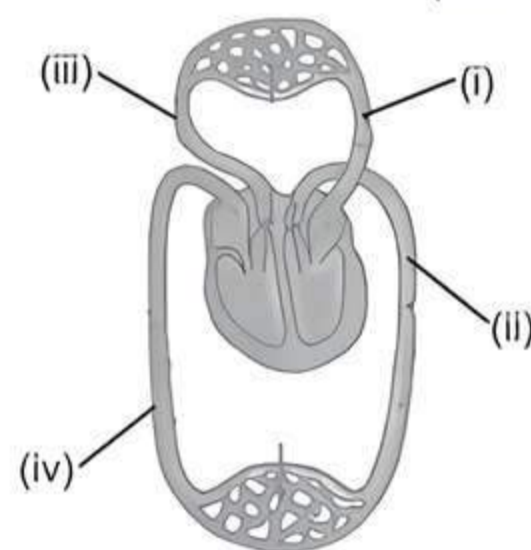
(CBSE SQP 2021 Term-1)



- Blood transferred to the right ventricle and left ventricle simultaneously
- Blood is transferred to lungs for oxygenation and is pumped into various organs simultaneously
- Blood transferred to the right auricle and left auricle simultaneously
- Blood is received from lungs after oxygenation and is received from various organs of the body

Q 23. The figure given below shows a schematic plan of blood circulation in humans with labels (i) to (iv). Identify the correct label with its functions.

(CBSE SQP 2021 Term-1)



- a. (i) Pulmonary vein takes impure blood from body part
- b. (ii) Pulmonary artery takes blood from lung to heart
- c. (iii) Aorta takes blood from heart to body parts
- d. (iv) Vena cava takes blood from body parts to right auricle

Q 24. Which one of the following statements is correct about the human circulatory system? (CBSE 2020)

- a. Blood transports only oxygen and not carbon dioxide
- b. Human heart has five chambers
- c. Valves ensure that the blood does not flow backwards
- d. Both oxygen-rich and oxygen-deficient blood gets mixed in the heart

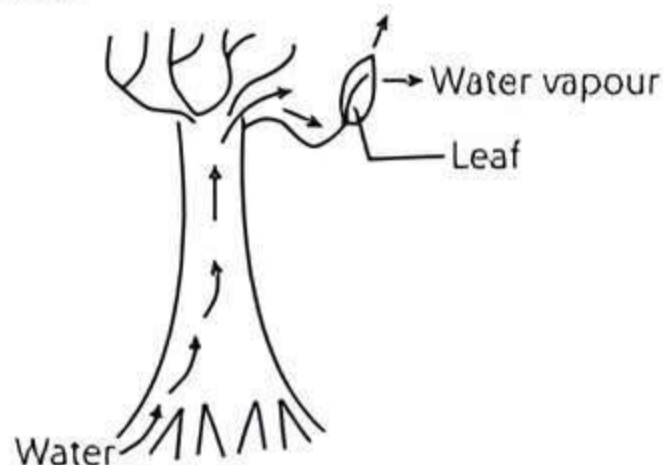
Q 25. Choose the correct statement that describes arteries.

- a. They have thick elastic walls, blood flows under high pressure, collect blood from different organs and bring it back to the heart.
- b. They have thin walls with valves inside, blood flows under low pressure and carry blood away from the heart to various organs of the body.
- c. They have thick elastic walls, blood flows under low pressure, carry blood from the heart to various organs of the body.
- d. They have thick elastic walls without valves inside, blood flows under high pressure and carry blood away from the heart to different parts of the body.

Q 26. Water in the root enters due to: (CBSE 2023)

- a. the function of the root to absorb water
- b. difference in the concentration of ions between the root and the soil
- c. excess water present in the soil
- d. diffusion of water in the roots

Q 27. Observe the following diagram and identify the process and its significance from the following options: (CBSE 2023)



- a. Evaporation: maintains water contents in leaf cells
- b. Transpiration: creates a suction force which pulls water inside the plant
- c. Excretion: helps in excreting out waste water from the plant
- d. Translocation: helps in transporting materials from one cell to another

Q 28. Identify the two components of phloem tissue that help in transportation of food in plants. (CBSE 2021 Term-1)

- a. Phloem parenchyma and sieve tubes
- b. Sieve tubes and companion cells
- c. Phloem parenchyma and companion cells
- d. Phloem fibres and sieve tubes

Q 29. What is common between extensive network of blood vessels around walls of alveoli and in glomerulus of nephron? (CBSE SQP 2021 Term-1)

- a. Thick walled arteries richly supplied with blood
- b. Thin walled veins poorly supplied with blood
- c. Thick walled capillaries poorly supplied with blood
- d. Thin walled capillaries richly supplied with blood

Q 30. In a person the tubule part of the nephron is not functioning at all. What will its effect be on urine formation? (CBSE SQP 2021 Term-1)

- a. The urine will not be formed
- b. Quality and quantity of urine is unaffected
- c. Urine is more concentrated
- d. Urine is more diluted

Q 31. Plants use completely different process for excretion as compared to animals. Which one of the following processes is not followed by plants for excretion? (CBSE SQP 2021 Term-1)

- a. They can get rid of excess water by transpiration
- b. They selectively filter toxic substances through their leaves
- c. Waste products are stored as resins and gums in old xylem
- d. They excrete waste substances into the soil around them

Q 32. Which one among the following is not removed as a waste product from the body of a plant? (CBSE 2021 Term-1)

- a. Resins and gums
- b. Urea
- c. Dry leaves
- d. Excess water



Assertion & Reason Type Questions

Directions (Q. Nos. 33-40): Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:

- a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- c. Assertion (A) is true but Reason (R) is false.
- d. Assertion (A) is false but Reason (R) is true.

Q 33. Assertion (A): Leaves are the main site of photosynthesis.

Reason (R): Chloroplast are present in leaves.

Q 34. Assertion (A): The inner walls of the small intestine have finger like projections called villi which are rich in blood.

Reason (R): These villi have a large surface area to help the small intestine in completing the digestion of food. (CBSE 2023)

Q 35. Assertion (A): Herbivores have longer small intestine than carnivores.

Reason (R): Carnivores can digest cellulose due to the presence of enzyme, cellulase.

Q 36. Assertion (A): Energy is used during the process of respiration.

Reason (R): Respiration stores energy in the form of ATP.

Q 37. Assertion (A): Amphibians can tolerate mixing of oxygenated and deoxygenated blood.

Reason (R): Amphibians are animals with two chambered heart. (CBSE SQP 2022-23)

Q 38. Assertion (A): Nitrogen is an essential element for plant growth and is taken up by plants in the form of inorganic nitrates or nitrites.

Reason (R): The soil is the nearest and richest source of raw materials like nitrogen, phosphorus and other minerals for the plants.

Q 39. Assertion (A): In humans, major amount of water is absorbed by tubular part of nephron.

Reason (R): The amount of water reabsorbed depends on how much dissolved waste is to be excreted from the body.

Q 40. Assertion (A): Resins and gums are stored in old xylem tissue in plants.

Reason (R): Resins and gums facilitate transport of water molecules.

Answers

- (b) carbon dioxide is released during the process
- (b) IV
- (b) movement of water in and out of guard cells
- (c) Large amount of water flows out from the guard cells
- (c) Both potted plants are kept in sunlight after the starch test
- (b) Mushroom
- (c) (ii) and (iv)
- (b) Starch breaking down into sugars
- (a) stomach and small intestine
- (d) Secreted by liver and stored in gall bladder
- (d) Trypsin digests proteins and lipase digests emulsified fats
- (b) (i)-amylase, (ii)-pepsin, (iii)-trypsin
Trypsin is secreted by pancreas (iii) which helps in digesting proteins. Salivary amylase is present in saliva (i) which helps in digesting starch in food. Pepsin secreted by gastric glands (present in walls of (ii)) which helps in protein digestion.
- (b) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)
- (c) lack of oxygen and formation of lactic acid
- (c) Percentage of carbon dioxide is more in the exhaled air
- (a) takes place in yeast during fermentation
- (d) (ii) and (iv)
- (c) (iii) Alveoli: Thin-walled sac like structures for exchange of gases
The primary function of trachea is to provide air passage to the lungs for respiration. When we breathe in, ribs are lifted and diaphragm is flattened.
- (b) Both have thin and moist surface for gaseous exchange
Gills are present on both the sides of head of fish i.e., placed externally the walls of both (i) and (ii) contain an extensive network of blood vessels. In fishes, the blood after being oxygenated is passed directly to the rest of the body.
- (d) Shark, dog fish, sting ray
- (d) (i), (ii) and (iii)
- (b) Blood is transferred to lungs for oxygenation and is pumped into various organs simultaneously
- (d) (iv) Vena cava takes blood from body parts to right auricle.
Here, (i) is pulmonary vein, (ii) is aorta, (iii) is pulmonary artery and (iv) is vena cava.
Pulmonary veins: Carries oxygenated blood from the lungs to the left atrium.
Pulmonary artery: Carries deoxygenated blood from the right ventricle to the lungs.
Vena cava: Carries deoxygenated blood from the body to the right atrium.
Aorta: Carries oxygenated blood from the left ventricle to the body.
- (c) Valves ensure that the blood does not flow backwards
- (d) They have thick elastic walls without valves inside, blood flows under high pressure and carry blood away from the heart to different parts of the body.
- (b) difference in the concentration of ions between the root and the soil
- (b) Transpiration creates a suction force which pulls water inside the plant
- (b) Sieve tubes and companion cells
- (d) Thin walled capillaries richly supplied with blood
The common thing in the extensive network of blood vessels around the walls of the alveoli and in the glomerulus of nephron is the thin walled capillaries richly supplied with blood.
- (d) Urine is more diluted
If the tubule from the nephron is not functioning at all, it results in lack of reabsorption of glucose, amino acids, sodium ions, etc., and reabsorption of water is also affected leading to more diluted urine.
- (b) They selectively filter toxic substances through their leaves
- (b) Urea

TIP

The blood goes only once through the heart in the fish during one cycle of passage through the body, whereas in vertebrates it goes twice through the heart during each cycle.

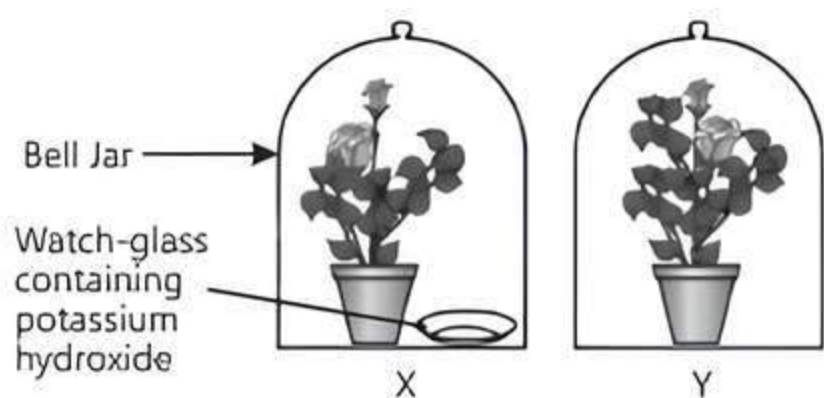


33. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
34. (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
35. (c) Reason is false because carnivores cannot digest cellulose.
36. (d) Assertion is false because energy is released during cellular respiration.
37. (c) Reason is false because amphibians have three-chambered hearts.
38. (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
39. (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
40. (c) Reason is false because resins and gums are waste products and do not facilitate the transport of water molecules.

Case Study Based Questions

Case Study 1

The figure shown below represents an activity to prove the requirements for photosynthesis. During this activity, two healthy potted plants were kept in the dark for 72 hours. After 72 hours, KOH is kept in the watch glass in setup X and not in setup Y. Both these setups are air tight and have been kept in light for 6 hours. Then, iodine test is performed with one leaf from each of the two plants X and Y.



(CBSE SQP 2021 Term-1)

Read the above passage carefully and give the answer of the following questions:

- Q 1. This experimental set up is used to prove essentiality of which of the following requirements of photosynthesis?**
- a. Chlorophyll b. Oxygen
c. Carbon dioxide d. Sunlight
- Q 2. The function of KOH is to absorb:**
- a. oxygen b. carbon dioxide
c. moisture d. sunlight
- Q 3. Which of the following statements shows the correct results of iodine test performed on the leaf from plants X and Y respectively?**
- a. Blue-black colour would be obtained on the leaf of plant X and no change in colour on leaf of plant Y.
b. Blue-black colour would be obtained on the leaf of plant Y and no change in colour on leaf of plant X.

- c. Red colour would be obtained on the leaf of plant X and brown colour on the leaf of plant Y.
d. Red colour would be obtained on the leaf of plant Y and brown colour on the leaf of plant X.

Q 4. Which of the following steps can be followed for making the apparatus air tight?

- (i) Placing the plants on glass plate.
(ii) Using a suction pump.
(iii) Applying vaseline to seal the bottom of jar.
(iv) Creating vacuum.
- a. (i) and (ii) b. (ii) and (iii)
c. (i) and (iii) d. (ii) and (iv)

Answers

- (c) Carbon dioxide
- (b) carbon dioxide
- (b) Blue-black colour would be obtained on the leaf of plant Y and no change in colour on leaf of plant X.
- (c) (i) and (iii)

Case Study 2

Naren was participating in a marathon. He was running at position two, right from the beginning. Just when he was close to the finishing line, he started running even faster so as to stand first. And when he was about to win the marathon, he got a severe muscle cramp in his leg. This cramp prevented Naren from running any further and shattered his dream of winning the marathon.

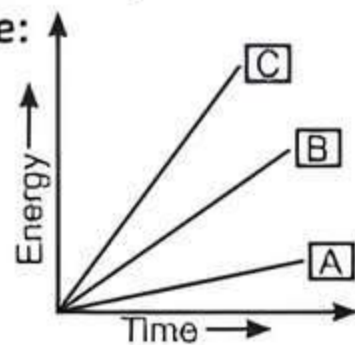
Read the above passage carefully and give the answer of the following questions:

- Q 1. The process which provides most of the energy to Naren for running the marathon is:**
- a. anaerobic respiration b. aerobic respiration
c. breathing d. fermentation
- Q 2. The process which provides a little extra energy to Naren for running very fast towards the end of race is:**
- a. anaerobic respiration b. aerobic respiration
c. breathing d. fermentation
- Q 3. The substance which gets accumulated in the leg muscles of Naren that causes muscle cramp is:**
- a. pyruvate b. ethanol
c. carbon dioxide d. lactic acid
- Q 4. Which of the following is correct for the process of anaerobic respiration?**

S. No.	Carbon dioxide always produced	A lot of energy is released
1.	Yes	No
2.	No	Yes
3.	No	No
4.	Yes	Yes

Q 5. Based on the data represented in the graph below, among A, B and C the products of respiration in C is likely to be:

- Alcohol + CO₂ + 38 ATP
- Lactic Acid + CO₂ + 2 ATP
- Alcohol + CO₂ + 2 ATP
- CO₂ + H₂O + 38 ATP

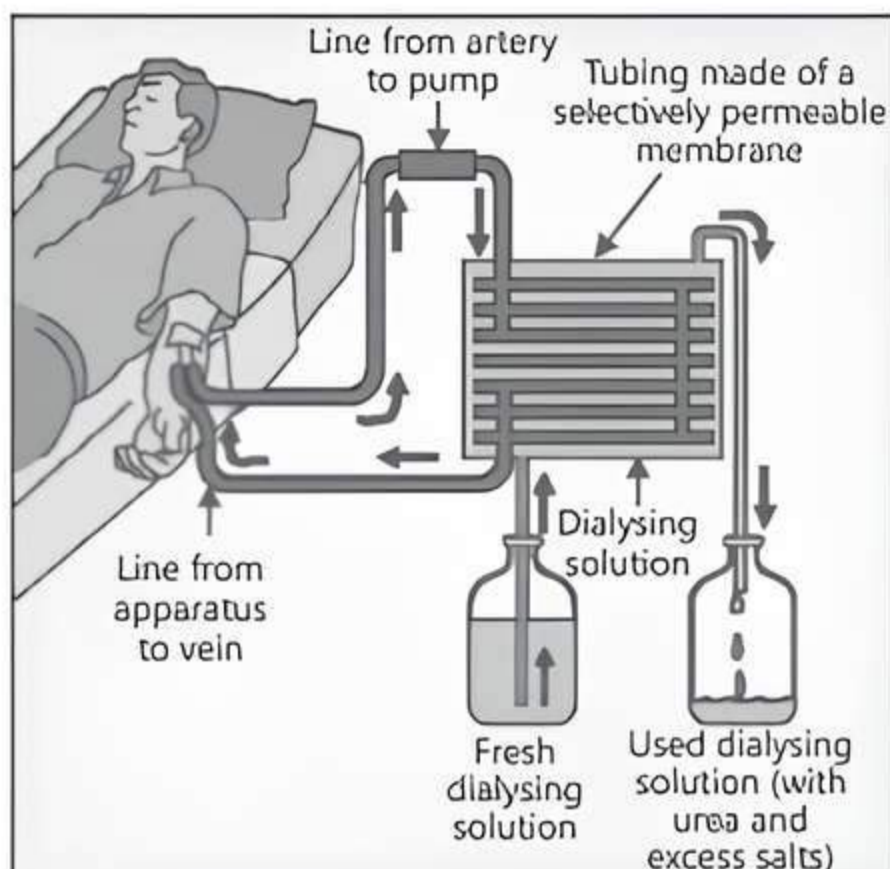


Answers

- (b) aerobic respiration
- (a) anaerobic respiration
- (d) lactic acid
- (c) No, No
- (d) CO₂ + H₂O + 38 ATP

Case Study 3

The figure shown below represents a common type of dialysis called as hemodialysis. It removes waste products from the blood such as excess salts, and urea which are insufficiently removed by the kidney in patients with kidney failure. During the procedure, the patient's blood is cleaned by filtration through a series of semi-permeable membranes before being returned to the blood of the patient. (CBSE 2021 Term-1)



Read the above passage carefully and give the answer of the following questions:

Q 1. The hemodialyser has semi-permeable lining of tubes which help:

- to maintain osmotic pressure of blood
- to filter nitrogenous wastes from the dialysing solution
- in passing the waste products in the dialysing solution
- to pump purified blood back into the body of the patient

Q 2. Which one of the following is not a function of artificial kidney?

- To remove nitrogenous wastes from the blood
- To remove excess fluids from the blood
- To reabsorb essential nutrients from the blood
- To filter and purify the blood

Q 3. The 'used dialysing' solution is rich in:

- urea and excess salts
- blood cells
- lymph
- proteins

Q 4. Which part of the nephron in human kidney, serves the function of reabsorption of certain substances?

- Glomerulus
- Bowman's capsule
- Tubules
- Collecting duct

Answers

- (c) In passing the waste products in the dialysing solution
- (c) To reabsorb essential nutrients from the blood
- (a) urea and excess salts
- (c) Tubules

Case Study 4

The partially digested food coming from the stomach of a person enters a long and narrow organ A in his body. The organ A receives the secretions of two glands: liver and pancreas. Liver secretes a greenish-yellow liquid B. Pancreas secretes pancreatic juice which contains two digestive enzymes C and D. The intestinal juice completes the process of digestion of food. The inner wall of organ A has millions of tiny finger-like projections E which help in the rapid absorption of digested food into blood stream. The undigested part of food then passes into wider tube F which absorbs most of the water from undigested food. The last part of tube F called G stores this undigested food (or waste) for some time. The undigested food is then passed out through opening H as faeces in the process known as I.

Read the above passage carefully and give the answer of the following questions:

Q 1. Enlist the site of synthesis and storage of liquid B.

Q 2. What are the digestive enzymes C and D?

Q 3. Choose the function of the digestive enzymes C and D from the following:

- C and D digest fats
- C digests carbohydrates and D emulsified fats
- C digest proteins and D emulsified fats
- C digest proteins and D carbohydrates

Q 4. Why is organ A in herbivores longer than in carnivores?

Q 5. Name (i) tube F, (ii) part G, (iii) opening H and (iv) process I.

Answers

- Site of synthesis-liver; site of storage-Gall bladder.
- Trypsin and Lipase
- (iii) C digest proteins and D emulsified fats

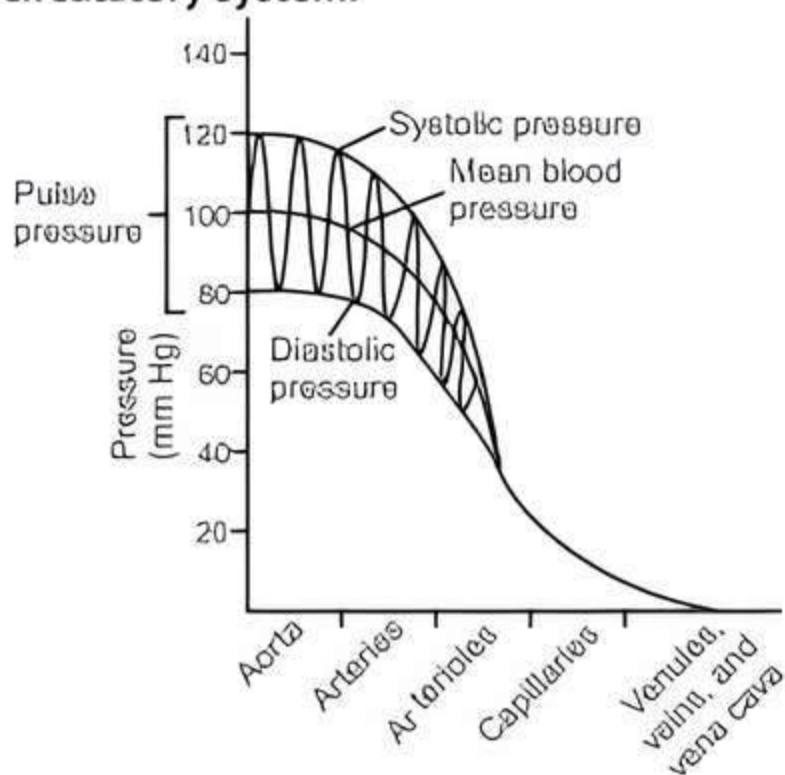
- The small Intestine is longer in herbivore than in carnivore because herbivores eat only grass which is full of cellulose and digestion of cellulose takes longer time.
- (i) Large Intestine. (ii) Rectum. (iii) Anus. (iv) Egestion

Case Study 5

Arteries, veins and capillaries are blood vessels through which blood flows in our body. Arteries carry blood from heart to different parts of the body whereas veins deliver blood back to the heart. Arteries are connected to veins by thin capillaries.

Read the above passage carefully and give the answer of the following questions:

- Which two chambers of the human heart have arteries connected to them?
- What are capillaries?
- Which blood vessels carry deoxygenated blood from the heart to the lungs and from which chamber?
- What is blood pressure? How is it measured?
- Study the graph below that represents the blood pressure in various blood vessels of the circulatory system.



Why is blood pressure higher in our arteries than in our veins?

Answers

- Left ventricle and right ventricle
- Capillaries are the smallest vessels which have one cell thick wall and which helps in the exchange of material between the blood and the surrounding cells.
- Pulmonary artery is the vessel that carries deoxygenated blood from the heart to the lungs. It arises from the right ventricle of the heart.
- The force that blood exerts against the wall of a vessel is called blood pressure. It is measured with an instrument called sphygmomanometer.
- Blood pressure in the arteries is much higher than in the veins because they receive blood directly from the heart after contraction.



Very Short Answer Type Questions

- 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. (NCERT EXEMPLAR)
 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.
- What is common for *Cuscuta*, ticks and leeches? (NCERT EXEMPLAR)
 Ans. All are parasites, they live on or inside the body of another organism to get food.
- What causes movement of food inside the alimentary canal?
 Ans. The wall of alimentary canal contains muscle layers. Rhythmic contraction and relaxation of these muscles pushes the food forward. This is called peristalsis, which occurs all along the gut and causes movement of food inside the alimentary canal.
- Name the correct substrates for the following enzymes.
 (i) Amylase (ii) Lipase
 Ans. (i) Starch (ii) Fats
- Mention any one point of difference between pepsin and trypsin.
 Ans. Pepsin is produced in the stomach by the gastric glands whereas trypsin is produced by the pancreas.
- Why is small intestine in herbivores longer than in carnivores?
 Ans. Herbivores eating grass need a longer small intestine to allow complete digestion of cellulose whereas meat is easier to digest, hence carnivores have a shorter small intestine.
- Name the energy currency in the living organisms. When and where is it produced?
 Ans. ATP (Adenosine Triphosphate) is the energy currency in living organisms. It is produced at the end of respiration and is produced in the mitochondria.
- What will happen if platelets were absent in the blood?
 Ans. In the absence of platelets, the process of blood clotting will be affected. This will lead to excess blood loss and even lead to death of a person.
- Plants have low energy needs as compared to animals. Explain.
 Ans. Plants do not move and plant bodies have a large proportion of dead cells in many tissues. As a result, plants have low energy needs.
- Define excretion.
 Ans. Excretion is the biological process involved in the removal of harmful metabolic waste from the body.
- Name a common nutrient that is absorbed in the small intestine and reabsorbed by the kidney tubules.
 Ans. Glucose is a common nutrient that is absorbed in the small intestine and reabsorbed by the kidney tubule.



Q 12. How do leaves of plants help in excretion?

Ans. Excretion of gaseous waste in plants takes place through stomatal pores on leaves. Excess of water is also excreted from the plant body through the stomatal pores. Many plant waste products are stored in leaves that fall off.

 **Short Answer** Type-I Questions 

Q 1. Is 'nutrition' a necessity for an organism? Discuss.

Ans. Nutrition is required for the following purposes:
 (i) It provides energy for the various metabolic processes in the body.
 (ii) It is essential for the growth of new cells and repair or replacement of worn out cells.

Q 2. 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.

Q 3. Two green plants are kept separately in oxygen free containers, one in the dark and other in sunlight. It was observed that plant kept in dark could not survive longer. Give reason for this observation. (CBSE 2023)

Ans. The plant kept in sunlight will live longer as the leaves of the plants will be able to make food for the plant through photosynthesis. However, in the absence of sunlight, the leaves will not be able to make food. This is because photosynthesis will not take place in the absence of sunlight. Hence, the plant kept in dark could not survive longer as compared to the plant kept in sunlight.

Q 4. Differentiate between an autotroph and a heterotroph.

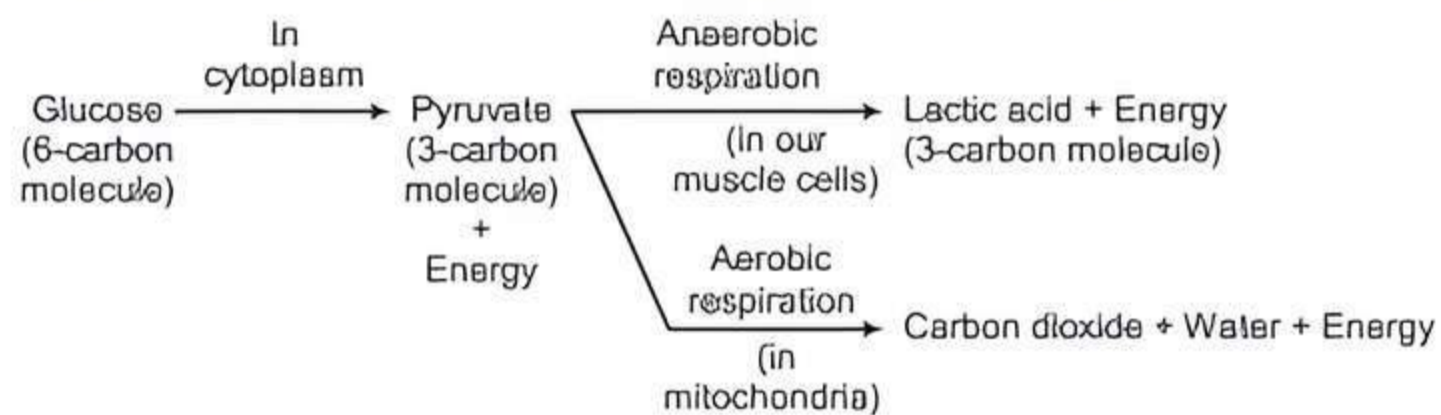
Ans.

 **TiP**
 Learn the differences between autotrophs and heterotrophs in tabular form for easy learning.

S. No.	Basis of Difference	Autotroph	Heterotroph
1.	Definition	Organisms that <u>prepare their own food.</u>	Organisms that <u>are dependent on other organisms for food.</u>

Q 9. Write two different ways in which glucose is oxidized to provide energy in human body. Write the products formed in each case. (CBSE 2019)

Ans. The two different ways in which glucose is oxidised to provide energy in human body are shown below:



2.	Pigment	They <u>have Chlorophyll</u>	They <u>lack chlorophyll</u>
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Q 5. Explain the role of mouth in digestion of food.

Ans. Mouth has the following role in digestion of food:

- (i) Food is crushed into small pieces by the teeth.
- (ii) It mixes with saliva and the enzyme amylase (found in saliva) breaks down starch into sugars.

Q 6. Give two reasons, why bile juice is considered to be an important secretion of liver in the process of digestion? (CBSE 2023)

Ans. Bile juice is considered an important secretion of liver in the process of digestion because of the following reasons:

- (i) It makes the acidic food coming from the stomach alkaline so that pancreatic enzymes can act on it.
- (ii) Bile salts break the fats present in the food into smaller globules making it easy for the enzymes to act and digest them.

Q 7. List two different functions performed by pancreas in our body. (CBSE 2019)

Ans. Two functions performed by pancreas in our body are given below:

- (i) Pancreas act as a gland by secreting pancreatic juice which contains enzymes and help in the digestion.
- (ii) It secretes Insulin which helps in regulating blood sugar levels.

Q 8. Why does absorption of digested food occur mainly in the small intestine?

Ans. Maximum absorption occurs in small intestine due to the following reasons:

- (i) Inner lining of small intestine is provided with villi which increases the surface area for absorption.
- (ii) Wall of intestine is richly supplied with blood vessels (which take the absorbed food to each and every cell of the body).



Q 10. Why is the rate of breathing in aquatic organisms much faster than in terrestrial organisms?

(CBSE 2019)

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 as 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 11. How is O₂ and CO₂ transported in human beings?

(CBSE 2019)

Ans. The oxygen in the alveoli of lungs is taken up by the blood in the blood vessels to transport to all the cells. The haemoglobin present in the red blood cells carries oxygen to different tissues of the body.

Carbon dioxide is transported in the dissolved form by plasma of our blood from various body tissues to lungs where it diffuses into air and is released in the environment by exhaling.

COMMON ERROR

Most students make error in explaining this concept.

Q 12. What is the advantage of having four chambered heart?

Ans. In four chambered heart, left half is completely separated from right half by septa. This prevents oxygenated and deoxygenated blood from mixing. This allows a highly efficient supply of oxygenated blood to all parts of the body.

Q 13. Why do arteries have thick and elastic walls whereas veins have valves?

(CBSE SQP 2023-24)

Ans. Arteries are the vessels which carry blood away from the heart to various organs of the body. Since, the blood emerges from the heart under high pressure, the arteries have thick and elastic walls. Veins have valves to ensure that the blood flows only in one direction.

Q 14. What is the other name of 'tissue fluid'? Write its two functions.

(CBSE 2023)

Ans. Tissue fluid is also known as lymph.

Functions of lymph:

- It carries digested and absorbed fat from intestine.
- It drains excess fluid from extra cellular space back into the blood.

Q 15. What will happen if:

- xylem tissue in a plant is removed?**
- we are injured and start bleeding?** (CBSE 2023)

Ans. (i) If xylem is removed, upward movement of water will stop leading to wilting of leaves and ultimately causes death of a plant.

(ii) This leads to loss of pressure which reduces the efficiency of the pumping system. To avoid this, blood has platelet cells which circulate around the body and plugs these leaks by helping to clot the blood at the point of injury.

Q 16. Why is transpiration important for plants?

Ans. Transpiration is important for plants because of the following reasons:

- It helps in absorption and upward movement of water and minerals from roots to leaves.
- It also helps in temperature regulation.

Q 17. What is the purpose of making urine in the human body? Name the organs that store and release the urine.

(CBSE SQP 2023-24)

Ans. The purpose of making urine in the human body is to filter out waste products (such as urea or uric acid) from the blood.

Urinary bladder store urine and urethra releases the urine.

Q 18. Write one specific function each of the following organs in relation with excretion in human beings:

- Renal artery
- Urethra
- Glomerulus
- Tubular part of nephron

(CBSE 2023)

Ans. (i) **Renal artery:** It carries oxygenated blood from the heart to the kidneys.

(ii) **Urethra:** This allows urine to pass from the urinary bladder to the outside.

(iii) **Glomerulus:** Its function is to filter the blood passing through it.

(iv) **Tubular part of nephron:** Its function is selective reabsorption of filtrate (such as glucose, amino acids, salts, water) as urine flows along it.

Q 19. Name the substances other than water, that are reabsorbed during urine formation. What are the two parameters that decide the amount of water that is reabsorbed in the kidney? (CBSE SQP 2022-23)

Ans. Glucose, amino acids and salts are selectively reabsorbed during urine formation. The amount of water reabsorbed depends on:

- the amount of excess water in the body.
- the amount of dissolved wastes that need to be excreted.



Short Answer Type-II Questions

Q 1. What is photosynthesis? Explain its mechanism.

(CBSE 2019)

Ans. Photosynthesis is a process by which green plants manufacture their food with the help of carbon dioxide and water in the presence of sunlight and chlorophyll.

The process of photosynthesis can be defined by the following events:

- Absorption of light energy by chlorophyll
- Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
- Reduction of carbon dioxide to carbohydrates.

COMMON ERROR

Students often write irrelevant answer. It seems that they are unaware of the mechanism of photosynthesis.



Q 2. List in tabular form three distinguishing features between autotrophic nutrition and heterotrophic nutrition. (CBSE 2019)

Ans.

S.No.	Basis of Difference	Autotrophic Nutrition	Heterotrophic Nutrition
1.	Function	They can <u>prepare their own food.</u>	They <u>cannot prepare their own food.</u>
2.	Raw materials	They <u>require raw materials like CO₂, H₂O in the presence of sunlight and chlorophyll to prepare their food.</u>	They <u>depend on other plants and animals for their food.</u>
3.	Food storage	They <u>store the food in the form of starch.</u>	They <u>store the food in the form of glycogen.</u>

Q 3. The leaves of a plant were covered with aluminium foil. How would it affect the physiology of the plant? (CBSE SQP 2022-23)

Ans.

- (i) No photosynthesis will occur so no glucose will be made. Also, no respiration will take place as no oxygen will be taken in.
- (ii) No transpiration will occur so there would be no upward movement of water or minerals from the soil as there will be no transpirational pull.
- (iii) Temperature regulation of leaf surface will be affected.

Q 4. (i) How does paramecium obtain its food?
(ii) List the role of each of the following in our digestive system:

- (a) Hydrochloric acid
- (b) Trypsin
- (c) Muscular walls of stomach
- (d) Salivary amylase (CBSE 2023)

- Ans.
- (i) Paramecium is a unicellular organism which has a definite shape and food is taken in at a specific spot. Food is moved to this spot by the movement of cilia (hair like structures) which cover the entire surface of paramecium.
 - (ii) (a) Hydrochloric acid creates an acidic medium which facilitates the action of enzyme pepsin.
 - (b) Trypsin helps in the digestion of proteins.
 - (c) The muscular walls of the stomach help in mixing the food thoroughly with more digestive juices.
 - (d) Salivary amylase breaks down starch present in food into sugar.

COMMON ERROR

Students get confused and interchange the role of trypsin.

Q 5. (i) What is the first step in the breakdown of glucose during aerobic and anaerobic respiration? Where does it take place?

(ii) ATP is called the energy currency of the cell. Why?

(iii) What is meant by "residual volume of air" in a breathing cycle? (CBSE 2023)

- Ans.
- (i) In both the cases, the first step is the breakdown of glucose, a six-carbon molecule, into a three-carbon molecule called pyruvate. This process takes place in the cytoplasm.
 - (ii) ATP is called the energy currency of the cell because it is used to fuel all other activities such as contraction of muscles, protein synthesis, conduction of nervous impulses etc.) In the cell.
 - (iii) Residual volume of air is the amount of air that remains in a person's lungs after maximal exhalation. It prevents the lungs from collapsing.

Q 6. What is haemoglobin? State the consequences of deficiency of haemoglobin in our bodies. (CBSE 2019)

- Ans. Haemoglobin is the respiratory pigment present in the red blood corpuscles, which helps in transporting oxygen from the lungs to different parts of the body through blood.

Consequences of deficiency of haemoglobin:

- (i) It can affect the oxygen supplying capacity of blood.
- (ii) It can also lead to a disease called anaemia.

Q 7. List four functions of the human heart. Why is double circulation necessary in the human body? (CBSE 2019)

Ans.

- Four functions of human heart are as follow:
- (i) It sends or pumps blood to lungs for oxygenation.
 - (ii) It pumps oxygenated blood to different parts of body.
 - (iii) It helps to maintain adequate blood pressure throughout the body.
 - (iv) It removes waste products and carbon dioxide from the blood.

Double circulation is necessary to avoid mixing of oxygenated and deoxygenated blood. It also allows a highly efficient supply of oxygen to the human body.

Q 8. List in tabular form three differences between arteries and veins.

Ans.

S.No.	Basis of Difference	Arteries	Veins
1.	Function	They are vessels which <u>carry blood away from the heart to various organs of the body.</u>	Veins <u>collect the blood from different organs and bring it back to the heart.</u>

2.	Structure	Arteries have <u>thick elastic walls</u> , since the blood is under high pressure.	They do not have <u>thick wall</u> because the blood is no longer under pressure.
3.	Location	They are <u>situated in deep layers</u> in the body.	They are <u>situated superficially</u> in the body.
4.	Valves	Valves are <u>absent</u> .	Valves are <u>present</u> .

(Any three)

COMMON ERROR

Students get confused and interchange the function and structure of arteries and veins.

Q 9. How is lymph an important fluid involved in transportation? If lymphatic vessels get blocked, how would it affect the human body? Elaborate.

(CBSE SQP 2022-23)

Ans. Lymph carries digested and absorbed fat from the intestine and drains excess fluid from extracellular space back into the blood.

Blockage of lymphatic system will lead to water retention and poor fat absorption in the body.

Q 10. What is transpiration? List its two functions.

(CBSE 2019)

Ans. The loss of water in the form of vapour from the aerial parts of the plant is known as transpiration.

Functions of transpiration:

(i) It helps in the absorption and upward movement of water and minerals dissolved in it from roots to the leaves.

(ii) It also helps in temperature regulation or cooling of the plant.

Q 11. (i) What is translocation? Why is it essential for plants?

(ii) Where do the substances in plants reach as a result of translocation?

(CBSE 2019)

Ans. (i) The transport of soluble products of photosynthesis from leaves to other parts of the plant is called translocation.

It is essential because, without it, the food prepared by the leaves cannot reach the other parts of the plant.

(ii) As a result of translocation, the food produced is delivered to the storage organs of roots, fruits and seeds and to growing organs through the phloem.

Long Answer Type Questions

Q 1. (i) A gas is released during photosynthesis. Name the gas and also state the way by which the gas is evolved.

(ii) What are stomata? What governs the opening and closing of stomata?

(CBSE 2020)

Ans. (i) Oxygen gas is released during the process of photosynthesis.

The oxygen evolved during photosynthesis comes from the splitting of water molecules into hydrogen and oxygen in the presence of light.

(ii) Stomata are tiny pores present on the surface of the leaves. Massive amounts of gaseous exchange takes place in the leaves through these pores for the purpose of photosynthesis. The opening and closing of stomata is a function of the guard cells. The guard cells swell when water flows into them, causing the stomatal pore to open. If the guard cells shrink, the pore closes.

COMMON ERROR

Students start explaining photosynthesis instead of just answering what is being asked in the question.

Q 2. Design an activity to show that chlorophyll is essential for photosynthesis.

(CBSE 2020)

Ans. Procedure:

- Take a potted plant with variegated leaves.
- Keep the plant in a dark room for three days so that all the starch gets used up.
- Keep the plant in sunlight for about six hours.
- Pluck a leaf from this plant. Mark the green areas in it and trace them on a sheet of paper.
- Dip the leaf in boiling water for a few minutes.
- After this, immerse it in a beaker containing alcohol.
- Place the beaker in a water-bath carefully and heat till the alcohol begins to boil.
- Now dip the leaf in a dilute solution of iodine for a few minutes.
- Take out the leaf and rinse off the iodine solution.

Observation: The green parts of the leaf have turned blue-black.

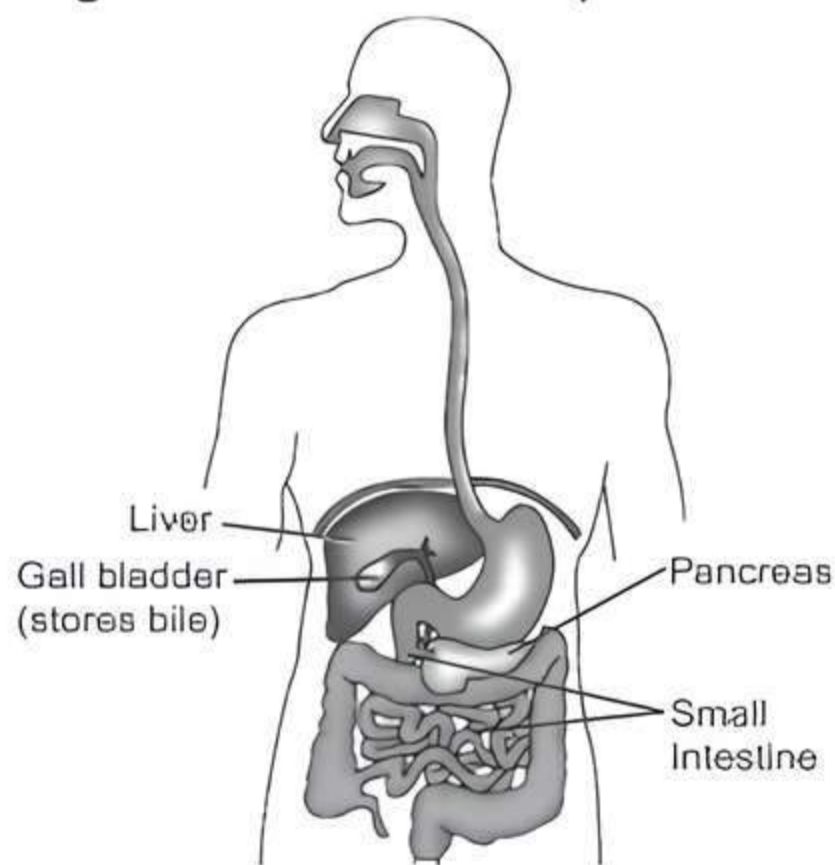
Inference: This indicates that the green parts of the leaf possess chlorophyll, which carry out photosynthesis and produce starch.

Q 3. (i) Draw a diagram of human alimentary canal and label: gall bladder, pancreas, liver and small intestine on it.

(ii) Give two reasons to explain why absorption of digested food occurs mainly in the small intestine?

(CBSE 2020)

Ans. (i) Diagram of Human Alimentary Canal:

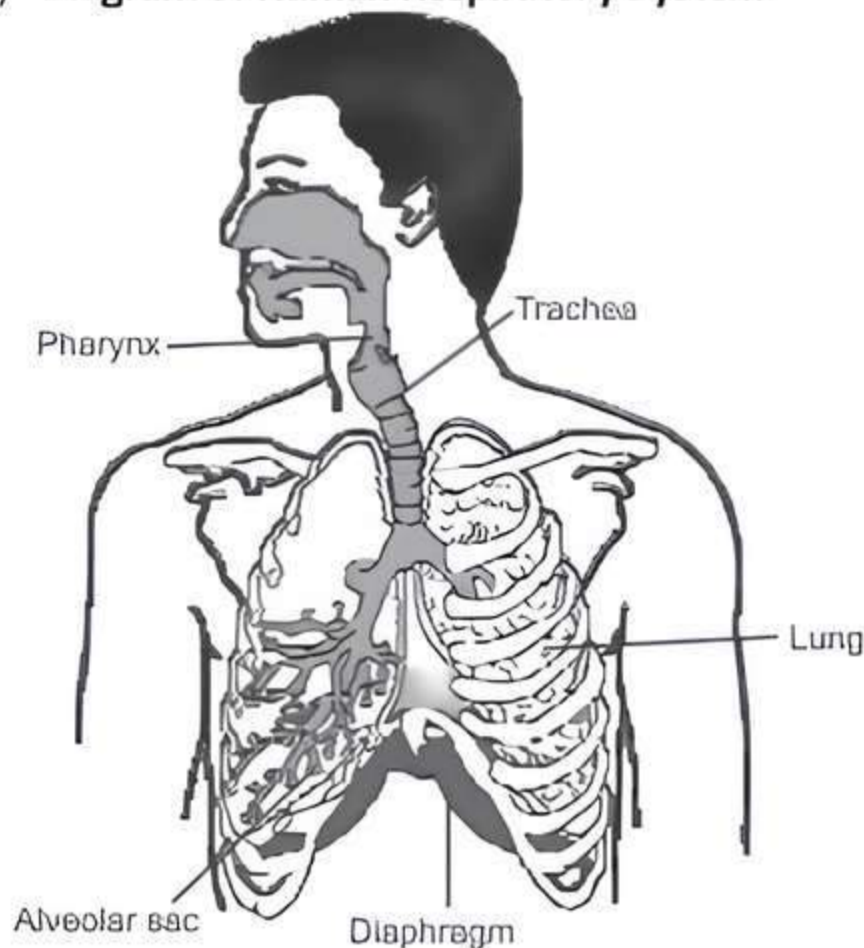


- (ii) Absorption of digested food occurs mainly in small intestine because of the following reasons:
- Inner lining of small intestine is provided with villi which increases the surface area for absorption.
 - Wall of intestine is richly supplied with blood vessels which take the absorbed food to each and every cell of the body.

- Q 4. (i) Why is there a difference in the rate of breathing between aquatic organisms and terrestrial organisms? Explain.
 (ii) Draw a diagram of human respiratory system and label-pharynx, trachea, lungs, diaphragm and alveolar sac on it. (CBSE 2020)

Ans. (i) Aquatic organisms breathe faster as compared to terrestrial organisms because the amount of oxygen present in water is very less as compared to the amount of oxygen present in the air. That's why aquatic organisms need to breathe faster as compared to terrestrial organisms to get more oxygen.

- (ii) Diagram of Human Respiratory System:



- Q 5. (i) Write the correct sequence of steps followed during journey of oxygen rich blood from lungs to various organs of human body.
 (ii) What happens when the system of blood vessels develop a leak? (CBSE 2020)

Ans. (i) The correct sequence of steps followed during journey of oxygen rich blood from lungs to various organs of human body is given below:

- Oxygen rich blood from the lungs comes to thin-walled upper chamber of the heart on the left side called left atrium through pulmonary vein.
- The left atrium relaxes when it collects the blood.
- When the sufficient blood pumps, it contracts and the left ventricle expands so that blood is transferred to it.

- (d) When the muscular left ventricle contracts, the blood is pumped to various organs of human body through aorta.

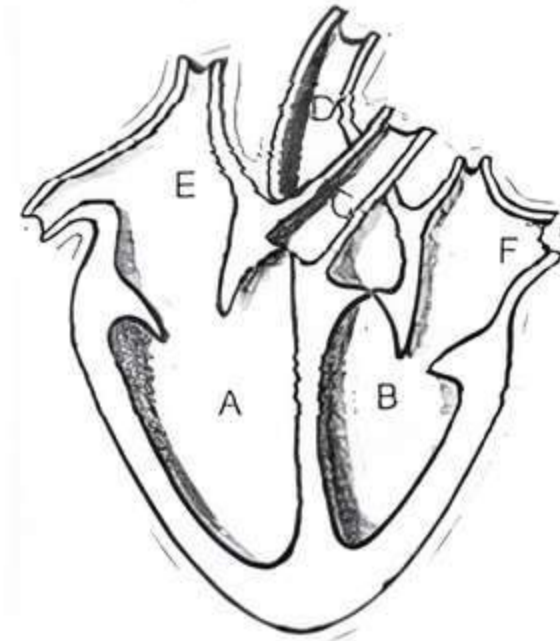


TIP

Write answers point-wise rather than in the form of an essay and steps should be written in the correct sequence.

- (ii) Leakage in system of blood vessels results in loss of blood pressure which would reduce the efficiency of the pumping system.

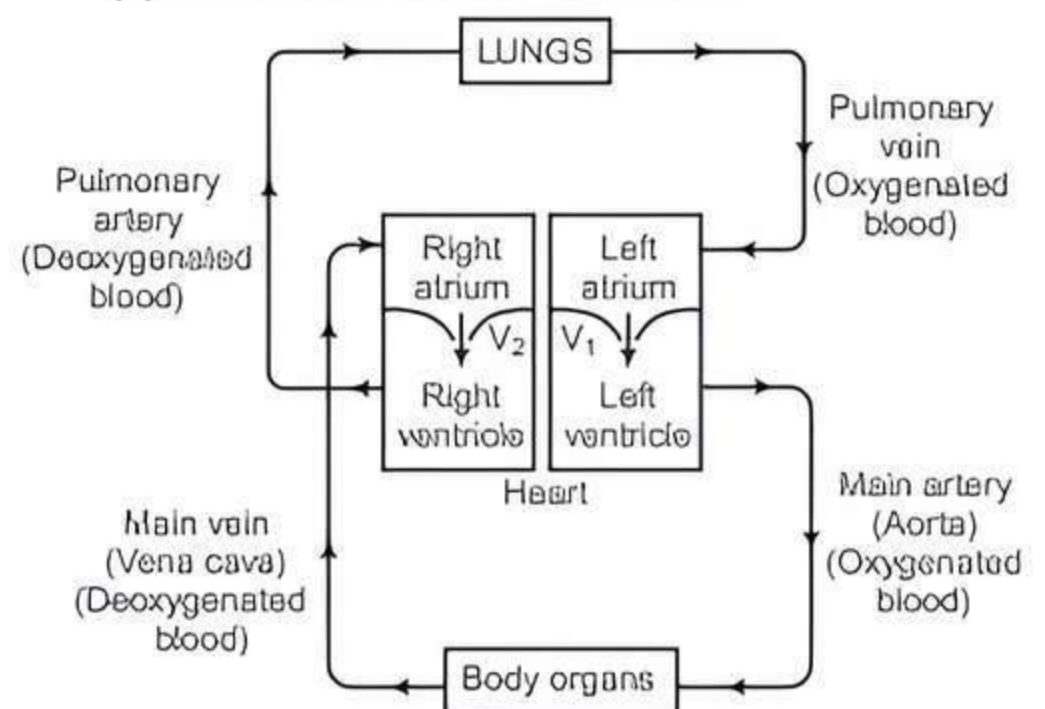
- Q 6. (i) Identify any two parts from the given diagram which carry oxygenated and deoxygenated blood.



- (ii) Explain the process of double circulation with the help of a flow chart.

Ans. (i) **Oxygenated:** B/D/F (B = left atrium/D = left ventricle/F = aorta/pulmonary vein)
Deoxygenated: A/C/E (A = right atrium/C = right ventricle/E = pulmonary artery)

- (ii) Process of Double Circulation:



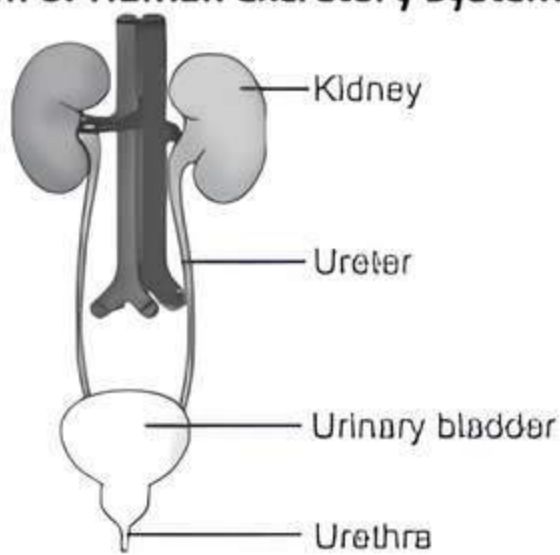
- Q 7. (i) "Blood circulation in fishes is different from the blood circulation in human beings." Justify the statement.
 (ii) Describe "blood circulation" in human beings. (CBSE 2020)

Ans. (i) In fishes, blood circulation is called single circulation due to the presence of two-chambered heart whereas double circulation is seen in human beings due to the presence of four chambered heart.

- (ii) The process of blood circulation in human beings is as follows:
- The deoxygenated blood from all body parts is collected by the veins to pour into vena cava.
 - Vena cava pours blood into the right atrium.
 - Right atrium transfers this blood into the right ventricle.
 - Right ventricle pumps blood to lungs through pulmonary artery.
 - The oxygenated blood from the lungs is brought to the left atrium through pulmonary vein.
 - Now the blood is pumped to left ventricle, from where the blood is distributed to all parts of the body through aorta.

- Q 8. (i) Draw a diagram of human excretory system and label on it the following parts:
 (a) Kidney (b) Ureter
 (c) Urinary bladder (d) Urethra
 (ii) Write one main function each of the labelled parts. (CBSE 2020)

Ans. (i) Diagram of Human excretory system:



TiP
 Practice drawing neat and well-labelled diagram of human excretory system. Incorrect labelling will deduct your marks.

- (ii) Functions:
 (a) Kidneys filter the blood and urine is the filtrate obtained.

- Ureter carries urine from the kidney to the urinary bladder.
- Urinary bladder is a muscular structure which stores urine.
- Urethra helps to expel urine out of the body.

- Q 9. (i) Describe the structure and function of the basic filtering unit of kidney.
 (ii) List two factors on which reabsorption of water from urine depends. (CBSE 2020)

Ans. (i) Nephron is the structural and functional unit of the kidney.

Structure of a Nephron: Nephrons are made up of cluster of thin walled capillaries called glomerulus which is associated with a cup-like structure called Bowman's capsule at one end and collecting duct at another end.

Functions of Nephron:

- Filtration of blood takes place in Bowman's capsule.
- Some useful substances such as glucose, amino acids and salts are selectively reabsorbed into the blood by capillaries surrounding the nephron tubule.
- The filtrate which remains after reabsorption is called urine. Urine is collected from nephrons by the collecting duct to carry it to the ureter.

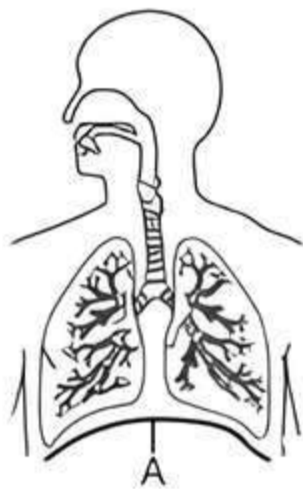
TiP
 While studying the human excretory system, lay stress on the structure and function of nephron.

- (ii) Reabsorption of water from urine depends upon the:
- amount of excess water in the body.
 - amount of dissolved wastes that need to be excreted.

Chapter Test

Multiple Choice Questions

Q 1. Which of the following statements are correct in reference to the role of A (shown in the given diagram) during a breathing cycle in human beings?



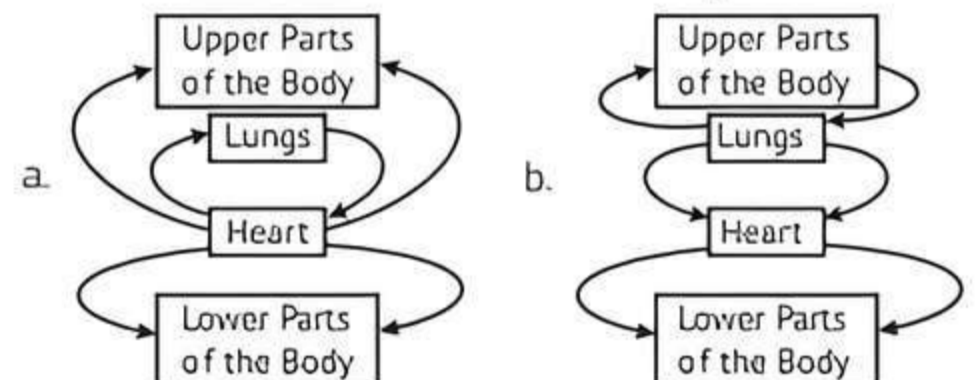
- It helps to decrease the residual volume of air in lungs.
 - It flattens as we inhale.
 - It gets raised as we inhale.
 - It helps the chest cavity to become larger.
- (ii) and (iv)
 - (iii) and (iv)
 - (i) and (ii)
 - (i), (ii) and (iv)

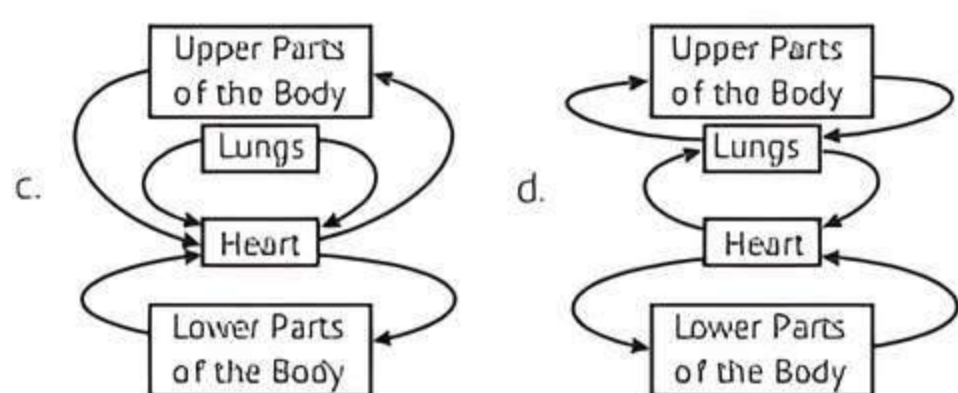
Q 2. The liver secretes bile, needed to digest fats in our food. The pancreas secretes several enzymes needed to breakdown food.

Which of the following is true of the food that we eat?

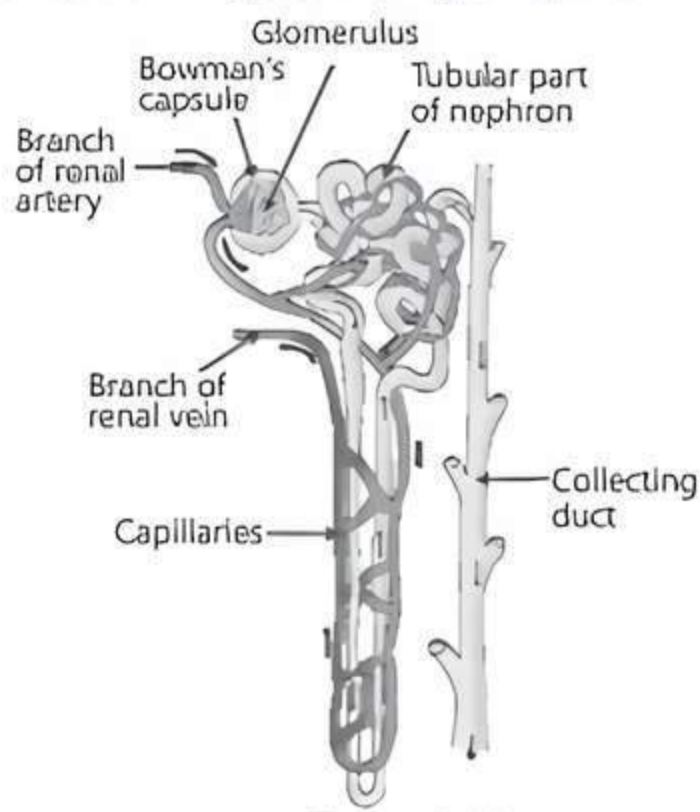
- It passes only through our liver
- It passes only through our pancreas
- It passes through both our liver and pancreas
- It passes neither through our liver nor pancreas

Q 3. Which of these flowcharts correctly shows the circulation of blood in the human body?





Q 4. Observe the image of a single nephron.



The amount of liquid passing through in the form of glomerular filtrate is approximately 150-180 litres per day whereas the amount of urine flowing out of all the nephrons is only 1.5 to 1.8 litres per day.

Water is getting reabsorbed.

In which part of the nephron could the water be getting reabsorbed?

- a. In the Bowman's cup b. In the long tubular part
c. In the collecting duct d. In the glomerulus

Assertion and Reason Type Questions

Directions (Q. Nos. 5-6): Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:

- a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true but Reason (R) is false.
d. Assertion (A) is false but Reason (R) is true.

Q 5. Assertion (A): Transpiration is a necessary evil.

Reason (R): It causes water loss but helps in absorption and upward movement of water and minerals.

Q 6. Assertion (A): Excretion is the biological process by which harmful wastes are removed from an organism's body.

Reason (R): The mode of excretion is same in both unicellular and multicellular organisms.

Case Study Based Question

Q 7. An organism A which cannot move from one place to another, makes a simple food B from the substances C and D available in the environment. This food is made in the presence of a green coloured substance E present in organs F in the presence of light energy in a process called G. Some of the simple food B also gets converted into a complex food H for storage purposes. The food H gives a blue-black colour with dilute iodine solution.

Read the above passage carefully and give the answer of the following questions:

- (i) What is (a) organism A, (b) food B, and (c) food H?
(ii) What are C and D?
(iii) Name (a) green coloured substance E and (b) organ F.
(iv) In each of the following situations, what happens to the rate of process G?
(a) Cloudy days
(b) Stomata get blocked due to dust

Very Short Answer Type Questions

- Q 8. What is the role of cartilaginous rings on trachea?
Q 9. Write the correct path of urine in our body.

Short Answer Type-I Questions

- Q 10. What are the strategies of plants to get rid of their wastes?
Q 11. (i) Write a balanced equation for photosynthesis.
(ii) Which digestive secretion does not contain any enzyme but is important? Discuss.
Q 12. How does nutrition take place in *Amoeba*? How is it different in *Paramecium*?

Short Answer Type-II Questions

- Q 13. Design an activity to show that CO_2 is produced during breathing. Name the intermediate and the end products of glucose breakdown in aerobic respiration.
Q 14. What are the main events occurring in the small intestine?
Q 15. (i) What is lymph?
(ii) Give two functions of blood.
(iii) "Fishes show single circulation". Explain.

Long Answer Type Questions

- Q 16. (i) Draw a diagram of excretory system in human beings and label on it: Aorta, vena cava, urinary bladder and urethra.
(ii) List two vital functions of the kidney.
(iii) Where are kidneys located in our body?
Q 17. (i) Draw a schematic representation of transport and exchange of oxygen and carbon dioxide during transportation of blood in human beings and label on it: Lung capillaries, Pulmonary artery to lungs, Aorta to body, Pulmonary veins from lungs.
(ii) What is the advantage of separate channels in mammals and birds for oxygenated and deoxygenated blood?