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*