

BOTANY

PAPER—I

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. (a) What are plasmids? Describe their role in bacterial genetic recombination. 2+6=8
(b) Explain how algae play harmful role in spoiling the water bodies. 8
(c) Draw and describe the structure and function of haustorium in *Phytophthora*. 8
(d) Write down the Koch's postulates. 8
(e) List five features in which the Bennettiales differ from the Cycads, and three in which they resemble. 5+3=8

2. (a) What is transduction? Describe in brief generalized and specialized transduction. 2+4+4=10
(b) What are the common features of *Anthoceros* and Chlorophyceae? Describe the development of sporophyte of *Anthoceros*. 5+10=15
(c) Describe the development of ascus in *Neurospora*. Why is *Neurospora* considered as a model for genetic studies? 10+5=15

3. (a) Describe the economical and ecological importance of *Sphagnum*. 5+5=10
(b) Describe and illustrate the development of female gametophyte in *Pinus*. Trace the pathway of pollen tube in the ovule leading to the formation of zygote. 10+5=15
(c) Explain with examples how bacteria improve soil fertility. 15

4. (a) Give an account of classification of gymnosperms as proposed by Takhtajan, Cronquist and Zimmermann. Where do we find gymnosperms distributed in India? 10+5=15
(b) Describe the life cycle of *Ustilago*. How can you differentiate loose smut and covered smut? 10+5=15
(c) Draw and describe the structure of strobilus in *Lycopodium* and discuss the development of sporangium. 5+5=10

SECTION—B

5. (a) State the salient features of Brassicaceae. Give the botanical names of any three economically important plants belonging to the family. 5+3=8
- (b) What are the pollen characters of taxonomic importance? 8
- (c) Mention the scientific name, family and economically important part of two beverage-yielding plants. 4+4=8
- (d) Distinguish between :
- (i) Redifferentiation and Dedifferentiation
- (ii) Indirect organogenesis and Direct organogenesis 4+4=8
- (e) What are the merits and demerits of Rolf Dahlgren's system of classification? 4+4=8
6. (a) What are the structural features of stomata that help in their opening and closing mechanism? Mention the four common types of stomata with their diagnostic features. 5+5=10
- (b) With the help of suitable diagrams, describe the development of nuclear endosperm. How does the process of its cellularization take place? 10+5=15
- (c) How are cybrids different from somatic hybrids? Describe the methodology of somatic hybrid production. 5+10=15
7. (a) Describe in detail about the production of haploid plants from anther culture. 10
- (b) Write down the scientific name, family and commercially important plant part of the following :
- (i) Hemp
- (ii) Nutmeg
- (iii) Indigo
- (iv) Ergot
- (v) Jatropha 3×5=15
- (c) Define polyembryony. What are the various ways in which it may arise in angiosperms? State the practical value of polyembryony. 10+5=15
8. (a) Discuss the role of ethnobotany with two examples in health care and treatment of diseases in India. 6+4=10
- (b) What are the adaptations among angiosperms for cross-pollination? State the advantages and disadvantages of self-pollination. 10+5=15
- (c) What do you mean by centre of origin of crops? Describe the concept of centre of origin of cultivated crops according to Vavilov. 3+12=15

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