

CHRIST KING HR. SEC. SCHOOL, KOHIMA
CLASS 10
SUBJECT: SCIENCE (BIOLOGY)

CHAPTER 6
PAGE 117

(QUESTION AND ANSWER)

1. Describe the structure and functioning of nephrons.

Ans: Structure of nephrons: Nephrons are the structural and functional unit of kidney. They are long coiled tubules whose one end is connected to the double walled-cup shaped structure called Bowman's capsule and the other end to a urine collecting duct. Bowman's capsule contains a bundle of blood capillaries, known as glomerulus that is followed by the tubular part of the nephrons, which forms loops at some places.

Functioning of nephrons:

- a. Filtration: Filtration of blood takes place in the capillaries of the glomerulus. Then the filtrate passes into the tubular part of the nephron. The filtrate contains glucose, amino acids, urea and uric acid and a large amount of water.
- b. Reabsorption: The filtrate flows along the tubule and useful substances such as glucose, amino acids, salts and some water are reabsorbed into the blood by the capillaries surrounding the nephron tubule.
- c. (iii) Formation of urine: The filtrate which remains after the re-absorption is called the urine, which is collected from nephron by the collecting duct to carry it to the urinary bladder and then to the urethra.

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

Ans: The methods used by plants to get rid of excretory products are:

- a. Gaseous wastes (i.e carbon dioxide and oxygen) are removed through stomata in leaves and lenticels in stems into the air.
- b. Plants get rid of excess water by transpiration.
- c. Plants also excrete some waste substances into the soil around them.
- d. Some waste products are stored as resins and gums.
- e. Waste products may be stored in leaves, bark or in any other plant part, which fall off or get rid of by plants.

3. How is the amount of urine produced regulated?

Ans: The amount of urine produced depends on the amount of excess water and dissolved wastes present in the body. More water and dissolved wastes in the body will produce more urine. On the other hand, less water and less dissolved wastes will produce less urine.

Exercise Questions

1. The kidneys in human beings are a part of the system for

(c) Excretion

2. The xylem in plants is responsible for

(a) Transport of water

3. The autotrophic mode of nutrition requires

(d) All the above

4. The breakdown of pyruvate to give carbon dioxide, water, and energy takes place in

(b) Mitochondria

5. How are fats digested in our bodies? Where does this process take place?

Ans: Fats are digested in the small intestine. The upper part of the small intestine receives bile juice, which contains bile salts for breakdown of fats into smaller globules there by, increasing the efficiency of the enzyme action. This process is known as emulsification. Bile also makes the medium alkaline. The walls of small intestine secrete intestinal juice containing enzyme lipase. It finally converts the fats into fatty acids and glycerol.

6. What is the role saliva in the digestion of food?

Ans: Saliva moistens the food for easy swallowing. It also contains a digestive enzyme called salivary amylase, which breaks down starch into sugar.

7. What are the necessary conditions for autotrophic nutrition and what are its by-products?

Ans: The necessary conditions for autotrophic nutrition are:

- (i) Water (ii) Sunlight (iii) Chlorophyll (iv) Carbon dioxide

The by-products is oxygen, which is released into the atmosphere through stomata

8. What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic respiration.

Ans: **Aerobic Respiration:**

- (i) It occurs in the presence of oxygen and releases large amount of energy.
- (ii) Each glucose molecule produces 38 ATP molecules.
- (iii) It begins in the cytoplasm and continues in the mitochondria.

Anaerobic Respiration:

- (i) It occurs in the absence of oxygen and releases relatively small amount of energy.
- (ii) Each glucose molecule produces 2 ATP molecules.
- (iii) It occurs only in the cytoplasm.

Some organisms that uses anaerobic mode of respiration are:-Yeast, bacteria etc.

9. How are the alveoli designed to maximise the exchange of gases?

Ans: The alveoli are thin walled and are richly supplied with a network of blood vessels to facilitate exchange of gases between blood and air filled in alveoli. They have balloon-like structure that provides maximum surface area for exchange of gases.

10. When a sportsman runs, he gets muscle cramps. Why?

Ans: When a sportsman runs, he gets muscle cramps because of the formation of lactic acid produced during anaerobic respiration due to lack of oxygen in muscles.

11. A doctor advised a patient to take less sugar in his diet. Mention the possible disease the patient would be suffering from?

Ans: Diabetes.

12. (a) Bile doesn't contain any digestive enzymes. Yet it is important for digestion of food. Why?

Ans: Bile juice breaks down large fat globules into smaller globules so that the pancreatic enzymes can easily act on them. Thus, bile juice is important for digestion of food.

(b) Explain the role of bile in digesting food.

Ans: Bile juice contains bile acids, which are critical for digestion and absorption of fats and fat soluble vitamins in the small intestine. The food coming from the stomach is acidic and has to be made alkaline for the pancreatic enzymes to act. Bile juice from the liver accomplishes this in addition to acting on fats.

13. Explain the process in which the energy requirements of the autotrophic organisms are fulfilled. In which form of the unused carbohydrates get stored?

Ans: The energy requirements of the autotrophic organisms are fulfilled by the process known as photosynthesis. In this process water and carbon dioxide are taken from outside and in the presence of sunlight and chlorophyll, these raw materials are converted into carbohydrates, which provides energy. Excess of carbohydrates are stored in the form of starch.

14. Name any nitrogenous waste present in urine. What is the basic filtration unit of kidney called? How the amount of urine produced is be regulated?

Ans: The nitrogenous waste present in the urine is urea.

The basic filtration unit of kidney is Nephron.

The amount of urine produced depends on the amount of excess water and dissolved wastes present in the body. More water and dissolved wastes in the body will produce more urine. On the other hand, less water and less dissolved wastes will produce less urine.

15. (a) Why does a piece of bread taste sweet when chewed for some time?

Ans: when we chew a piece of bread for some time, the starch present in it gradually starts converting into sugar by the action of enzyme called the salivary amylase present in our mouth. And thus, the bread tastes sweet when chewed for some time.

(b) Cellulose acts as roughage in man but serves as a source of nutrient in cow. Justify the statement.

Ans: Man does not have the digestive enzyme to break down cellulose while the digestive gland of a cow produces runinococcus bacteria which help the cow to easily digest cellulose and provide nutrients to the cows.

16. What would be the consequences of deficiency of haemoglobin in our bodies?

Ans: Haemoglobin is the respiratory pigment that transports oxygen to the body cells for respiration. Therefore, deficiency of haemoglobin can affect the oxygen supplying capacity of blood which leads to deficiency of oxygen in the blood cells. It can also lead to a disease called anaemia.

17. Describe double circulation of blood in human beings. Why is it necessary?

Ans: During double circulation in human beings blood passes through heart twice for completing one cycle of circulation. The double circulation includes the following processes:

(i) Pulmonary circulation: In this circulation, the deoxygenated blood is pushed by right ventricle to the lungs for oxygenation through pulmonary artery. This oxygenated blood is then, brought back to the left atrium of the heart through pulmonary veins.

(ii) Systematic Circulation: In this circulation, oxygenated blood brought to left atrium goes to the left atrium goes to the left ventricle. It is then, passed on to different body parts through aorta.

18. What are the differences between the transport of materials in xylem and phloem?

Ans: The differences between transport of materials xylem and phloem are as follows:

Transport in xylem:

- Xylem transport water and minerals in plants.
- The movement of water is unidirectional in xylem.
- Major operating forces are diffusion and transpirational pull.
- It is not influenced by metabolic inhibitors.
- It is carried out by xylem vessels and tracheids.

Transport in phloem:

- Phloem transports the products of photosynthesis, amino acids and other organic substances in plants.
- The movement of substances is multidirectional.
- Energy (ATP) is required for translocation.
- Phloem transport is inhibited by metabolic inhibitors.
- Takes place in sieve tubes with the help of adjacent companion cells.

19. Compare the functioning of alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning?

Ans: **AIVEOLI:**

- Alveoli are balloon like structures found in the lungs.
- The thin walled alveoli contain an extensive network of blood vessels.
- Alveoli provide a large surface area, where exchange of gases can take place.
- (iv)The phenomenon of diffusion is employed in exchange of gases in alveoli.
- A large number of alveoli are present in lungs.

NEPHRONS:

- a. Nephrons are long, coiled tubule-like structures present within kidneys.
- b. It contains a bundle of blood capillaries called glomerulus. The tubular part of nephron also contains blood vessels for reabsorption of useful substances.
- c. Nephrons help in filtering waste from blood, so that only harmful products are eliminated.
- d. Nephrons apply selective reabsorption of useful substances into the blood capillaries.
- e. Nephrons are very small in size, but are large in number in each kidney.

CHAPTER 7 CONTROL AND COORDINATION PAGE-125

1. What are the difference between a reflex action and walking?

Ans: The differences between a reflex action and walking are as follows:

Reflex action:

- a. It is spontaneous and involuntary response to a stimulus.
- b. It is regulated by spinal cord.
- c. It increases the survival and protective values of an organism.

Walking:

- a. It is acquired through learning and is a voluntary response.
- b. It is coordinated by brain.
- c. It is concerned with the locomotion.

2. What happens at the synapse between two neurons?

Ans: Synapse is defined as the point of contact between the terminal branches of axon of one neuron with the dendrite of another neuron. At synapse the nerve ending of a nerve cell converts the nerve impulse into some chemical substance that travels through the gap towards the dendrite of the succeeding neuron.

3. Which part of the brain maintains posture and equilibrium of the body?

Ans: Cerebellum, which is a part of hindbrain, maintains posture and equilibrium of the body.

4. How do we detect the smell of an agarbatti (incense stick)?

Ans: The smell of an agarbatti reaches the neurons of olfactory receptor of nose. There it causes the generation of nerve impulses that reach the olfactory lobes of the forebrain to produce the sensation of smell.

5. What is the role of the brain in reflex action?

Ans: Reflex action is a sudden involuntary response which does not involve thinking. The actual reflex action is carried out by spinal cord, but the action is registered in cerebral brain just for memory.

PAGE 128

1. What are plant hormones?

Ans: Plant hormones are organic substances produced naturally in higher plants. They control growth and other physiological functions of the plants.

2. How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?

Ans: **Movement of leaves:**

- a. This movement is independent of growth.
- b. Stimulus is touch.
- c. Movement is not directional.
- d. Movement is neither away nor towards the stimulus.

Movement of shoot:

- This movement is dependent on growth.
- Stimulus is light.
- Movement is directional.
- Movement is towards the light.

3. Give an example of a plant hormone that promotes growth.

Ans: Auxin

4. How do auxins promote the growth of a tendril around a support?

Ans: Auxins are plant hormones which are synthesized at the tip of the shoot. When tendril comes in contact with a support, auxin stimulates faster growth of the cells on the opposite sides. Thus, the tendril forms a coil around the support.

5 Design an experiment to demonstrate hydrotropism.

Ans: **Aim:** To demonstrate hydrotropism

Materials required: seeds of peas, a deep tray, sand, a porous flower pot.

Procedure:

- Fill the tray with sand and insert some seeds in it.
- Make a pit in the sand and insert the porous pot in it.
- Fill the porous pot with water.
- Leave the set up for about a week.

Observation: After a week when seeds are taken out, it is observed that roots grow in the direction of the porous pot. This shows hydrotropic movement in roots.

PAGE 131**1. How does chemical coordination takes place in animals?**

Ans: In animals, chemical coordination takes place with the help of hormones. These hormones are secreted by endocrine glands and coordinate the activities of living organisms and also their growth.

2. Why is the use of iodised salt advisable?

Ans: Iodised salt contains iodine, which is an essential element for the synthesis of thyroxine hormone by thyroid gland. Deficiency of iodine in our body causes goitre. Hence, iodised salt is advised in our diet.

3. How does our body respond when adrenaline is secreted in to the blood?

Ans: Adrenaline hormone is secreted in large amounts when a person is frightened, or mentally disturbed. When it reaches the heart, it beats faster to supply more oxygen to our muscles. The breathing rate also increases because of the contractions of diaphragm and the rib muscles. It also raises the blood pressure and allows more glucose to enter into the blood. All these responses together enable our body to deal with the emergency situations.

4. Why are some patients of diabetes treated by giving injections of insulin?

Ans: Diabetes is caused due to less or no secretion of hormone insulin by pancreas. In such a person, blood sugar level is high. Insulin converts extra sugar present in blood into glycogen. Thus patients suffering from diabetes are given insulin injection to control their blood sugar level.

EXERCISES:

1. Ans :- (d) Cytokonin
2. Ans:- (b) Synapse
3. Ans:- (d) All of the above

4. What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?

Ans: The receptors in our body collect information about changes in the environment around us in the form of stimuli. They are located in our sense organs such as the inner ear, nose, eye, etc. These then pass the information in the form of nerve impulses to central nervous system (spinal cord and brain) where message is interpreted and instructions are sent to effectors which reveal responses. When receptors do not work properly, the environment stimuli are not able to create nerve impulses and body doesn't respond.

5. Draw the structure of a neuron and explain its function.

Ans: Diagram: (structure of neuron-refer textbook)

Neurons are nerve cells which are functional units of the nervous system. Neurons consist of three main parts:- Dendrites, Axons and Cell body.

Dendrites: Detects information and sends it to cell body.

Cell body:- Maintains growth of the cell.

Axon:- Conducts messages away from cell body and signal to the next neuron.

6. How does phototropism occur in plants?

Ans: Directional movements and growth of plants in response to light is called as phototropism. The shoot respond by bending towards light (positive phototropism) and the roots respond by bending away from the light. (negative phototropism).

7. Which signals will get disrupted in case of a spinal cord injury?

Ans: In case of spinal cord injury, signals for reflex actions and involuntary actions will get disrupted.

8. How does chemical coordination occur in plants?

Ans: In plants, chemical coordination occurs with the help of plant hormones (phytohormones). Different plant hormones help to coordinate growth, development, and response to the environment. They are synthesized at places away from where they act and diffuse to the area for action. For example, auxin promotes cell growth, gibberellins promote stem growth, cytokinins promote cell division and abscisic acid inhibits growth and its effects include wilting of leaves.

9. What is the need for a system of control and coordination in an organism?

Ans: All the living organisms need a well-organised system of control and coordination. It is necessary that various organs of the body of an organism work together in a proper manner for proper functioning to a stimulus. Responding to stimuli is a characteristic property of all living organisms.

10. Tendrils encircle or coil around the object in contact with it. Elaborate.

Ans: The part of the tendril in contact with the support doesn't grow as fast as the other parts of a plant. It coils around the support with the help of plant hormone called auxin. This causes the tendril to coil around the support.

11. How does chemical coordination occur in plants? Explain with the help of three examples.

Ans: Chemical coordination in plants occurs with the help of plant hormones. Plant hormones are the chemical compounds, which help the plant to coordinate the growth, development and responses to the environment. They are synthesized at places away from where they act and diffuse to the area for action.

Examples:

- (i) Cytokinins promote cell division.
- (ii) Auxins help in cell elongation.
- (iii) Gibberellins help in the growth of the stem.

12. "Brain and spinal cord are two vital organs of our body". How is our body designed to protect them?

Ans: Brain and spinal cord are two vital organs of our body. They are necessary for the proper functioning of our body. In human beings, brain is protected by cranium (skull) and it is surrounded with a fluid substance which helps in the absorption of damage and spinal cord is protected by the vertebral column or the backbone.

13. State how concentration of auxin stimulates the cell to grow longer on the side of the shoot which is away from light?

Ans: When the growing plants detect light, a hormone called auxin, synthesized at the shoot tip, helps the cells to grow longer. When light is coming from one direction of the plant, auxin diffuses towards the shady side. This concentration of auxin stimulates the cell to grow longer on the side of the shoot which is away from light. Thus, the plant appears to bend towards light.

14. Which is the main thinking part of the brain? State how it functions.

Ans: 'Forebrain' or the Cerebrum is the main thinking part of the brain. Its functions are as follows:

- a. It controls feeling of thirst, hunger, and many other voluntary actions.
- b. It is specialised for hearing, sight and smell.
- c. It helps in relating the information.

15. How are involuntary actions and reflex actions different from each other?

Ans: Involuntary action:-It is the set of muscle movement which do not require thinking. But it is controlled by brain. For example, beating of heart. While on the other hand, the reflex action is rapid and spontaneous action in response to any stimulus which doesn't involve brain. For example, blinking of eyes.

16. Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

Ans: Nervous control:

- a. It consists of nerve impulse between Peripheral Nervous System (PNS), Central Nervous System (CNS), and brain.
- b. Time of response is very short.
- c. Nerve impulse is not specific in their action.
- d. The flow of information is rapid.

Hormonal control:

- a. It consists of endocrine system which secretes hormones directly into the blood.
- b. The time of response is very long.
- c. Each hormone has specific actions.
- d. The flow of information is very slow.

17. What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?

Ans: The movement in a sensitive plant is a response to stimulus (touch) which is an involuntary action. A plant doesn't have a special tissue for transfer of information or specialised protein for movement. Whereas movement in our legs is a voluntary action. Animal cells have specialised protein which help muscles to contract.

*****The End*****