

Botany

Paper-II

Time Allowed: Three Hours

Maximum Marks: 300

- Note:* 1. The figures in the margin indicate full marks for the questions.
2. Candidate should answer questions No. 1 and 5 which are compulsory and any **three** of the remaining questions, selecting at least **one** from each section.

SECTION – A

1. Answer any **three** of the following in not more than **250** words each:

20×3=60

- (a) Describe major phases involved in a cell division cycle in eukaryotes.
- (b) What do you mean by chromosomal aberrations? What is their significance? Describe giving suitable examples.
- (c) Describe genome structure in plants.
- (d) Write about regulation of gene expression in eukaryotes.
- (e) Write about chemiosmotic theory of ATP synthesis during photophosphorylation.

2. Write critical notes on the following:

12×5=60

- (a) Different models of membrane structure in living organisms.
- (b) Lampbrush chromosome-structure and functions.
- (c) Heterosis breeding.
- (d) CAM plants and their photo physiology.
- (e) Physical and physiological basis of seed dormancy in plants.

3. Answer the following: 15×4=60

- (a) What are DNA based molecular markers? How they can be used to study polymorphism in plants?
- (b) Male sterility and its significance in plant breeding.
- (c) Theories of organic evolution.
- (d) Biosphere reserves and their role in conservation.

4. Answer the following: 12×5=60

- (a) What is plant introduction? How it is helpful in plant breeding? Explain.
- (b) What is test of significance? How it can be carried out? Explain giving any one example.
- (c) What do you mean by analysis of variance? How it can be analyzed from Random Block Design? Explain giving any one example.
- (d) Describe methods of hardening and acclimatization of micro propagated plants.
- (e) Discuss the role of heat shock proteins in stress tolerance in plants.

SECTION – B

5. Answer any **three** of the following in not more than **250** words each:

20×3=60

- (a) Describe photorespiration and explain its significance in photosynthetic efficiency in plants.
- (b) Describe in detail the molecular basis of cell cycle.
- (c) Describe in detail the mechanism of enzyme action with special reference to current hypothesis.
- (d) What do you mean by signal transduction? How cells communicate with external environment? Explain its mechanism in detail.
- (e) Write about history, chemical nature, biosynthesis and functions of ethylene in plant growth regulation.

6. Answer the following:

15×4=60

- (a) What do you mean by bioremediation? How methods of bioremediation can solve the problem of pollution? Explain.
- (b) What is biodiversity? What are different methods of its conservation involving in situ and ex situ approaches?
- (c) Write a brief note on social forestry and its significance in afforestation.
- (d) Describe forest ecosystem with special reference to biomass production.

7. Answer the following:

12×5=60

- (a) What is Red Data Book? What is the role of IUCN in conservation of endangered plants? Explain.
- (b) What are biomes? Identify different biomes of the world and describe their characteristics.
- (c) Identify different air pollutants and describe their harmful effects on plants. Suggest control measures.

- (d) Describe enzymatic methods of isolation of plant protoplasts and their role in genetic transformation of plants.
- (e) Describe thylakoid membrane system and its role in photosynthesis in different group of organisms.

8. Write short notes on the following: 12×5=60

- (a) Nucleosome structure and organization.
- (b) What is biochemical genetics? Explain in detail.
- (c) Write about the principal steps involved in development of transgenic crops.
- (d) What do you mean by *in planta* genetic transformation? Explain with examples.
- (e) Write about the mechanism of stomatal opening and closing in plants.