

INSTRUCTIONS: Attempt Any FIVE Questions in All. Be Precise and to the Point. Attempt ONE Question Each from Each Section 1, 2, 3 and TWO Questions from Section 4.

SECTION-1

- Q No. 1:**
- a) Discuss biological importance of water for plants. Also describe the path of water transport in plant body.
 - b) What are the physical forces and factors that drive the transport of water and minerals over a range of distances?
 - c) Define osmotic, turgor and wall pressures. What are the components of water potential? Discuss in detail.
 - d) What is the difference between evaporation and transpiration? Discuss the factors that affect transpiration rate in desert plants.
- (5x4=20 Marks)**

- Q No. 2:**
- a) Write a note on physiological and ecological considerations of photosynthesis.
 - b) Discuss the mechanism of action and role of brassinosteroids in plants.
 - c) Write a note on blue-light responses keeping in view stomatal movements and morphogenesis.
 - d) Describe the role of secondary metabolites in plant defense.
- (5x4=20 Marks)**

SECTION-2

- Q No. 3:**
- a) Differentiate between biotic and abiotic factors. How can abiotic factors affect plant distribution?
 - b) Forest ecosystem is the most productive. Comment.
 - c) Discuss different sampling techniques to evaluate population dynamics.
 - d) Differentiate *ex-situ* and *in-situ* conservation. Describe the role of *ex-situ* conservation with special reference to Pakistan.
- (5x4=20 Marks)**

- Q No. 4:**
- a) Define biome. Also discuss different vegetation zones in Punjab with reference to dominant plant species.
 - b) How does salinity affect productivity of crop species? How can we reclaim salt-affected lands?
 - c) How can we conserve our natural resources from soil, air and water pollution?
 - d) What is soil erosion? Discuss its causes and control in the Punjab region.
- (5x4=20 Marks)**

SECTION-3**Q No. 5:**

- a) Write a note on genetic control of meiosis.
- b) Describe the structure and function of plant nucleus with the help of suitable diagrams.
- c) Discuss role of chromosomal aberrations in cell and tissue culture.
- d) Discuss in detail the cytology of vacuoles.

(5x4=20 Marks)**Q No. 6:**

- a) What are the cytological events of cell division?
- b) Describe the relationship between Golgi apparatus, endoplasmic reticulum and nuclear envelop.
- c) Write a note on transportation of material between the cells.
- d) What is the composition and ecological significance of cuticle and wax in plants?

(5x4=20 Marks)**SECTION-4****Q No. 7:**

- a) Discuss the role of sexual hybridization and wide crosses in plant breeding.
- b) What is polyploidy? Discuss its role in crop production.
- c) Write a note on genetic basis of alternation of generation in lower plants.
- d) Differentiate between transduction and transformation.

(5x4=20 Marks)**Q No. 8:**

- a) Discuss the significance of crossing over in plants.
- b) Write a note on structure and chemical nature of genes.
- c) What is epigenetics? Discuss the role of epigenetic modifications.
- d) Write a note on test cross, reciprocal cross and back cross.

(5x4=20 Marks)**Q No. 9:**

- a) Explain evolutionary records and methods of reconstruction in plants.
- b) Write a note on origin and early evolution of plants.
- c) Discuss the evolutionary genetics of self-compatibility.
- d) Describe the importance of artificial selection for improving crop yield.

(5x4=20 Marks)**Q No. 10:**

- a) Discuss major evolutionary events and trends in terrestrial plants.
- b) Differentiate between domestication and cultivation.
- c) Discuss merits and demerits of Darwinism and Lamarckism?
- d) Describe the importance of artificial selection for improving crop yield.

(5x4=20 Marks)