

# IAS Mains Botany 2006

## Paper-II

### Section A

1. Write short notes on any three of the following in about 200 words each: ( $3 \times 20 = 60$ )
  - a. Structure of plasma membrane
  - b. Polytene chromosomes
  - c. DNA damage and repair
  - d. Molecular markers in plant breeding
2. Answer the following questions
  - a. Explain linkage and crossing-over. Describe the methods of construction of gene maps (30).
  - b. What are mutations? Describe different types of mutations and add a note on chemical mutagens (30).
3. Explain the following with suitable examples:
  - a. Techniques of breeding self-pollinated crops (20).
  - b. Protoplast culture and its importance (20).
  - c. Uses and applications of correlation and regression analysis in plant genetics (20).
4. Answer the following questions
  - a. Explain the mechanism of DNA replication (20).
  - b. Discuss cytoplasmic inheritance: (20)
  - c. Describe in brief the regulation of gene expression in eukaryotes (20).

### Section B

5. Answer any three of the following. Each part should be answered in not more than 200 words: ( $20 \times 3 = 60$ )
  - a. Discuss the role of any three trace elements in plant nutrition. Give their deficiency symptoms.
  - b. Explain the mechanisms of respiratory functions in plants.
  - c. Discuss the strategies for conservation of endemic and endangered plants.
  - d. Describe the causes and consequences of greenhouse effect
6. Answer the following questions
  - a. Describe the photosynthetic carbon assimilation in C<sub>3</sub> and C<sub>4</sub> plants (20).
  - b. Explain the factors that affect photosynthesis. Define photosynthetic efficiency of crops (20).

7. Answer the following questions

- a. Write an account of the physiological changes that occur during high temperature stress. How plants have adopted physiologically for tolerance of high temperature stress (30)?
- b. Describe the effects of metal stress on plant growth and development (30).

8. Answer the following questions

- a. Define succession. Explain different stages of succession with illustrations (30).
- b. Enumerate the structure and functions of an ecosystem (30).