

IAS Mains Botany 1990

Paper-II

Section A

1. Answer any three of the following in not more than 200 words each:
 - a. What are peroxisomes and glyoxysomes? Present brief account of their functions in the light of modern work.
 - b. Define epistasis. Explain the pattern of interactions involved with a suitable example.
 - c. Briefly describe the cloning of eukaryotic genes in *E. coli*.
 - d. Discuss the structure and importance of polygene chromosome in the study of gene regulation.
2. Answer the following questions
 - a. Write a short account on male sterility and its significance in plant breeding.
 - b. Mention the condition required to maintain the Hardy-Weinberg equilibrium over several generations. How does the equilibrium get altered by a change in these conditions?
3. Give the characteristics that a substance must possess to be a hereditary carrier. Discuss the role of genetic code in eukaryotic protein synthesis.
4. Answer any two of the following:
 - a. Explain gene evolution by mutation through duplication.
 - b. Discuss the significance of cytoplasm inheritance and its importance in hybridization.
 - c. Present critical evidences for the concept of organic evolution.

Section B

5. Answer any three of the following in not more than 200 words each:
 - a. What is photosystem II? Discuss the structure and function.
 - b. Describe mitochondrial electron transport chain and its relation to oxidative phosphorylation.
 - c. Give the modern concept of the mechanism of stomata opening and closure.
 - d. Discuss the hormonal control of seed dormancy and germination.
6. What is C₄ photosynthesis? In what groups of plants does this occur? Explain its high efficiency with special reference to productivity.
7. Answer any two of the following:
 - a. Forest types of India
 - b. The role of micronutrient elements in plant nutrition with particular reference to zinc and manganese.

8. Answer the following questions

- a. Write briefly about the conservation of ecosystems.
- b. Give complete botanical names of the following plants, the family to which they belong, the morphological nature of the parts yielding the economic products and their uses:
 - i. Jute
 - ii. Saffron
 - iii. Teak
 - iv. Rubber
- c. discuss in brief the major centers of origin of cultivated plants in the world with particular references to origing of wheat.