

IAS Mains Botany 2002

Paper-II

Section-A

1. Answer any three of the following. Each part should be answered in not more than 200 words. $20 \times 3 = 60$
 - a. What is micro-propagation? List the various ways this technique can be used to practical advantage.
 - b. What determines a sex-linked trait? Give two examples.
 - c. Explain 'test of significance' and comment on its application in Botanical Research.
 - d. Briefly review the methods adopted for determining distance between two genes on a chromosome.
2. Describe the extra cellular matrix of a plant cell. What is the relationship of plasmodesmata to the extracellular matrix? 60
3. How is recombinant DNA produced? What applications have been found for recombinant DNA? 60
4. Distinguish between: $20 \times 3 = 60$
 - a. Transcription and translation
 - b. Spontaneous and induced mutations
 - c. Binomial Distribution and Poisson Distribution.

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. What is oxidative phosphorylation? What is its significance?
 - b. Define phototropism. What pigment (s) function as the photoreceptor for phototropism? Give evidence to support your conclusion.
 - c. What are cytokinins? Give an account of roles they play in plant growth and development.
 - d. What are biomes? Explain, with examples, how climate determines what biome occurs in a region.
6. Review the Crassulacean acid metabolism (CAM). In what significant way does CAM differ from C₄ metabolism? 60
7. Describe how plants may be injured by water stress. In what way are freezing stress and salt stress similar to water stress?
8. Give concise answers to the following: $20 \times 3 = 60$
 - a. Explain why temperate forests and woodlands are less productive and diverse than tropical forests.
 - b. How are endangered species listed in the Red Data Books?

c. What is the function of leg hemoglobin in symbiotic nitrogen fixation?