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:

20x3=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:

12x5=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.