

## LIFE PROCESSES TRANSPORTATION

Question (1): How do organisms like amoeba transport materials?

Answer: Amoeba is a unicellular organism. In unicellular organisms a single cell carries out all the life processes as the cell itself is the organism. The uptake of materials from the environment is through the general body surface and the transport within the cell is by diffusion.

Question (2): Why do higher plants and animals need a transportation system?

Answer: In higher plants and animals, the sites of absorption and synthesis are very specific and separated by a greater distance from the other parts of the body. Thus, they need a transportation system.

Question (3): What is mass flow system?

Answer: The transport of materials in bulk across the plant or animal body through the vascular tissue is called the mass flow system.

Question (4): Which transport system - plant or animal, does not use muscular energy?

Answer: Transport in plants does not use muscular energy.

Question (5): What are vascular plants?

Answer: The higher plants are also called the vascular plants as the transport in them is with the help of the vascular system.

Question (6): Which are the materials transported in plants?

Answer: The materials transported across the plant body are water, minerals, food and metabolites like the hormones and vitamins.

Question (7): What are the two types of vascular tissues?

Answer: The two types of vascular tissues are xylem and phloem.

Question (8): What are the functions of xylem and phloem?

Answer: Xylem conducts water from the roots to the other parts of the plant and phloem conducts food from the leaves to the different parts of the body.

Question (9): Which tissue conducts organic substances in plants?

Answer: Phloem conducts organic substances in plants.

Question (10): Why are the sieve tube cells called so?

Answer: The sieve tube cells are joined end to end and their end walls are perforated. This gives the appearance of a sieve and hence they are called as the sieve tube cells.

Question (11): What is the process by which carbon dioxide enters the cell?

Answer: The process by which carbon dioxide enters the cell is called diffusion.

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Question (12): Define osmosis.

Answer: The process of movement of solvent particles from the regions of higher concentration to the regions of lower concentrations through a semi-permeable membrane is called osmosis.

Question (13): What is turgor pressure?

Answer: It is a positive pressure developed inside the cells due to the pushing of the cytoplasm against the cell wall as the cytoplasm gets more water.

Question (14): When does a cell become flaccid?

Answer: A cell becomes flaccid on losing water.

Question (15): What is active transport? Give an example.

Answer: Active transport is the transport of materials across the cell membrane with the help of energy. For example, the entry of mineral ions into the cells.

Question (16): What is transpiration?

Answer: It is the loss of water from the aerial parts of the plant in the form of water vapour.

Question (17): What are the three types of transpiration?

Answer: The three types of transpiration are stomatal, lenticular and cuticular transpiration.

Question (18): What are stomata? Where are they present?

Answer: Stomata are openings on the surface of the leaves that are surrounded by the guard cells. They are present more on the lower surface of the leaves.

Question (19): How is the rate of transpiration affected?

Answer: The rate of transpiration is affected by many factors such as light, temperature, availability of soil water and atmospheric humidity.

Question (20): Why is transpiration important?

Answer: Transpiration is important because:

- 1) it is responsible for uptake of water from the soil
- 2) it is responsible for movement of water and dissolved minerals from the roots to different parts of the plant.
- 3) it results in cooling of the leaf surfaces, thereby protecting them from excessive heat.

Question (21): What is ascent of sap?

Answer: The upward movement of water along with the dissolved solutes up the xylem is called ascent of sap.

Question (22): What are the two factors responsible for ascent of sap?

Answer: The two factors responsible for ascent of sap are root pressure and transpiration pull.

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Question (23): What are root hairs? What is their function?

Answer: Root hairs are outgrowths of the epidermal cells. They help in increasing the surface area of water absorption.

Question (24): What is root pressure?

Answer: The water enters the roots through the root hairs. It then travels through the root tissue to reach the root xylem. Therefore the xylem in the root has more water than the xylem column above it and this creates a positive pressure in the xylem of the root. This is called the root pressure.

Question (25): What is transpiration pull? What is its effect?

Answer: The force with which the water is pulled up the xylem is called the transpiration pull. The transpiration pull results in a continuous stream of water called the transpiration stream extending from the xylem of the leaves to the xylem of the roots.

Question (26): How is the continuity of the water column maintained?

Answer: The continuity of the water column is maintained by the adhesive and cohesive properties of water. The adhesive property of the water molecules makes them adhere to the xylem walls and its cohesive property makes the water molecules remain together and move up as a stream.

Question (27): How are the minerals transported across the plants?

Answer: The minerals are transported in their ionic, soluble form along with water across the plant in xylem and phloem.

Question (28): In what form is the food transported along phloem?

Answer: The food is transported along the phloem in the form of sucrose, a carbohydrate.

Question (29): What is translocation?

Answer: The transport of soluble substances like the sugars, amino acids and hormones by the phloem is called translocation.

Question (30): What are the substances translocated by the phloem?

Answer: The phloem translocates the food manufactured by the leaves, the hormones and the mineral ions from the falling leaves to the other regions of the plant.

Question (31): What is the path of translocation of food in plants?

Answer: The food is manufactured in the leaves. From the mesophyll cells of the leaves, the food enters the phloem cells. They are then transported along the phloem to the different parts of the plant (stem, roots, etc.). From the phloem, the cells draw the food as per their requirement.

Question (32): How is the food translocated in the phloem?

Answer: The food is translocated in the phloem along the concentration gradient. That is, the food is translocated from the region of higher concentration to a region of lower concentration in the phloem.

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Question (33): How are the materials transported in higher animals?

Answer: In higher animals, the materials are transported by a mass flow system called the circulatory system. This involves the movement of a liquid medium through the closed tubes and open spaces between the cells.

Question (34): What are the types of substances transported by the circulatory system?

Answer: The materials transported by the circulatory system include:

- 1) digested food
- 2) respiratory gases
- 3) hormones
- 4) excretory products

Question (35): What are the two types of circulatory systems in man?

Answer: The two types of circulatory systems are:

- 1) blood circulatory system
- 2) lymphatic circulatory system

Question (36): What are the two types of blood circulatory systems?

Answer: The two types of circulatory systems are:

- 1) open circulatory system
- 2) closed circulatory system

Question (37): What is open circulatory system?

Answer: In the open circulatory system the exchange of materials between the cells and the blood is done directly. The blood enters into the interstitial spaces (space between the tissues) and circulates in these spaces. There are few blood vessels but they are not extensive. The blood vessels are open-ended as they open into the common cavities called the haemocoel. For example: Insects.

Question (38): What are the three components of circulatory system in man? Answer: The three components of the circulatory system in man are:

- 1) Blood: A fluid that carries all the materials
- 2) Heart: The pumping organ
- 3) Blood vessels: Tubes through which the fluid can flow to different parts of the body.

Question (39): What is blood made up of?

Answer: Blood is made up of:

- 1) The liquid component called the plasma
- 2) The solid components: the formed elements that are freely present in the plasma. The solid elements include the red blood cells, white blood cells and the platelets.

Question (40): Mention any two functions of the plasma.

Answer: The two functions of plasma are:

- 1) Maintaining osmotic pressure and viscosity of the blood
- 2) Helping in transport of substances like the hormones and enzymes

Question (41): What is the main function of the red blood cells?

Answer: The main function of the red blood cells is to carry oxygen. These cells contain the pigment haemoglobin which has an affinity for oxygen.

Question (42): Write short notes on erythrocytes.

Answer: Erythrocytes are the red blood cells. They are biconcave discs with the edges being thicker than the centre. They are enucleated and contain a pigment called the haemoglobin. The haemoglobin gives the characteristic red colour. They number 5 million per cubic mm in adult males and 4.5 million per cubic mm in adult females. They are synthesised in the bone marrow of certain bones like the sternum. Each has a life span of about 120 days. After this, they are destroyed in the liver.

Question (43): What are the functions of leucocytes?

Answer: The functions of leucocytes are:

**Phagocytosis** The neutrophils and lymphocytes can engulf foreign bodies by the process called phagocytosis.

**Antibody Production** The leucocytes produce antibodies that attack the foreign bodies.

**Anti-allergic Properties** Eosinophil, a granulocyte is thought to be anti-allergic.

Question (44): What is the other name for platelets and what is their function?

Answer: Platelets are also called thrombocytes. They play an important role in the clotting of blood.

Question (45): What are the functions of platelets?

Answer: The functions of platelets are:

1) Release of thromboplastin when damaged.

Thromboplastin which initiates a series of reactions that result in the clotting of blood.

2) Retraction of clot.

The clot formed by the blood is further made dense by the addition of platelets and this retracts the clot making it tighter and smaller.

3) Repair of damaged endothelium.

The platelets stick to the damaged portion of the wall and prevent loss of blood.

Question (46): List the various functions of blood.

Answer: The various functions of blood are:

1) Transport of nutrients, respiratory gases, excretory wastes, hormones, etc.

2) Plays a role in immune system

3) Maintenance of pH

4) Maintenance of ionic balance

5) Maintenance of water content

6) Regulation of blood pressure

7) Plays a role in temperature regulation

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8) Plays a role in homeostasis

9) Plays a role in clotting

Question (47): What is blood transfusion?

Answer: Replacement of blood from outside to make up for lost blood is called blood transfusion.

Question (48): What is agglutination?

Answer: The sticking together (clumping) of red blood cells because of the reaction between antigens and antibodies is called agglutination.

Question (49): What are arteries and veins?

Answer: Arteries are blood vessels arising out of the heart and supplying blood to all the parts of the body. Veins are blood vessels that bring blood from different parts of the body back to the heart.

Question (50): How does the blood flow in the veins?

Answer: The blood flows in the veins by the action of the muscles of the veins and those of the skeletal muscles surrounding them.

Question (51): Which are the two chambers of the heart? Which of the two is more muscular?

Answer: The two chambers are the upper atria (auricles) and the lower ventricles. The ventricles are more muscular.

Question (52): What are the functions of the following in the heart:

1) Aorta

2) Inferior vena cava

3) Auriculoventricular valve

4) Semilunar valve

Answer: 1) Aorta It is a major blood vessel into which the ventricle pumps the oxygenated blood.

2) Inferior vena cava The vein that collects the blood coming from the different parts of the body and pours it into the right auricle.

3) Auriculoventricular valve The valve between the auricles and the respective ventricle allowing the movement of blood in only one direction, that is, from the auricle into the ventricle and not vice-versa.

4) Semilunar valve The valve having three semi-lunar shaped flaps. These valves only allow the flow of blood from the auricle into the aorta.

Question (53): What is systole and diastole?

Answer: The contraction of the heart is called the systole and the relaxation of the heart is called the diastole.

Question (54): What are the stages in the pumping action of the heart?

Answer: There are three stages in the pumping action of the heart. They are:

1) Auricular systole

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- 2) Ventricular systole
- 3) Joint diastole (auricular and ventricular)

Question (55): What are the 'lub' and 'dub' sounds produced by the heart?

Answer: These are the sounds of the heartbeat and they are produced when the valves close during the contraction or relaxation of the heart. At the start of the ventricular contraction or systole, the auriculoventricular valve closes with a 'lub' sound. The 'dub' sound is produced when the semilunar valve at the entrance of the aorta closes at the beginning of the joint diastole that is the relaxation of both ventricles and auricles.

Question (56): What initiates and controls the pumping action of the heart?

Answer: The pumping action of the heart is initiated by a set of muscles called the sinoatrial node (SAN). The rate of the heart beat is also controlled by the nerves and the hormones.

Question (57): What is ECG?

Answer: ECG stands for electrocardiogram. It is the recording of the electropotential changes over the heart muscles. It is used for detecting any abnormality in the functioning of the heart that reflects as a change in the regular ECG pattern.

Question (58): What is the normal value for blood pressure? Which instrument is used to measure the blood pressure?

Answer: The normal value for blood pressure is 120/80 mm of Hg. Sphygmomanometer is used to measure the blood pressure.

Question (59): What is pulse rate?

Answer: If a finger is kept at a spot where an artery runs close to the body surface, the rhythmic movement generated by the contraction and relaxation of the heart can be felt. This is called the pulse. It is found to be the same as the heart rate. The number of pulses per minute is called the pulse rate.

Question (60): What is double circulation?

Answer: The circulation in which the blood passes through heart twice during one circulation is called double circulation.

Question (61): Name the major arteries of systemic circulation.

Answer: The major arteries of systemic circulation are:

- 1) Aorta - the main artery that leaves the heart
- 2) Coronary artery - to the heart wall
- 3) Sub-clavian artery - to the shoulder region
- 4) Carotid artery - to the neck and head region
- 5) Mesentric region - to the stomach and intestines
- 6) Hepatic artery - to the liver
- 7) Iliac - to the genitals and the legs

Question (62): What is pulmonary circulation ?

Answer: The right ventricle pumps blood into the pulmonary artery that carries it to the lungs. After purification in the lungs, the blood is carried back by the pulmonary vein to the left auricle of

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the heart. This circulation of blood between the heart and the lungs is called pulmonary circulation.

Question (63): What are the components of the lymphatic system?

Answer: The components of the lymphatic system are: 1) The fluid lymph 2) The channels through which the fluid flows - smaller lymph vessels and larger lymph ducts 3) The enlarged cavities called the lymph glands or nodes

Question (64): What is tissue fluid? How is it formed?

Answer: The fluid that escapes from the blood vessels into the interstitial spaces is called the tissue fluid. The blood flows under high pressure in the arteries. These arteries branch out as arterioles and then as capillaries. The walls of these vessels are very thin. The blood under pressure comes out into the tissue spaces. The cellular components and the larger proteins are not able to come out. Thus, the blood without the cells and the proteins is called the tissue fluid.

Question (65): What are lymph nodes? Name one.

Answer: The lymph vessels and ducts are enlarged at certain areas. These enlarged portions are called the lymph nodes or lymph glands. They contain lymphocytes that are involved in the production of antibodies during infection. The nodes are also lined by phagocytic cells that engulf the foreign bodies like the bacteria. The tonsil in the throat is an example of a bacterial infection.