FIRST TERM MODEL QUESTION PAPER 2024 WITH ANSWER KEY SET 3

BIOLOGY - Standard IX

Time: 1.5 hours

Max. Marks: 40

(Prepared by www.educationobserver.com)

---

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 processes is an example of catabolism?
   a) Photosynthesis
   b) Protein synthesis
   c) Digestion of food
   d) Cell division

2. The tissue responsible for the transport of water in plants is:
   a) Phloem
   b) Xylem
   c) Epidermis
   d) Cortex

3. The basic unit of life is:
   a) Atom
   b) Molecule
   c) Cell
   d) Tissue

4. Which organelle is known as the powerhouse of the cell?
   a) Nucleus
   b) Chloroplast
   c) Mitochondria
   d) Ribosome

5. In which of the following does diffusion occur?
   a) Only solids
   b) Only liquids
   c) Only gases
   d) Solids, liquids, and gases

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

1. What is plasmolysis? Provide an example of where it occurs in plants.
2. Explain the difference between autotrophic and heterotrophic nutrition.
3. Mention any two functions of the cell membrane.
4. How do stomata contribute to the process of photosynthesis?
5. Define endocytosis and explain its significance in cell functioning.

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

1. Describe the phases of photosynthesis and explain where each phase takes place.
2. Discuss the role of enzymes in cellular metabolism with examples.
3. Explain how plants absorb water and minerals from the soil.
4. Describe the process of diffusion and its importance in living organisms.
5. How does the structure of a leaf support efficient photosynthesis?

Section D:

1. You placed a raw potato slice in saltwater and freshwater. Describe what happens to the potato in each solution and explain the reason behind it.
2. Design an experiment to measure the effect of temperature on the rate of photosynthesis in a plant. Explain the setup and expected results.
3. Explain how active transport is essential for nutrient absorption in plants, using the example of root hair cells.
4. How would you demonstrate the presence of starch in a leaf using an iodine test? Describe the steps involved.
5. Explain how homeostasis is maintained in animals through the regulation of body temperature, providing examples of both cooling and heating mechanisms.

Answer Key

Section A: MCQs

1. c) Digestion of food
2. b) Xylem
3. c) Cell

4. c) Mitochondria
5. d) Solids, liquids, and gases

Section B: Short Answer Questions

1. Plasmolysis is the process where the cell membrane pulls away from the cell wall due to water loss in a hypertonic solution. Example: Wilted plant cells in saltwater.
2. Autotrophic nutrition involves organisms producing their own food (e.g., plants through photosynthesis), while heterotrophic nutrition involves organisms depending on others for food (e.g., animals).
3. The cell membrane regulates the entry and exit of substances and maintains the internal environment.
4. Stomata allow gas exchange and water vapor release, which are essential for photosynthesis.
5. Endocytosis is the process where the cell membrane engulfs external materials to bring them into the cell, crucial for nutrient intake and defense.

Section C: Descriptive Questions

1. The light phase occurs in the grana, where light energy is converted into ATP and splits water. The dark phase occurs in the stroma, where glucose is synthesized using hydrogen and carbon dioxide.
2. Enzymes lower activation energy, speeding up reactions like digestion (e.g., amylase breaking down starch) and respiration (e.g., enzymes in glycolysis).
3. Water and minerals are absorbed by root hair cells through osmosis and active transport, moving through the xylem to other plant parts.
4. Diffusion is the passive movement of molecules from high to low concentration, crucial for processes like oxygen intake and waste removal in cells.
5. Leaves are broad and flat, maximizing sunlight absorption, with chloroplasts concentrated in mesophyll cells for efficient photosynthesis.

Section D: Application Level and Experiment Description Questions

1. In saltwater, the potato shrinks due to water loss (exosmosis), while in freshwater, it swells as water enters (endosmosis).
2. Set up a plant under varying temperatures with controlled light and CO2 levels. Measure oxygen production or starch formation. The rate of photosynthesis increases with temperature up to a point, then decreases due to enzyme denaturation.
3. Active transport allows root hair cells to absorb minerals like potassium from soil against their concentration gradient using ATP.

4. Boil a leaf in water, then alcohol, to remove chlorophyll. Place it in iodine solution. The presence of starch is indicated by a blue-black color.
5. Homeostasis is maintained through sweating to cool down or shivering to produce heat, regulating body temperature according to environmental changes.