

**BOTANY**

**PAPER—II**

Time Allowed : Three Hours

Maximum Marks : 200

**QUESTION PAPER SPECIFIC INSTRUCTIONS**

**Please read each of the following instructions carefully  
before attempting questions**

There are EIGHT questions in all, out of which FIVE are to be attempted.

Question Nos. 1 and 5 are compulsory. Out of the remaining SIX questions, THREE are to be attempted selecting at least ONE question from each of the two Sections A and B.

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

All questions carry equal marks. The number of marks carried by a question/part is indicated against it.

Neat sketches may be drawn, wherever required.

Answers must be written in ENGLISH only.

**SECTION—A**

1. Write short notes on the following : 8×5=40
- (a) Nuclear pore complex
  - (b) Microtubule binding proteins
  - (c) Substitution mutation
  - (d) Functions of ribosomes and subunits
  - (e) Nuclear male sterile lines for hybrid seed production
2. (a) What are the processes of membrane transport? How do carrier molecules transport materials across a cell membrane? 10+10=20
- (b) Explain extranuclear inheritance citing examples from two different organelles. 10
- (c) What are the different stages involved in micropropagation? 10
3. (a) Describe the mechanism of meiotic crossing-over and the theories related to the process. 20
- (b) "Mitochondria are semi-autonomous organelles." Justify. 10
- (c) What are cell cycle regulators? Discuss their different types. Why are these important? 5+3+2=10
4. (a) Give a detailed account of direct gene transfer methods. 20
- (b) Is heterochromatin genetically inactive? Explain. Discuss the function and features of heterochromatin. 5+5=10
- (c) Give the difference between dominance and epistasis. Explain different kinds of epistatic interactions. 3+7=10

**SECTION—B**

5. Write short notes on the following : 8×5=40
- (a) Effects of global warming
  - (b) Z-test
  - (c) Red Data Book
  - (d) Heat shock proteins and their functions
  - (e) GS-GOGAT pathway
6. (a) Describe different types of biogeochemical cycles. Discuss their importance. 15+5=20
- (b) Describe the key features of enzyme active sites. 10
  - (c) What are the different types and attributes of biodiversity? Discuss various causes for the loss of biodiversity. 5+5=10
7. (a) Explain CO<sub>2</sub> concentrating mechanisms in plants. What are the benefits of CO<sub>2</sub> concentrating mechanisms? 15+5=20
- (b) Discuss various hot spots of diversity and their role in conservation. 10
  - (c) Discuss probability and the types of probability distributions. 10
8. (a) (i) Describe phytochrome and its involvement in the photoperiodic induction of flowering in plants. 10
- (ii) Describe the molecular basis of vernalization. 10
  - (b) Write a detailed note on the Convention on Biological Diversity. 10
  - (c) Give the key features of chemiosmotic theory. 10

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