Seat No. : _____

NF-133

November-2025

M.Sc., Sem.-III

MIC-501 : Microbiology

(Agriculture Biotechnology)

Time : 2:30 Hours] **[Max. Marks : 70**

1. Write a note on vermicomposting. **14**

OR

1. (A) Discuss in detail the mechanisms adopted for phosphate solubilization by bacteria. **7**

1. (B) Write a note on Mycorrhizae and its significance. **7**

2. Describe the BT toxin and its mechanism of action for pest management. **14**

OR

2. (A) Give an outline of the types of biofertilizers. **7**

2. (B) Discuss strategies used in IPM and their importance. **7**

3. Write a detailed note on Direct gene transfer techniques. **14**

OR

3. (A) Explain marker-assisted selection in plants. Explain any two in detail. **7**

3. (B) What are Ti- and Ri- plasmids ? Write their role in agriculture. **7**

4. Explain how cytokinin interacts with other phytohormones to regulate plant growth and defence mechanisms ? **14**

OR

4. (A) Write a detailed note on callus culture. **7**

4. (B) Discuss in detail the applications of plant tissue culture technology. **7**

5. Answer the following (any **seven**) : **14**

(1) Give an example of free-living nitrogen-fixing bacteria with a mechanism.

(2) What are rhizobacteria ? Give the scientific names of any two rhizobacterial species.

(3) What are endophytes ?

(4) List out three biocontrol agents that are widely used in modern agricultural practices.

(5) What is a bio-pesticide ? Explain with an example.

(6) What are bioinoculants ?

(7) Mention names of various Opines and state their significance.

(8) What does QTL stand for ?

(9) Name one molecular marker commonly used in MAS.

(10) Differentiate between de-differentiation and re-differentiation ?

(11) What is cryopreservation, and why is it important in germplasm conservation ?

(12) What is the role of auxin in plant growth ?