

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.*

*Questions no. **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

- Q1.** (a) Explain different kinds of Endoplasmic reticulum and give a brief account on Endomembrane system. 8
- (b) Discuss cAMP-mediated regulation of signal transduction. 8
- (c) Give a brief account on theories of organic evolution. 8
- (d) Explain different kinds of plastids with reference to their structure and functions. 8
- (e) Briefly describe the properties of genetic code with examples. Explain, in short, the degeneracy of the code by Wobble hypothesis. 4+4=8
- Q2.** (a) What is mutation breeding ? Discuss different methods of mutation breeding along with their applications and limitations. 2+10+4+4=20
- (b) Discuss briefly *Agrobacterium*-mediated gene transfer method in plants with special emphasis on T-DNA processing. 10
- (c) If a red coloured Four-o'clock plant is crossed with a white flowered one, what will be the flower colours of the F_1 ; of the F_2 ; of the offspring of a cross between F_1 with its red parent, and also with its white parent ? (In Four-o'clock plant red flower colour (R) is incompletely dominant over white (r) ; while heterozygous plants (Rr) being pink flowered). 10
- Q3.** (a) Discuss the control points and explain various molecular factors involved in cell cycle regulation. 5+15=20
- (b) Write notes on the following : 5+5=10
- (i) Hardy-Weinberg equilibrium
- (ii) A normal woman, whose father had hemophilia, married a normal man. What is the chance of hemophilia in their children ? Explain with suitable reasons.
- (c) Name two diseases caused by prion in humans. Mention the ways by which prions can infect humans. Enumerate the steps by which prions can cause disease. 2+3+5=10
- Q4.** (a) Describe the process of DNA replication in eukaryotic organism mentioning the role of specific enzymes at different stages. 20
- (b) Describe heterosis and inbreeding depression along with their genetic bases. 10
- (c) Explain origin and induction of polyploidy. Justify the importance of polyploidy in relation to crop improvement. 5+5=10

SECTION B

- Q5.** (a) What are the characteristics of “triple response” induced by ethylene in etiolated seedlings ? 8
- (b) With reference to soil-water relationship, differentiate between field capacity and permanent wilting percentage. 8
- (c) State the specific applications of regression analysis and correlation analysis in assessing the relationship between variables. 8
- (d) Enumerate any four species each of endemic and threatened plants with the help of botanical name, family and their distribution in India. 4+4=8
- (e) Explain different types of vegetation in India along with their geographical distributions. 8
- Q6.** (a) Define water potential. Discuss the major factors influencing the water potential in plants. 20
- (b) Give a critical account on ecological succession. Discuss the concept of ‘climax’. 5+5=10
- (c) “Crassulacean acid metabolism is an adaptation to desert life of plants.” Comment and discuss. 10
- Q7.** (a) Discuss the structure-function relationship of phloem tissues with reference to translocation of photoassimilates. 20
- (b) Write a note on the inhibitors of photosynthetic electron transport as effective herbicides. 10
- (c) Compare the applications of standard deviation and coefficient of variation in data analysis. 10

- Q8.** (a) Discuss the biotechnical approaches used in the conservation of biodiversity with special reference to endangered species. 20
- (b) "Phytochrome-mediated responses can be grouped according to their fluence requirements." Comment. 10
- (c) Give a critical account on biogeochemical cycles with reference to any terrestrial ecosystem. 10