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RLSE-106

Ph. D. IN LIFE SCIENCES (PHDLS)

Term-End Examination

December, 2024

RLSE-106 : BIOCHEMISTRY

Time : 3 Hours

Maximum Marks : 100

Note : Attempt any **five** questions. All questions carry equal marks.

1. (a) Elaborate the role of different antioxidative enzymes in the detoxification of reactive oxygen species (ROS) in plants. 15
(b) How are lipids and proteins affected by ROS ? 5
2. Discuss the regulatory role of heat shock proteins and heat shock factors in heat stress tolerance in plants. How does increase in cytosolic calcium help in adaptation to heat stress in plants ? 15+5=20

3. Enumerate the different advantages and disadvantages of phytoremediation. Add a brief note on phytostabilization and rhizofiltration. Discuss the structure of phytochelatin synthase enzyme and the functional components.

8+8+4=20

4. (a) Explain, with illustration, the model for abscisic acid signaling in stomatal guard cells. 10
- (b) What are compatible solutes ? Discuss the mechanism of action of compatible solutes during stress conditions and their role in stress mitigation in plants. 10
5. (a) Describe the origin of physical and chemical stress in plants. 10
- (b) Elucidate the different plant responses to salinity and drought stress. 10
6. Define secondary metabolites with example. Enumerate the different functions of secondary metabolites. Discuss the role of cyanogenic glycosides and glucosinolates as secondary metabolites in plants. Name any *four* terpenes and state their functions. 3+5+8+4=20

7. (a) Describe the role of different enzymes in the conversion of ammonium to amino acids in plants. 10
- (b) Discuss the process of formation of root nodules in leguminous plants. 10
8. (a) How is carbon concentrating mechanism operated in algae and cyanobacteria ?
- (b) Discuss the biochemical pathways involved in Crassulacean Acid Metabolism (CAM) and its significance. How does CAM pathway differ from C_4 pathway ? 5+15=20

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