2021
BOTANY
[HONOURS]
Paper : VIII

Full Marks : 80 Time : 4 Hours

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.

Answer all the questions.

(Genetics and Molecular Genetics)

[Marks : 55]

1. Answer any **three** of the following: 1×3=3
   a) What is translocation heterozygote?
   b) What is transversion?
   c) What is partial dominance?
   d) What is chromatid interference?

2. Answer any **seven** of the following: 2×7=14
   a) Define replicative transposon with an example.
   b) Define supplementary gene interaction.
   c) Name one thermostable DNA polymerase with proof-reading activity mentioning its source organism.
   d) What is complementation test?

   e) Mention two salient features of molecular markers.
   f) What is photolyase?
   g) What is dominant lateral gene action?
   h) Define linkage group.
   i) What is catabolite repression?

3. Answer any **three** of the following: 6×3=18
   a) Write a brief note on reciprocal translocation with suitable diagrams. 6
   b) Define coupling and repulsion phase. Enumerate the different types of linkage using suitable examples. What is gene conversion? 2+3+1=6
   c) Briefly discuss the Ac-Ds system in maize. 6
   d) Briefly explain the cytological basis of crossing over with suitable sketches. 6
   e) Critically explain the mechanism of bi-directional replication in prokaryotic system. 6

4. Answer any **two** of the following: 10×2=20
   a) Explain one gene one polypeptide hypothesis. What is position effect? Briefly discuss the concept of multiple allele using suitable example. 3+3+4=10

b) Write brief notes on any **two** of the following: 5+5=10

i) Salient features and types of cloning vectors.

ii) cDNA library.

iii) Properties of genetic code.

c) Distinguish between repression and end product inhibition. Discuss the structure and mode of regulation of tryoplophan operon using suitable diagrams. 2+8=10

d) Differentiate between mutagens and clastogens. Briefly explain the CLB method of detection of mutation. Explain the mechanism of induction of mutation by alkylating agents. 2+4+4=10

(Plant Biotechnology)

[Marks : 25]

5. Answer any **three** of the following: 1×3=3

a) What is reporter gene?

b) What is electroporation?

c) What is redifferentiation?

d) What is somatic embryogenesis?

6. Answer any **three** of the following: 2×3=6

a) What is somatic hybridization?

b) Mention the importance of embryo culture.

c) What is the importance of Suspension culture?

d) What is regeneration potential?

e) Define artificial seeds.

7. Answer any **one** of the following: 6×1=6

a) Write a brief note on principle and applications of callus culture.

b) Briefly discuss the steps involved in protoplast isolation and culture with suitable diagrams.

8. Answer any **one** of the following: 10×1=10

a) Discuss the mechanism of integration and expression of foreign DNA in plant cells. Make a brief note on the applications of transgenic technology in crop improvement. 6+4=10

b) Briefly discuss the mechanism of plant transformation using *Agrobacterium* system with suitable diagrams. 10