LIFE PROCESSES

Solved Intext Exercises

Q1. Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?

Ans. As in multicellular organisms, all the cells are not be in direct contact with environment, simple diffusion does not meet the requirement of all the body cells.

Q2. What criteria do we use to decide whether something is alive?

Ans. The most important criterion to decide whether something is alive (or not) is the movement. All the living things are alive move by themselves without any external help.

All living organisms perform certain processes listed below:

(i) Nutrition

(ii) Respiration

(iii) Excretion

(iv) Transportation

(v) Reproduction and

(vi) All are made of cells

Q3. What are outside raw materials used for by an organism ?

Ans. Outside raw materials used for by an organism are :

(i) Food

(ii) Water

(iii) Oxygen

Plants also use CO_2, light energy and water to carry out photosynthesis.

Q4. What process would you consider essential for maintaining life?

Ans. (i) Nutrition

(ii) Respiration

(iii) Transportation and

(iv) Excretion

Q5. What are the difference between autotrophic nutrition and heterotrophic nutrition ?

Ans. Distinction between autotrophic nutrition and heterotrophic nutrition

Autotrophic Nutrition: Is that mode of nutrition in which an organism makes (or synthesizes) its own food from the simple inorganic materials like carbon dioxide and water present in the surroundings with the help; of sunlight energy.

Heterotrophic Nutrition: Is that mode of nutrition in which an organism cannot make (or synthesize its own food from simple inorganic materials like carbon dioxide and water), and depends on other organisms for its food.

Q6. Where do plants get each of the raw materials required for photosynthesis?

Ans.

(i) CO_2 from atmosphere.

(ii) Water from soil.

(iii) Light from Sun.

(iv) Chlorophyll presents in chloroplast found in green parts of plants.

Q7. What is the role of the acid in our stomach?

Ans. (i) The hydrochloric acid creates an acidic medium which facilitates the action of the enzyme pepsin.

(ii) Kills harmful bacteria present in food.

(iii) Inactivates salivary amylase.

(iv) Prevents fermentation of food.

Q8. What is the function of digestive enzymes?

Ans. Enzymes break-down the various complex components of food into simple and soluble components so that they can be absorbed easily.

Q9. How is the small intestine designed to absorb digested food?

Ans. The digested food is taken up by the walls of the intestine. The inner lining of the small intestine has numerous finger-like projections called will which increase the surface area for absorption. The villi are richly supplied with food vessels which take 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 the old ones.

Q10. What advantage over an aquatic organism does a terrestrial organisms have with regard to obtaining oxygen for respiration?

Ans. The rate of breathing is slower in terrestrial organisms as compared to aquatic organisms. This is due to the fact that in water, the amount of O_2 is less as compared to air.

Q11. What are the different ways in which glucose is oxidised to provide energy in various organisms?

Ans. Some organisms use oxygen to break-down glucose completely in CO2 and water. Some use other pathways that do not involve oxygen.

Q12. How is oxygen and carbon dioxide transported in human beings?

Ans. In human beings, a pigment haemoglobin is present in red blood corpuscles which has a high affinity for oxygen, takes up the oxygen from the air in the lungs and carry it to tissues which are deficient in oxygen. Carbon dioxide which is more soluble in water than oxygen is mostly transported in the dissolved form in our blood.

Q13. How are the lungs designed in human beings to maximise the area for exchange of gases?

Ans. In lungs, the bronchioles terminates in balloon-like structures called alveoli. The alveoli provide a surface where the exchange of gases can take place. The walls of the alveoli contains an extensive network of blood-vessels. [The alveolar area, if spread out, it covers about 80 m^2 which is more than our body surface area].

Q14. What are the components of the transport system in human beings? What are the functions of these components.

Ans. Components of human transport system:

Heart

Arteries

Veins

Capillaries

Heart: Receives and pumps blood.

Arteries: Carry blood away from heart to various organs.

Veins: Brings back blood to heart.

Capillaries: Arteries divide to form capillaries in tissue, through them exchange of various material takes place.

Q15. Why is necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Ans. The separation of the right side and left side of the heart is useful to keep oxygenated and deoxygenated blood from mixing. Such separation allows a highly efficient supply of oxygen to the body. This is useful in animals that have high energy needs, such as birds and mammals, which constantly use the energy to maintain their body temperature.

Q16. What are the components of the transport system in highly organised plants?

Ans. The transport system consists of xylem and phloem. Xylem which has vessels and tracheids transport water and minerals from root to other parts of the plant. Phloem which consists of sieve tubes, sieve cells and companion cells transport food from leaves to shortage organs and other parts of the plant. In xylem, the transports unidirectional i.e., from root upward while in phloem, it is bidirectional.

Q17. How are water and minerals transported in plants?

Ans. Water and minerals are transported in plants through xylem which consists of tracheids and vessels. At the roots, cells in contact with the soil actively take up ions. The creates a difference in the concentration of these ions between the root and the soil. Water, therefore, move into the root form the soil to eliminate this difference this creating a column of water that is steadily pushed upwards. In fact, evaporation of water molecules from the cells of a leaf creates a suction which pulls water from the xylem cells of roots. The loss of water in the form of vapour from the aerial parts of the plant is known as transpiration.

Thus, transpiration helps in the absorption and upward movement of water and minerals dissolved in it from roots to the leaves. It also helps in temperature regulation. The effect of root pressure in transport of water is more important at night. During the day when the stomata are open, the transpiration pull becomes the major driving force in the movement of water in the xylem.

Q18. How is food transported in plants?

Ans. Food is transported in plants through phloem which is tubes, sieve cells and companion cells. This transport of soluble products of photosynthesis is called translocation and it occurs in the part of the vascular tissue known as phloem. Besides the products of photosynthesis, the phloem transports amino acids and other substances. These substances are especially delivered to the storage organs of roots, fruits and seeds and to growing organs. The translocation of food and other substances takes place in the sieve tubes with the help of adjacent companion cells both in upward and downward directions. The translocation in phloem is achieved by utilising energy. Material like sucrose is transferred into phloem tissue using energy from ATP. This increases the osmotic pressure of the tissue causing water to move into it. This pressure moves the materials in the phloem to move material according to the plant's needs. For example, in the spring, sugar in root or stem tissue would be transported to the buds which need energy to grow.

Q19. Describe the structure and functioning of nephrons.

Ans. Each nephron is a cluster of very thin-walled blood capillaries. Each capillary cluster in the kidney is associated with the cup-shaped Bowmans capsule that collects are filtered urine. Nephrons filter the blood in order to remove nitrogenous metabolic waste. They also absorb some useful substances such as glucose, amino acids, minerals and major amount of water from the filtrate.

Q20. What are the methods used by plants to get rid of excretory products?

Ans.

(i) Plants produced carbon dioxide as waste during respiration and oxygen as waste during photo synthesis.

(ii) Excess water is removed through transpiration.

(iii) Waste products stored in leaves is eliminated along with falling leaves.

(iv) Some waste products like gums and resins are stored in older xylem tissue.

(v) Plants also excrete some waste substances into the soil around them.

Q21. How is amount of urine produced regulated?

Ans. The amount of urine depends on how much excess water there is in the body and on how much dissolved waste there is to be excreted. If the amount of water and dissolved wastes in body are more than prescribed limit the amount of urine will be more and if water and dissolved wastes are les in body, the amount of urine will be less.