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SOCH BADLO BY MAK

Contact WhatsApp Number: +92 331 5014353

Section-II

Questions With Answers

Q.1 What are carnivorous plants? Give examples.

Ans. Carnivorous plants are photosynthetic autotrophs. They have developed adaptations to thrive in nutrient-deficient environments by incorporating insects into their food. They have modified leaves that serve as traps for capturing and digesting insects.

Examples include the Pitcher Plant (*Nepenthes pupurea*), Venus Flytrap (*Dionaea muscipula*), and Sundew (*Drosera intermedia*).

Q.2 Define osmosis and diffusion.

Ans. Osmosis is the movement of water from an area of higher concentration to an area of lower concentration through a semipermeable membrane.

Diffusion is the movement of molecules from an area of higher concentration to an area of lower concentration until equilibrium is reached, occurring in gases and liquids.

Q.3 What is water potential?

Ans. Water potential (Ψ_w) is a measure of the potential energy in water, enabling it to move from one place to another. It is expressed in units of pressure and indicates the direction of water movement. Pure water has the highest potential

of zero (0 MPa), and the potential of all other solutions or cells is less than zero, indicating a negative range.

Q.4 Why does exchange of gases occur more efficiently in air than in water?

Ans. The exchange of gases occurs more efficiently in air than in water due to the higher diffusivity of gases in air. In water, the diffusion rate of gases is slower, reducing the efficiency of gas exchange compared to air.

Q.5 Name the hormones involved in each of the following physiological processes:

- Ans.**
- (a) Germination of seeds: Gibberellins
 - (b) Stem elongation: Gibberellins
 - (c) Ripening of fruits: Ethylene
 - (d) Abscission of leaves: Absciscic acid (ABA)
 - (e) Dormancy of seeds: Absciscic acid (ABA)

Q.6 Differentiate between:

Ans. **Collenchyma and Sclerenchyma:** Collenchyma cells provide flexible support, especially in growing regions of the plant and have thicker cell walls, particularly at the corners. Sclerenchyma cells provide rigid support and strength, are mature, dead, and have very thick lignified walls.

Photoperiodism and Phototropism:

photoperiodism is the physiological reaction of organisms to the length of day or night. It is most notably used by plants to time flowering and other developmental processes. Phototropism is the growth of an organism in response to a light stimulus, where plants can grow towards or away from the light.

Transpiration and Evaporation: Transpiration is the process of water movement through plants and its evaporation from aerial parts, such as from leaves but also from stems and flowers. Evaporation is a more general process where liquid water turns into vapor and can occur from any surface, not just living organisms.

Q.7 Define:

Ans. Nutrition: Nutrition involves all processes by which organisms take in and utilize food substances necessary for growth, reproduction, and maintenance of health.

- **Nutrients:** Nutrients are substances that provide nourishment essential for the maintenance of life and for growth.

- **Osmotic Adjustment:** Osmotic adjustment, or osmoregulation, is the process by which cells regulate the osmotic pressure in their cytoplasm to maintain homeostasis in varying water and salt conditions.

- **Primary Growth:** Primary growth is the growth that occurs as a result of cell division at the tips of stems and roots, causing them to elongate, and gives rise to primary tissues.

- **Secondary Growth:** Secondary growth involves the increase in thickness or girth of the plant, facilitated by the vascular cambium, and is common in dicots and gymnosperms.

- **Homeostasis:** Homeostasis is the state of steady internal physical and chemical conditions maintained by living systems. This is a fundamental concept in biology.

- **Cohesion and Adhesion:** Cohesion refers to the sticking together of alike molecules, such as water molecule-to-water molecule.

Adhesion refers to the clinging of unlike molecules, such as water molecules to plant cell walls.

Q.8 Why is support needed in terrestrial life?

Ans. Support is needed in terrestrial life because organisms on land are subject to gravity and need structural strength to maintain their body structure against gravity, support their weight,

and withstand environmental stresses like wind and rain.

Q.9 What is the path of salts and water in vascular plants?

Ans. In vascular plants, water and salts absorbed by the roots travel through the xylem. The movement starts in the root hair cells, passes through the root cortex, enters the xylem, and then is transported upwards through the stem to the leaves.

Q.10 How does symplast differ from apoplast?

Ans. Symplast: The symplast pathway involves the movement of water and solutes through the cytoplasm of plant cells interconnected by plasmodesmata. This pathway allows for selective permeability and regulatory control over material transport.

- **Apoplast:** The apoplast pathway involves the movement of water and solutes through the cell walls and the spaces between cells. This pathway is less selective and is not under tight cellular control.

Q.11 Enlist the names of supporting tissues in plants:

Ans. Collenchyma: Provides flexible support, particularly in regions of growth.

- **Sclerenchyma:** Provides more rigid support with cells that are typically dead at maturity and have thick, lignified walls.

- **Xylem:** Also serves a supportive role due to its thick, lignified walls which help to support the plant structurally.

Q.12 What are annual rings? Define primary and secondary growth in plants.

Ans. Annual Rings: These are layers of growth that can be observed in a cross-section of a tree trunk, each ring typically representing one year of growth. They are formed due to variations in growth speed through the seasons, visible as rings of different widths.

- **Primary Growth:** This type of growth results in the elongation of the plant and occurs at the tips of roots and shoots, facilitated by the apical meristems.

- **Secondary Growth:** This growth increases the thickness or girth of the plant. It occurs due to the activity of the lateral meristems (vascular and cork cambiums) and is common in dicots and gymnosperms, leading to the formation of wood and bark.

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Chapter 9 »» Diversity in Plant Functions

Q.13 What happens to the primary tissue of a stem when secondary growth occurs?

Ans. When secondary growth occurs, the primary tissues, such as the primary xylem and phloem, get pushed outward and inward respectively. As the vascular cambium produces more tissues, the primary xylem and phloem can become crushed and cease to function as new xylem and phloem take over their roles.

Q.14 Why does the wood of many tropical trees lack annual rings?

Ans. Many tropical trees lack distinct annual rings because they grow in equatorial climates that do not have marked seasonal changes that influence growth rates. Thus, growth is more uniform, and distinct rings do not form.

Q.15 Why is hardwood more desirable than softwood for making furniture?

Ans. • Hardwood is generally more desirable than softwood for making furniture because it is

typically denser and has a finer grain, making it more durable and resistant to wear. Hardwoods also often provide a better finish and are more aesthetically pleasing due to their varied grain patterns and colors.

Q.16 What are the types of movement in plants in response to stimuli?

Ans. Tropisms: Directional movements towards or away from a stimulus. Examples include phototropism (light), gravitropism (gravity), and thigmotropism (touch).

- **Nastic Movements:** Non-directional response to stimuli, such as nyctinasty (movement in response to day-night cycle) and thigmonasty (response to touch).
- **Growth Movements:** Movements caused by growth, often in response to environmental stimuli.
- **Hydraulic Movements:** Movements based on changes in water pressure within plant cells, often seen in the opening and closing of stomata.