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| CSM – 15/18 |
| Botany |
| Paper – II |

Time : 3 hours

Full Marks : 300

The figures in the right-hand margin indicate marks.

Candidates should attempt Q. No. 1 from Section – A and Q. No. 5 from Section – B which are compulsory any three of the remaining questions, selecting at least one from each Section.

SECTION – A

1. Write explanatory notes on any three of the following : 20×3 = 60
- (a) Ultrastructure and functions of prokaryotic ribosomes
 - (b) Molecular basis of mutation
 - (c) Use of molecular markers in plant breeding
 - (d) Evidences of organic evolution

2. (a) Explain the ultrastructure of chromatin based on nucleosome concept.
- (b) Describe the merits and demerits of particle gun bombardment and electroporation in direct gene transfer.
- (c) Describe the different types of structural changes found in chromosomes. Comment on their meiotic behaviour. $20 \times 3 = 60$
3. (a) What is heterosis ? Describe the procedure and significance of heterosis breeding in crop improvement.
- (b) What are constitutive and inducible enzymes ? Describe the regulation of gene expression with reference to enzyme induction.
- (c) Give an illustrated account of the molecular basis of cell cycle. $20 \times 3 = 60$
4. (a) What are prions ? Give an account of the prion hypothesis and diseases caused by prions.
- (b) Explain with example the application of plant transformation in crop improvement.

- (c) What are cytoplasmic genes ? Explain cytoplasmic inheritance with example.

20×3 = 60

SECTION - B

5. Answer any three of the following : 20×3 = 60

(a) What are the physiological and biochemical functions of the microelements ?

(b) How do the external and internal factors influence photosynthesis ?

(c) Discuss the role of higher plants in the control of heavy metal pollution.

(d) Write an elaborate account of sovereign rights.

6. (a) Distinguish between C_3 and C_4 plants. Explain fixation of CO_2 in C_4 plants.

(b) Discuss the physio-biochemical processes involved in the germination of seeds.

(c) Explain the adaptive strategies of plants against salinity and high temperature.

20×3 = 60

7. (a) What is meant by conservation? Discuss the different methods followed for the biodiversity conservation.
- (b) Enumerate the role and applications of both synthetic and natural plant hormones in agriculture and horticulture.
- (c) Discuss plant succession with reference to hydrosere and xerosere. $20 \times 3 = 60$
8. (a) What is grand period of growth? Discuss the role of environmental factors influencing plant growth.
- (b) Give an account of plastidial pigments with reference to their chemistry and physiological role in plants.
- (c) Define biogeochemical cycling. Discuss the key processes involved in biogeochemical cycling of nitrogen. $20 \times 3 = 60$

