

BOTANY

Paper—II

Time Allowed : Three Hours

Maximum Marks : 200

INSTRUCTIONS

Candidates should attempt Question Nos. 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.

Important Note

All parts/sub-parts of a question being attempted are to be answered contiguously on the answer-book. That is, where a question is being attempted, all its constituent parts/sub-parts must be answered before moving on to the next question.

Pages left blank, if any, in the answer-book(s) must be clearly struck out. Answers that follow pages left blank may not be given credit.

Section—A

1. Distinguish between the following : $5 \times 8 = 40$
- (a) Allopolyploid and Autopolyploid
- (b) Prophase of Mitosis and Meiosis-I

- (c) Sex determination in Birds and in Man
- (d) z-test and t-test
- (e) Backcross and Test cross
- (f) Transformation and Transduction
- (g) Autosomes and Heterosomes
- (h) Trisomy and Nullisomy
2. (a) Draw a labelled diagram of a plant cell as seen under the electron microscope. 20
- (b) Which parts of the plant cell play a role in protein synthesis and export, and how? 15
- (c) Distinguish between mRNA and rRNA. 5
3. (a) How does RNA differ from DNA in form and function? 15
- (b) Describe the role of RNA in origin and evolution. 15
- (c) Write a short note on cytoplasmic male sterility. 10
4. (a) What are molecular markers? Mention their types and their applications in crop improvement. Explain why molecular markers are more desirable than biochemical or morphological markers. 5+15+10
- (b) What do you understand by correlation? List its various types. How do correlation studies help in a plant breeding programme? 5+5

Section—B

5. Write short notes on any *five* of the following : 8×5=40
- (a) Pollution and its phytoremediation
 - (b) Electron transport chains and their role in energy transfer
 - (c) Differences between the symptoms of boron deficiency and boron toxicity
 - (d) Red Data Book
 - (e) Donnan's hypothesis with reference to ion exchange
 - (f) Heat-shock proteins
6. (a) Discuss the molecular basis of fruit ripening and its commercial aspects. 20
- (b) Discuss PCD (programmed cell death) highlighting the regulation of senescence in plant development. 20
7. (a) Explain, with diagrams and metabolic pathways, how C₄ and CAM photosynthesis are helpful for plants. 20
- (b) What are phytochromes? Describe their interconvertible forms. 10
- (c) Write a short note on coenzymes. 10

- 8. (a) What is meant by biodiversity? 5
- (b) Enumerate the reasons for global concern towards protection of biodiversity. 20
- (c) Name the relevant organizations in India along with their contributions towards protection and conservation of biodiversity. 15

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