

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.

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.

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.

Answers must be written in ENGLISH only.

**SECTION—A**

1. Write short notes on the following :

8×5=40

- (a) Membrane proteins—structure and function
- (b) Chromosomal sex determination in higher plants
- (c) Origin and cytological behaviour of trisomics
- (d) Male sterility and its significance in plant hybrid production
- (e) Pearson's correlation coefficient

2. (a) Describe briefly the role of allopolyploidy in the evolution and speciation of plants. 20

(b) In what ways is a plant vacuole similar to a lysosome? What are lysosomal storage diseases? 7+3=10

(c) Describe various mechanisms of transport of molecules across the cell membrane. 10

3. (a) What are the criteria for cytoplasmic inheritance? Describe the plastid inheritance in *Mirabilis jalapa* (four o'clock plant). 10+10=20

(b) Describe briefly the prophase I of meiosis. What are recombination nodules? 7+3=10

(c) What is the significance of normal, binomial and Poisson distributions of data? 10

4. (a) How was gene linkage discovered? Describe gene mapping by three-point test cross. 7+13=20

(b) What are autocrine, paracrine and endocrine types of intercellular signaling? 10

(c) "Genetic code is triplet, degenerate and universal." Explain. 10

**SECTION—B**

5. Write short notes on the following : 8×5=40
- (a) Oxidative phosphorylation
  - (b) Vernalization
  - (c) Seed dormancy
  - (d) Global warming
  - (e) Biodiversity hotspots
6. (a) What is meant by biodiversity? What are alpha, beta and gamma diversity? Why is conservation of biodiversity essential for future of mankind? 5+8+7=20
- (b) What is the concept of climax community? How does succession progress in tropical forest ecosystem after extensive damage? 3+7=10
- (c) What are the abiotic and biotic components of an ecosystem? 10
7. (a) What are the steps of nitrogen cycle? Describe the processes and factors involved in nodule formation of legumes. 5+15=20
- (b) Explain the Z-scheme of light reaction of photosynthesis. 10
- (c) Give a concise account of Krebs cycle. 10
8. (a) What is plant stress physiology? Explain developmental and physiological mechanisms against environmental stresses. 7+13=20
- (b) What are the differences among afforestation, reforestation and social forestry? Why are these important for environmental protection and ecosystem functions required for the human society? 5+5=10
- (c) Write an elaborate note on the phytogeographical zones (regions) of India. 10

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