Give Short Answers of the Following Questions

1. Differentiate between macronutrients and micronutrients?

Ans. Macronutrients and Micronutrients:

Macronutrients	Micronutrients
• Macronutrients are required in larger quantities for plant growth • Examples Include nitrogen, phosphorus, and potassium.	• Micronutrients are required in smaller amounts but are still crucial. • Examples Include iron, zinc, and boron.

2. What is water potential?

Ans. Water potential:

- Water potential measures the energy status of water, which makes the water molecules to move from higher to lower concentration.
- Influenced by solute concentration, pressure, and gravity.
- Water moves from high to low water potential**.**

3. What are the main three pathways for the movement of water between plant cells?

Ans. (i) The Apoplast Pathway:

- It is a continuous pathway that involves a system of adjacent cell walls in the plant roots.
- **Limitation:** The apoplast pathway becomes discontinuous in the endodermis in the roots due to the presence of Casparian segments.

(ii) The Symplast Pathway:

- In symplast pathway, water and minerals move through interconnected protoplasts of root cells.
- The protoplasts of neighbouring cells are interconnected through plasmodesmata which are cytoplasmic strands that extend through pores in adjacent cell walls.
- **Limitations:** The symplast pathway is less important, except for minerals in the region of endodermis.

(iii) The Vacuolar Pathway:

- In vacuolar pathway, water and minerals move through cell membranes, cytoplasm and tonoplast (membranes of vacuoles) and vacuoles.
- They move from vacuole to vacuole and bypass the symplast pathways.
- **Limitation:** Movement in vacuolar pathway negligible.

4. Differentiate between hypertonic and hypotonic solution?

Chapter	8 Plant Physiology	Class	1st Year	Subject	Biology

Ans. Hypertonic and Hypotonic:

Hypertonic	Hypotonic
• The more concentrated external environment compared to the cell concentration is termed as hypertonic environment. • The hypertonic environment causes cell solution concentrated and shrink the cell due to loss of water. • This condition is also harmful for cell.	• If the external environment has lower solute conc. Compared to the internal cell concentration, it is known as the hypotonic environment. • The hypotonic environment osmotically causes entry of water into the cell and diluted the cell solution. • The cell in hypotonic environment becomes turgid due to gain of water. Thus it may be harmed.

5. What are halophytes?

Ans. Halophytes:

- Plants which grow in high salt concentrations.
- Found in coastal or saline environments.
- Specialized mechanisms to tolerate or exclude salt.

6. Differentiate between long day plants and short day plants?

Ans. Long Day Plants and Short Day Plants:

Long Day Plants	Short Day Plants
• Flowering induced by dark periods shorter than a critical length, e.g., henbane 13h. (Under natural conditions equivalent to days longer than a critical length, e.g., henbane 11h). • Examples: henbane (Hyoscyamus niger), snapdragon cabbage, spring wheat, spring barley.	• Flowering induced by dark periods longer than a critical length, e.g., cocklebur 8.5 h; tobacco 10-11h. (under natural conditions equivalent to days shorter than a critical length e.g., cocklebur 15.5 h; tobacco 13-14h) • Examples: cocklebur (xanthium), chrysanthemum, soyabean, tobacco, strawberry.

7. Write down the phases of plant growth?

Ans. (i) Cell Division:

- The cells of apical meristems undergo divisions and the number of cells is increased. It happens at the tips of apical meristems of root and shoot.

- The area of apical meristem where cell division occurs is called zone of cell division. In this zone, cells are non-vacuolated and small. These cells have spherical nuclei in the centre of cytoplasm.

(ii) Cell Elongation:

- After the formation of new cells, their volume increases due to uptake of water. Plasticity of cell wall increases and wall pressure is reduced. It happens at a little distance from the tips of apical meristems.
- The area where cell elongation occurs is called zone of cell elongation. In this zone, cells are vacuolated and large.

(iii) Cell Differentiation:

- After the cells have got their final size and shape, elongation stops and cells are specialized to perform specific functions.
- Their cell wall become thicker and many new structural features develop.
- It happens in the area next zone of elongation. This area is called of cell differentiation. In this zone, cells are fully differentiated and each type of cell performs specific function.

8. Differentiate between Vernalin and Florigen.

Ans. Vernalin and Florigen:

Vernalin	Florigen
• A hypothetical substance for vernalization.	• A hormone-like substance promoting flowering.

9. Differentiate between Thigmotropism and Geotropism

Ans. Thigmotropism and Geotropism:

Thigmotropism	Geotropism
• It is the movement in response to stimulus of touch, for example climbing vines. • When they come in contact with some solid object, the growth on the opposite side of contact increases and the tendril coils around the support.	• It is the movement of plant parts in response to gravity. • Roots display positive geotropism and shoots negative geotropism.

10. How intercalary meristem is different from apical meristem?

Ans. Apical Meristems and Intercalary Meristems:

Apical Meristems	Intercalary Meristems
• They are found at the tips of root and shoots. • They are primarily responsible for the extension of the plant body. • These are perpetual growth zones found and are responsible for the increase in the number of cells at the tips of roots and stems. They play an important role in primary growth.	• They are separated from the apex by permanent tissues. • They are situated at the bases of internodes in many plants such as grasses and play an important role in the production of leaves and flower. These are temporary.