

N^o 012993

B-JGT-K-CPB

BOTANY**Paper II**

Time Allowed : Three Hours

Maximum Marks : 200

INSTRUCTIONS

Candidates should attempt questions 1 and 5 which are compulsory, and any THREE of the remaining questions, selecting at least ONE question from each Section.

All questions carry equal marks.

Marks allotted to parts of a question are indicated against each.

Answers must be written in ENGLISH only.

Suitable diagrams may be drawn, wherever required.

SECTION A

1. Distinguish between any *eight* of the following : $5 \times 8 = 40$
- (a) x , n and $2n$ chromosome numbers
 - (b) Degree of freedom and Probability
 - (c) Meiotic and Somatic pairing
 - (d) Transition and Transversion
 - (e) Nucleolus and Nucleosome
 - (f) Plastogenes and Holandric genes

- (g) Coupling and Repulsion
 - (h) Cytoplasmic inheritance and Dauermodification
 - (i) RFLP and RAPD
 - (j) *cis* and *trans* conditions
2. (a) Despite the fact that DNA sequences do not arise *de-novo* in living organisms, their number increased during evolution. Name and describe the most probable mechanism responsible for this increase. 10
- (b) Discuss how discovery of infectious proteins brought a change in the concept of inheritance. 10
- (c) Using plants with genomic constitution "AA" and "BB", explain how you can raise intervarietal, interspecific and intergeneric polyploids. 10
- (d) What are the problems of distant hybridisation and what strategies would you suggest in overcoming the same? 10
3. (a) Illustrate the fate of two homologous chromosomes that have undergone unilateral crossing over. 10
- (b) How has the exception to one of the Mendelian principles helped in better understanding of the precise location of Mendelian factors? 10
- (c) What are designer crops? Explain how these can be developed. 10
- (d) What will be the fate of a cell line that lacks guide RNA? 10

4. (a) Describe two phenomena that have led to the formation of multigene families. 10
- (b) Name and describe the phenomenon that can work as an antidote to the terminator gene and ensure that a good allelic combination does not break down. 10
- (c) Although Y chromosome of *Drosophila* is heterochromatic and remains "inactive", lack of Y chromosome results in sterile males. How does the mere presence of "inactive Y" chromosome make them fertile? 10
- (d) Micropropagation technique is widely used in increasing the productivity of vegetatively propagated crops. Explain. 10

SECTION B

5. Explain any *eight* of the following : 5×8=40
- (a) Isoenzymes
 - (b) RUBISCO
 - (c) Phytochelatins
 - (d) Brassinosteroids
 - (e) Chloroplast dimorphism
 - (f) $F_0 - F_1$ ATPase
 - (g) Nutrient Loading
 - (h) Bioremediation
 - (i) Florigen
 - (j) Temperature inversion
6. (a) Discuss the role of carrier proteins in ion uptake by plants. 15.
- (b) Explain the carbon fixation pathway in plants where the activities of two carboxylating enzymes are temporally separated. What is the ecological significance of that pathway? 15
- (c) What are the causal factors that are associated with symptoms such as shortened internodes, death of shoot apices and intraveinal chlorosis in crop plants ? 10
7. (a) Mention the biotechnological approaches used for delaying ripening of fruits such as tomatoes. 15
- (b) Abscisic acid is a stress hormone. Discuss. 15

- (c) Comment on the following : 10
- (i) Transpiration – a necessary evil.
 - (ii) Photorespiration – useful if not essential process.
8. (a) Deep water bodies in alpine environment never completely freeze to solid. Explain. 10
- (b) Explain the role of hydrological cycle in regulating the climate. 10
- (c) What are the criteria used in the assessment of conservation status of species ? Cite at least one example belonging to each of the threatened categories of plants. 10
- (d) "The length of grazing food chain is finite and terminates at the third trophic level, on an average, in a community." Explain. 10

