Use Separate Answer Script for each Group

M.Sc. Examination, 2017
Semester – II
Botany
Course - MBC-22

Time: 3 Hours **Full Marks: 48**

Questions are of value as indicated in the margin.

Group-A (Plant Physiology)

Answer ***any three*** questions

1. Explain why: 2x4=8
   (a) C_4 plants show negligible photorespiration.
   (b) Mutation in *tmr* locus of *Agrobacterium* Ti-plasmid results in rooty tumors while that in *tms* locus results in shooty tumors.
   (c) Bidirectional transport of solutes is not possible through the same sieve element.
   (d) Application of auxin on distal side of abscission zone in leaf petiole delays abscission while that on proximal side accelerates the process.
2. Define water potential and describe how its components changes during water uptake by a cell. 'Driving force for water movement through the whole plant originates in leaves' – explain. Why is root pressure not revealed in trees under highly transpiring condition? 3+4+1=8
3. Discuss in detail the mechanism of regulation of Calvin cycle by light. What is CO_2 concentrating mechanism? Explain how C4 plants get advantage of such mechanism to increase photosynthetic productivity. 4+1+3=8
4. Describe the tryptophan-dependent and tryptophan-independent pathways for IAA biosynthesis. Discuss the mechanism of polar transport of IAA in plants with special reference to PIN proteins. 4+4=8
5. 'Short-day plants should have been called long-night plants' – justify. What experimental evidence does indicate the existence of circadian rhythm in photoperiodic time keeping? Explain the coincidence of light and *CO* gene expression during photoperiodic induction of flowering in both LDP and SDP. 3+2+3=8

Group-B (Biochemistry)

Answer ***any three*** questions

1. Illustrate the steps involving dehydrogenases in citric acid cycle. Discuss the energetics of the cycle based on the reducing equivalents generated from these reactions. Explain the roles of ATP and NADH in regulating citric acid cycle. 4+2+2=8

P.T.O.

2. Write the reactions of pentose phosphate pathway (PPP) resulting in production of pentose sugars and NADPH. State the role of NADPH in regulating the partitioning of glucose 6-phosphate between glycolysis and PPP. How is the deficiency of glucose 6-phosphate dehydrogenases related to decreased antioxidant defences? 4+2+2=8

3. Discuss the chromatographic technique to purify a certain fraction of protein A of molecular weight 20 kDa from a mixture with another protein B, 100 kDa. Explain Edman's method of protein sequencing. How will you sequence a protein of long polypeptide chain (over 100 amino acids) using this method? 3+3+2=8

4. In respect of hydrogen bonding how does α-(alpha) helix differ from β-(beta) sheet of protein? Show the enzymatic pathway of amino acid degradation leading to ammonia formation. Give an account of the role of pyridoxalphosphate during the process.

2+4+2=8

5. Write short notes on: 2x4=8
   a) Malate-aspartate shuttle
   b) Electrochemical gradient across mitochondrial membrane
   c) Gibbs free energy change (ΔG) for a reaction
   d) Tm value of DNA

_____