

BOTANY (Paper II)

Time Allowed : Three Hours

Maximum Marks : 300

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

There are EIGHT questions divided in two Sections.

Candidate has to attempt FIVE questions in all.

Question Nos. 1 and 5 are compulsory and out of the remaining, any THREE are to be attempted choosing at least ONE question from each Section.

The number of marks carried by a question/part is indicated against it.

Wherever any assumptions are made for answering a question, they must be clearly indicated.

Word limit in questions, wherever specified, should be adhered to.

SECTION 'A'

1. Answer any three of the following. Each part should be answered in not more than 200 words:

20×3=60

 - (a) With suitable diagrams, critically examine the various models of membranes systems in eukaryotic cells and state which one is the most suitable to explain the E.M. structure and functions of the system.
 - (b) Give an account of linkage and crossing-over method for gene mapping.
 - (c) Describe the techniques of gene transfer to produce transgenic plants. Add a critical note on the importance of genetic engineering with special reference to the Indian agriculture.
 - (d) Explain the concept of 'standard error' and comment on its application in various research programmes.
2. Present an account of extra-chromosomal inheritance, and examine its significance with respect to growth and development of a plant. **60**
3. Discuss the genetic and physiological control of sex determination in plants. Is it possible to modify the genetically determined sex by physiological factors? Substantiate your answer. **60**
4. Critically examine the following alternatives and substantiate with reasons which of the two is preferable:

20×3=60

 - (a) Role of RNA in origin and evolution of life on earth versus extra-terrestrial origin and evolution of life.
 - (b) Gene and genome mapping for selective cloning versus cloning without any restriction.
 - (c) Mutation for breeding versus protoplast fusion for crop improvement.

SECTION 'B'

5. Answer any three of the following. Each part should be answered in not more than 200 words:

20×3=60

 - (a) With the help of diagrams, bring out the differences in electron transport mechanism in cyclic and non-cyclic photophosphorylation and explain why the latter is superior to the former.

- (b) Describe the structural peculiarities of enzymes & explain their mode of action in metabolism, growth and development.
- (c) The tropical countries are very rich in biodiversity as compared to the temperate countries. Substantiate the statement. Describe methods to conserve biodiversity.
- (d) Explain the phenomena of food chain, biomagnifications and ecological pyramids in terms of maintaining ecological equilibrium or otherwise.
6. Give concise answers to the following: **20×3=60**
- (a) Point out the various sources of environmental pollution and suggest suitable remedial measures.
- (b) Enumerate the causes of seed dormancy and suggest methods to overcome them. Comment on the probable selective advantages of seed dormancy in the course of evolution.
- (c) Give diagrammatic representations of any five biogeochemical cycles showing the direction of energy flow.
7. Explain the concepts of photoperiodism and vernalization. What is meant by critical photochemical requirement for plant growth and development? In this background re-examine the photoperiodic classification of plants. **60**
8. Compare C_3 and C_4 plants from the point of view of metabolic efficiency and total productivity. **60**