FIRST TERM MODEL QUESTION PAPER 2024 WITH ANSWER KEY SET 2

BIOLOGY - Standard IX

Time: 1.5 hours

Max. Marks: 40

(Prepared by www.educationobserver.com)

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1. 15 minutes is given as cool-off time.
2. This time is to be used for reading the question paper.
3. You are not supposed to write anything during the cool-off time.
4. Attempt the questions according to the instructions.

Section A: Multiple Choice Questions (MCQs) [1 mark each]

1. Which of the following organelles is responsible for photosynthesis in plants?
   a) Mitochondria
   b) Ribosome
   c) Chloroplast
   d) Nucleus
2. The movement of ions against their concentration gradient across the cell membrane is called: a) Diffusion
   b) Active transport
   c) Osmosis
   d) Facilitated diffusion
3. What is the primary product of the dark phase of photosynthesis? a) Oxygen
   b) ATP
   c) Glucose
   d) Water
4. Which of the following is a biotic component of the ecosystem? a) Soil
   b) Water
   c) Plants
   d) Sunlight
5. The term "plasmolysis" refers to: a) The bursting of a cell
   b) The shrinking of the cytoplasm away from the cell wall
   c) The division of the nucleus
   d) The synthesis of new molecules

Section B: Short Answer Questions (Answer any 4 out of 5) [2 marks each]

1. What is facilitated diffusion, and how is it different from simple diffusion?

2. Mention any two factors affecting the rate of photosynthesis.
3. Define catabolism and provide an example.
4. Explain the importance of homeostasis in living organisms.
5. What are the products of photosynthesis, and how are they utilized by plants?

Section C: Descriptive Questions (Answer any 4 out of 5) [3 marks each]

1. Draw and explain the structure of a plant cell, labeling key organelles involved in metabolism.
2. Describe the role of enzymes in metabolic processes with examples.
3. How do guard cells regulate the opening and closing of stomata during photosynthesis?
4. Explain the process of osmosis with the help of a labeled diagram.
5. Discuss the importance of the plasma membrane in maintaining cellular integrity.

Section D:

1. You conducted an experiment with a raw egg and a boiled egg to observe permeability. Describe your observations and explain the differences in permeability between the two.
2. Design an experiment to demonstrate the effect of light intensity on the rate of photosynthesis in a water plant. Include the steps and expected results.
3. Explain active transport with a real-life example, such as the sodium-potassium pump in nerve cells.
4. Describe how plants adapt to varying environmental conditions to maintain homeostasis, with examples of adaptations in desert plants.
5. You placed a leaf in a test tube with alcohol and heated it to observe the removal of chlorophyll. Describe the steps and the purpose of this experiment.

Answer Key

Section A: MCQs

1. c) Chloroplast
2. b) Active transport
3. c) Glucose
4. c) Plants

5. b) The shrinking of the cytoplasm away from the cell wall

Section B: Short Answer Questions

1. Facilitated diffusion uses carrier proteins to help substances move across the cell membrane without energy, whereas simple diffusion does not require proteins or energy.
2. Light intensity and carbon dioxide concentration are two factors affecting the rate of photosynthesis.
3. Catabolism is the breakdown of complex molecules into simpler ones, releasing energy. Example: Cellular respiration breaking down glucose into carbon dioxide and water.
4. Homeostasis keeps internal conditions stable, ensuring the proper functioning of enzymes and metabolic processes.
5. The products of photosynthesis are glucose and oxygen. Plants store glucose as starch or use it for energy, and oxygen is released into the atmosphere.

Section C: Descriptive Questions

1. (Include a labeled diagram of a plant cell showing organelles like chloroplast, mitochondria, and nucleus.) Chloroplasts carry out photosynthesis, mitochondria generate energy, and the nucleus controls cell activities.
2. Enzymes speed up metabolic reactions by lowering activation energy. Example: Salivary amylase breaks down starch, and pepsin digests proteins.
3. Guard cells control stomatal opening and closing by changing turgor pressure, allowing gas exchange during photosynthesis.
4. (Include a labeled diagram showing osmosis in a plant cell.) Water moves into or out of cells depending on the surrounding solution's concentration, regulating cell turgidity.
5. The plasma membrane regulates the entry and exit of substances, maintains homeostasis, and protects the cell from its environment.

Section D:

1. The raw egg's membrane is permeable, allowing osmosis, while the boiled egg's membrane becomes impermeable due to protein denaturation, preventing osmosis.
2. Set up a water plant (e.g., Elodea) under different light intensities and measure the rate of oxygen bubbles produced. The rate increases with higher light intensity until saturation.
3. Active transport requires energy to move ions against their gradient. In the sodium-potassium pump, ATP is used to pump Na^+ out and K^+ into nerve cells, crucial for nerve impulse transmission.

4. Desert plants, like cacti, have thick stems for water storage and reduced leaves (spines) to minimize water loss, maintaining homeostasis in arid conditions.
5. The experiment involves removing chlorophyll to test for starch in the leaf, showing that photosynthesis has occurred in green areas.