INDIAN FOREST SERVICE (MAIN) EXAM- 2023

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.

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.

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

1. Write short notes on the following : 8×5=40

   (a) Nuclear pore complex

   (b) Microtubule binding proteins

   (c) Substitution mutation

   (d) Functions of ribosomes and subunits

   (e) Nuclear male sterile lines for hybrid seed production

2. (a) What are the processes of membrane transport? How do carrier molecules transport materials across a cell membrane? 10+10=20

   (b) Explain extranuclear inheritance citing examples from two different organelles. 10

   (c) What are the different stages involved in micropropagation? 10

3. (a) Describe the mechanism of meiotic crossing-over and the theories related to the process. 20

   (b) "Mitochondria are semi-autonomous organelles." Justify. 10

   (c) What are cell cycle regulators? Discuss their different types. Why are these important? 5+3+2=10

4. (a) Give a detailed account of direct gene transfer methods. 20

   (b) Is heterochromatin genetically inactive? Explain. Discuss the function and features of heterochromatin. 5+5=10

   (c) Give the difference between dominance and epistasis. Explain different kinds of epistatic interactions. 3+7=10

SECTION—B

5. Write short notes on the following : 8×5=40

(a) Effects of global warming

(b) *Z*-test

(c) Red Data Book

(d) Heat shock proteins and their functions

(e) GS-GOGAT pathway

6. (a) Describe different types of biogeochemical cycles. Discuss their importance. 15+5=20

(b) Describe the key features of enzyme active sites. 10

(c) What are the different types and attributes of biodiversity? Discuss various causes for the loss of biodiversity. 5+5=10

7. (a) Explain CO_2 concentrating mechanisms in plants. What are the benefits of CO_2 concentrating mechanisms? 15+5=20

(b) Discuss various hot spots of diversity and their role in conservation. 10

(c) Discuss probability and the types of probability distributions. 10

8. (a) (i) Describe phytochrome and its involvement in the photoperiodic induction of flowering in plants. 10

(ii) Describe the molecular basis of vernalization. 10

(b) Write a detailed note on the Convention on Biological Diversity. 10

(c) Give the key features of chemiosmotic theory. 10

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