

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 strategies are employed by plants for the uptake of iron under conditions of iron stress? | 15 |
| | (b) | Describe about the factors that affect the recombination frequencies. | 15 |
| | (c) | Explain antisense RNA technology with an example. Highlight its applications. | 15 |
| | (d) | Explain the ecological significance of forests. | 15 |
| 2. | (a) | Discuss the mechanism of T-DNA transfer from <i>Agrobacterium tumefaciens</i> to host plant. | 15 |
| | (b) | Explain the concept of limiting factor in ecology. | 15 |
| | (c) | How can you identify the multigene families? Discuss the significance of identical or non-identical genes of multigene families. | 15 |
| | (d) | Present the current model for long distance transport of floral stimulus. | 15 |
| 3. | (a) | Comment on 'EPSPS' and 'Tra' genes. | 15 |
| | (b) | Explain the Theory of Age and Area. | 15 |
| | (c) | Discuss the mechanism of the regulation of gene activity in lactose operon with reference to β -galactosidase activity. | 15 |
| | (d) | What evidences support starch-statolith hypothesis for gravitropism? | 15 |
| 4. | (a) | Describe different methods of gene transfer in plants. | 15 |
| | (b) | Distinguish between monoploid and haploid and their role in evolution. | 15 |
| | (c) | Explain salient features of "The Environment Protection Act" and mention how far it is effective in maintenance of the quality of environment. | 15 |
| | (d) | What is the chemical nature of saponins? How do saponins provide defence against fungal attack on plants? | 15 |

SECTION 'B'

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| 5. | (a) | Explain interspecific and intergeneric hybridization. Comment on Raphano-brassica. | 15 |
| | (b) | What is eutrophication? What are its impacts on the ecosystem? | 15 |
| | (c) | Explain how the chromatin modification leads to genome expression. | 15 |
| | (d) | Schematically present ethylene biosynthesis in plants. Describe/illustrate the 'triple response' due to ethylene. | 15 |

6.	(a)	Explain the quantitative characteristics of a plant community.	15
	(b)	Highlight the biosafety aspects arising out of plant genetic engineering.	15
	(c)	What is RNA splicing? Describe the known mechanism of RNA splicing for group-II introns.	15
	(d)	What is an osmosensor? How does a two-component sensing/signalling system contribute to osmosensing?	15
7.	(a)	What is 'Satpura hypothesis'? How does it explain discontinuous distribution of certain species?	15
	(b)	Explain the current developments in transgenic technology contributing to crop improvement.	15
	(c)	How can you prove that DNA is a genetic material? Describe with a suitable example.	15
	(d)	What are the major functions of cytoskeleton in living cells?	15
8.	(a)	Give the basis of classification of Indian forests and give its outline.	15
	(b)	How will you identify the expression of a cloned gene?	15
	(c)	Describe briefly, how RNA molecule transports within the eukaryotic cell.	15
	(d)	Compare the pattern of CO ₂ and ethylene production in a climacteric fruit.	15