CSM – 15/21
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 and any **three** of the remaining questions, selecting at least **one** from each Section.*

SECTION – A

1. Answer any **three** of the following in not more than **200** words each : 20×3 = 60

   (a) Discuss the role of cyclin in cell cycle.

   (b) Explain the regulatory mechanism of the lac operon.

   (c) Give a brief account of heterosis.

   (d) Name the different enzymes involved in DNA replication. Discuss the role of helicase, topoisomerase, and primase in DNA replication.

2. (a) Describe the steps involved in T-DNA mediated transfer of foreign genes in plants. 20

(b) Suggest why prions should not be included among viruses. State the function of extracellular matrix. 20

(c) Briefly discuss the nucleosome model of chromosome. 20

3. (a) What is nuclear pore complex ? State its role in nucleocytoplasmic traffic. 5+15 = 20

(b) Name the different types of RNA. Discuss the role of RNA in evolution. 5+15 = 20

(c) Explain the properties of genetic code. What is "Wobble Hypothesis" ? 12+8 = 20

4. (a) Discuss the use of molecular markers in plant breeding. 20

(b) Explain briefly :

(i) Allopolyploidy

(ii) Pericentric inversion

(iii) Posttranscriptional modification of mRNA 7+3+10 = 20

(c) Explain briefly : Male sterility, Function of lysosome, Frameshift mutation, epistasis. 5×4 = 20

SECTION – B

5. Answer any **three** of the following in not more than **200** words each : 20×3 = 60

(a) Distinguish between holoenzyme, apoenzyme, coenzyme and cofactor. What is abzyme ? 16+4 = 20

(b) Discuss the role of gibberellin in germination and flowering. 10×2 = 20

(c) Mention the different subunits of nitrogenase complex. Discuss its role in nitrogen fixation. 8+12 = 20

(d) What is red data book ? Describe the methods of conservation of endangered species. 5+15 = 20

6. (a) Discuss the role of Zn, Fe, Boron and Mg in plants. 5×4 = 20

(b) Explain briefly : 10×2 = 20

(i) Phytoremediation

(ii) Autogenic and allogenic succession

(c) Mention the differences between C3 and C4 plants. What is Kranz anatomy ? 16+4 = 20

7. (a) What is photorespiration ? Comment on compartmentation of biochemical events involved in photorespiration with the help of suitable sketches. 5+15 = 20

(b) What is photoperiodism ? Give a brief account of the structure and mode of action of the photoreceptor involved in the process. 8+12 = 20

(c) State the causes and consequences of global warming. 20

8. (a) What is fruit ripening ? Discuss the physiological changes during the process. Add a note on molecular mechanism of fruit ripening. 2+8+10 = 20

(b) Explain briefly :

(i) Richmond Lang effect

(ii) Chemiosmotic theory 10×2 = 20

(c) Explain briefly :

(i) Intellectual property rights

(ii) Biodiversity hotspots

(iii) Eutrophication 7+7+6 = 20