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Total Pages : 3

756303

December-2023

M.Sc (BOTANY)–IIIrd SEMESTER

Physiology and Biochemistry (MBOT 303)

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) Discuss the hierarchical structure of proteins. (1.5)
- (b) Differentiate between competitive and non-competitive enzyme inhibition with suitable examples. (1.5)
- (c) Write a note on Ramachandran plot. (1.5)
- (d) Differentiate between substrate-level and oxidative phosphorylation with suitable examples. (1.5)
- (e) What is photomorphogenesis? Name three key photoreceptors, in plants. (1.5)
- (f) Discuss the structure and role of aquaporins in plants. (1.5)

756303/40/111/51

91 [P.T.O.

- (g) Describe the two pathways of radial 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 is the role of light on flowering in plants? (1.5)

PART-B

2. (a) Describe the Z scheme of noncyclic photophosphorylation (light reaction) in plants with a suitable diagram. Discuss Q cycle separately using suitable diagrams. (10)
- (b) Differentiate between C3 and C4 plants. (5)
3. (a) How do chaperons play a role in protein folding? (5)
- (b) What is the typical work flow (general scheme) for protein purification, and how do researchers go about characterizing its function once purified? (10)
4. Show the fate of a one glucose molecule through glycolysis, Krebs'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) What are the specialized mechanisms used by plants (dicots and monocots) for the uptake of iron? (5)
- (b) Describe the structure, mechanism of action and physiological roles of phytochrome in plants. (10)
6. (a) Describe the ABCDE model of floral organ development in detail. (10)
- (b) Describe the signaling mechanism of gibberellic acid in plants. (5)
7. Write short notes on any *three* :
- (a) Chemiosmosis theory (with diagram).
- (b) Shuttle systems in respiration (with diagram).
- (c) Cryptochromes (structure and signalling mechanism).
- (d) Role of hormones in defence against abiotic stress.
- (e) Crassulacean acid metabolism pathway. (15)