

BOTANY (Paper II)

Time Allowed : Three Hours

Maximum Marks : 300

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

There are EIGHT questions divided in two Sections.

Candidate has to attempt FIVE questions in all.

Question Nos. 1 and 5 are compulsory and out of the remaining, any THREE are to be attempted choosing at least ONE question from each Section.

The number of marks carried by a question/part is indicated against it.

Wherever any assumptions are made for answering a question, they must be clearly indicated.

Word limit in questions, wherever specified, should be adhered to.

SECTION 'A'

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| 1. (a) | What is 'RNA world' and what makes it to be considered as the precursors for the origin and evolution of cellular life? | 12 |
| (b) | How would you distinguish between reverse and suppressor mutations? | 12 |
| (c) | Briefly explain the different pathways taken by secreted proteins. | 12 |
| (d) | Give an experimental evidence to demonstrate that DNA is a genetic material. | 12 |
| (e) | What do you mean by site-specific recombination? Discuss the role of recombinase enzyme in this process. | 12 |
| 2. (a) | What do you mean by aneuploidy and what kinds of chromosomal variations are found in aneuploid plants? | 20 |
| (b) | What are transposons and how do they cause mutations? | 20 |
| (c) | Compare the different types of RNA and protein components found in the ribosomes of prokaryotes and eukaryotes. | 20 |
| 3. (a) | Explain the role of cdk and cyclin proteins in the regulation of cell cycle. | 15 |
| (b) | Compare the gene expression of lac operon in the presence and absence of its functional regulatory gene. | 15 |
| (c) | Describe the chromosomal basis of sex differentiation in plants. | 15 |
| (d) | Discuss how the discovery of infectious proteins brought a change in the concept of inheritance. | 15 |
| 4. (a) | Illustrate the fate of two homologous chromosomes that have undergone unilateral crossing-over. | 15 |
| (b) | Explain the importance of DNA–DNA hybridization techniques in the study of biodiversity. | 15 |
| (c) | What are gene markers? Explain their importance in biological studies. | 15 |
| (d) | Discuss the use of apomixes in plant breeding. | 15 |

SECTION 'B'

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| 5. (a) | What is superbug? Describe its properties and possible role in bioremediation. | 12 |
| (b) | What are ozone-depleting substances and how they cause depletion of ozone layers in stratosphere? | 12 |

	(c)	What is characteristic pathway of carbon fixation in tropical grasses and what are the advantages of the pathway?	12
	(d)	What makes the leguminous plants to grow under the nitrogen stress condition?	12
	(e)	Distinguish between passive and facilitated diffusion.	12
6.	(a)	Explain the process of anaerobic glucose catabolism and mention the mode of ATP generation during the process.	20
	(b)	What are the different IUCN threat categories of biodiversity and their implications in conservation?	20
	(c)	What is Rubisco, where is it located and what function does it serve?	20
7.	(a)	Explain the mechanism of chemiosmotic generation of ATP.	15
	(b)	What are primers? Explain their role in PCR.	15
	(c)	Discuss the ecological significance of nitrifying and denitrifying bacteria associated with biogeochemical cycle.	15
	(d)	How is light energy captured in green plants?	15
8.	(a)	Give a brief note on the concept of sustainable development.	15
	(b)	What is the principle of blotting? Give an illustrated account of the steps involved in Southern blotting.	15
	(c)	What is 'hot spot'? Describe the hot spots of India, giving names of few important species.	15
	(d)	Explain eco-regulation. Justify plant appearances and disappearances leading to climatic climax.	15