GROUP—D

Answer *any* **two** questions : 5×2=10

9. Describe the different genotypic and phenotypic methods for identifying bacterial strains. 2·5+2·5=5

10. Define the 'healthy' gut microbiota and dysbiosis with respect to the microbiota-gut-brain axis. 2·5+2·5=5

11. Mention the important differences in anaerobic chambers, GasPak system, and the roll tube method for isolating the anaerobic bacterial strains.Why and what are these methods' reducing agents and redox indicators used? 3+2=5

★★★

MASTER OF SCIENCE EXAMINATION, 2025

(2nd Year, 1st Semester)

BIOTECHNOLOGY

PAPER : BT/PG/334T

(Plant and Microbial Biotechnology)

Time : 2 *Hours* *Full Marks* : 40

GROUP—A

Answer *any* **two** questions : 5×2=10

1. What are the major protein domains found in plant R genes? What are the different classes of plant R genes? 2+3=5

2. What are the differences between ISSR and SSR markers? What are the advantages of ISSR over RAPD? 3+2=5

3. What are the different strategies of metabolic engineering in plants? How metabolic engineering can be used for altering flower colour in plants? 2+3=5

4. What are the advantages of using plant virus as expression vectors? Give examples of one DNA and one RNA virus used as plant expression vectors. 3+2=5

GROUP—B

5. Answer *any* **two** questions : 4×2=8

(a) Write short notes on the following : 2+2

(i) microinjection

(ii) particle- bombardment method of gene delivery.

(b) Define the functional contribution of different *vir* genes in *Agrobacterium.* 4

(c) Describe quartet model of flowering. What will happen if Class C genes get mutated (according to quartet model)? 3+1=4

(d) Describe HY5-mediated signaling pathway of photomorphogenesis.

6. Answer *any* **one** questions : 2×1=2

(a) What are the applications of GFP as a reporter gene? 2

(b) Write down the general features of Ti plasmid. 2

(c) Define photoreversibility of phytochromes. 2

(d) How does FLC play a significant role in vernalization mechanism? 2

GROUP—C

7. Answer *any* **five** questions : 1×5=5

(a) Why do we need to treat wastewater?

(b) What are the differences between primary and secondary metabolites?

(c) What are xenobiotic compounds?

(d) What are probiotics?

(e) How is raw cheese different from ripened cheese?

(f) Why is it better sometimes to have the enzyme immobilized?

(g) What are the uses of the enzyme glucose oxidase?

(h) What are meant by the terms GRAS, GMP, and IPR?

(i) (1) What is the method in between upstream processing and downstream processing?

(2) Which ore of copper is richer in its copper content Covelite (CuS) or Chalcopyrite ($CuFeS_2$)?

8. Write short notes on *any* ***one*** of the following : 5

(a) Bioremediation of mercury pollution

(b) Bioleaching of copper

(c) Biofuels

(d) Desirable properties of an ethanol producing strain