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Total Pages : 3

**325501**

**December 2023**

**B.Sc. (Life Sciences) Vth SEMESTER**

**Botany V Plant Physiology (BLS 501)**

Time : 3 Hours]

Max. Marks : 75

*Instructions :*

1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other,

**PART-A**

1. (a) What is water potential? Discuss the components that contribute to water potential in a cell. (1.5)
- (b) Differentiate between competitive and non-competitive enzyme inhibition with suitable examples. (1.5)
- (c) Write the key roles of minerals - Nitrogen, Magnesium and Phosphorus in metabolism. (1.5)
- (d) Differentiate between macronutrients and micronutrients with suitable examples. (1.5)
- (e) What is photomorphogenesis? Name three key photoreceptors in plants. (1.5)

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- (f) Write a note on Kranz Anatomy in  $C_4$  plants and its significance. (1.5)
- (g) Describe the apoplastic and symplastic pathways of Movement of water and minerals in plant. (1.5)
- (h) Discuss the role of abscisic acid in stomatal closure. (1.5)
- (i) Differentiate between short-day and long-day plants. (1.5)
- (j) What are anaplerotic reactions? Discuss their significance in respiration. (1.5)

### PART-B

2. (a) Define photosynthetic unit. Draw the structures of photosystem I and II. Write the mechanism of non-cyclic photophosphorylation (Z scheme) in detail. (10)
- (b) Explain transpiration pull theory of water uptake by plants along with suitable diagrams. (5)
3. (a) Explain in detail the pressure flow model of phloem transport in plants. Draw the necessary diagrams. (10)
- (b) State and explain Michaelis-Menten equation of enzyme kinetics. (5)
4. Show the fate of a one glucose molecule through glycolysis, Kreb's cycle and electron transport chain during cellular respiration in plants with suitable pathways/diagrams and reactions. Also, show the net gain of ATP during the entire process. (15)

5. (a) Describe the signaling mechanism of auxins in plants. (5)
- (b) Describe the structure, mechanism of action and physiological roles of phytochrome in plants. (10)
6. What is biological nitrogen fixation? Describe the mechanism (biochemistry) of symbiotic nitrogen fixation. Show nodule formation and enzymatic reactions of nitrogen fixation. (15)
7. Write short notes on any *three* :
- (a) Chemiosmosis theory (with diagram).
- (b) Transport proteins in Plasma membrane (with diagram).
- (c) Mechanism of enzyme catalysis.
- (d) Vernalisation.
- (e) Crassulacean Acid Metabolism pathway. CAM (15)