KPK Class 11 Biology Conceptual Questions – Chapter 10

Form and Functions in Plants

Q1: Why do insectivorous plants depend on insects?

Answer:

Insectivorous plants depend on insects primarily for nutrition. These plants often grow in nutrient-poor soils, particularly low in nitrogen. By capturing and digesting insects, they obtain essential nutrients like nitrogen and phosphorus, which are crucial for their growth and development.

Q2: What do you mean by water potential?

Answer:

Water potential is the measure of the potential energy of water in a system compared to pure water. It determines the direction of water movement. It is affected by solute potential (osmotic pressure) and pressure potential (turgor pressure). Water moves from regions of higher water potential to regions of lower water potential.

Q3: Differentiate between mesophytes and xerophytes.

Answer:

- Mesophytes: Plants that thrive in moderate environments with ample water supply. They have well-developed root systems and stomata for efficient water uptake and gas exchange. Examples include beans and roses.

- Xerophytes: Plants adapted to dry, arid environments with limited water. They have specialized structures such as thick cuticles, reduced leaf surface area, and deep root systems to minimize water loss. Examples include cacti and succulents.

Q4: How does turgor provide support to herbaceous plants?

Turgor pressure, created by water filling the central vacuole of plant cells, provides structural support to herbaceous plants. The pressure pushes the cell membrane against the cell wall, maintaining cell shape and rigidity, which supports the plant and keeps it upright.

Q5: Differentiate between primary and secondary growth in plants.

- Primary Growth: Refers to the increase in length of the plant due to the activity of the apical meristems at the tips of roots and shoots. It results in the elongation of stems and roots.

- Secondary Growth: Involves an increase in girth or thickness of the plant, primarily due to the activity of lateral meristems such as the vascular cambium and cork cambium. It is common in woody plants and contributes to the formation of secondary xylem (wood) and phloem.

Q6: Differentiate between primary and secondary growth in plants.

- Primary Growth: Involves the elongation of shoots and roots, leading to an increase in the plant's height and length. It occurs at the apical meristems (tips of roots and shoots) and results in the formation of new tissues like primary xylem and phloem.

- Secondary Growth: Involves an increase in the thickness or girth of the plant. It occurs in the lateral meristems, namely the vascular cambium and cork cambium. This growth results in the formation of secondary xylem (wood) and secondary phloem, contributing to the plant's increased diameter.

Q7: Briefly describe the mechanism of formation of annual rings in plants.

Annual rings are formed due to the variation in the growth rate of xylem tissues throughout the year. During the growing season, vascular cambium produces large, thin-walled cells, forming the earlywood or springwood. In the later part of the season, growth slows, and the cambium produces smaller, thicker-walled cells, forming the latewood or summerwood. The contrast between these two types of wood creates distinct annual rings visible in the stem or trunk of trees.

Q8: List the adaptations in plants to cope with low temperatures.

1. Antifreeze Proteins: Some plants produce proteins that prevent ice crystal formation within cells.
2. Modified Leaves: In some species, leaves are modified into scales or are reduced to minimize water loss and damage from frost.
3. Increased Solute Concentration: Plants may accumulate solutes like sugars and other compounds to lower the freezing point of their cell fluids.
4. Growth Form Changes: Many plants grow as low, compact forms to avoid exposure to extreme temperatures.
5. Dormancy: Some plants enter a dormant state to survive harsh winter conditions.
6. Protective Structures: Plants may develop thick bark, insulating tissues, or cover leaves with hairs or wax to reduce heat loss.