REV-01
MMB/01/06

2025/06

SET A

M.Sc. MICROBIOLOGY
SECOND SEMESTER (REPEAT)
SOIL AND ENVIRONMENTAL MICROBIOLOGY
MMB-204

[USE OMR FOR OBJECTIVE PART]

Duration: 1:30 hrs. **Full Marks: 35**

(Objective)

Time: 15 mins. **Marks: 10**

1×10=10

Choose the correct answer from the following:

1. What is the primary function of leghemoglobulin in root nodules of leguminous plants?
   a. To transport nitrogen from soil to root cells
   b. To fix atmospheric nitrogen directly
   c. T regulate the concentration of oxygen in nodule and protect nitrogenase
   d. To absorb excess water in root nodules

2. Hooghly-Matlah is the largest ..... in India.
   a. Estuarine system
   b. Freshwater ecosystem
   c. Deep sea
   d. Marine ecosystem

3. Which of the following processes is directly responsible for converting atmospheric nitrogen (N_2) into a form that plants can use?
   a. Nitrification
   b. Denitrification
   c. Nitrogen Fixation
   d. Ammonification

4. Trickling filters operate most efficiently under:
   a. Anaerobic conditions
   b. Aerobic conditions
   c. Anoxic conditions
   d. Facultative conditions

5. What is the ideal carbon-to-nitrogen (C:N) ratio for effective composting?
   a. 10:1
   b. 30:1
   c. 50:1
   d. 100:1

6. Which gas is commonly produced in landfills due to anaerobic decomposition?
   a. Oxygen
   b. Carbon monoxide
   c. Nitrogen
   d. Methane

7. The rhizosphere refers to
   a. The layer of soil below the water table
   b. The region of soil that surround and is influenced by the plant roots
   c. Soil particles bound together by fungal hyphae
   d. Sterile soil used for lab-based techniques

8. Which of the following is most common site of infection in tuberculosis in human?
   a. Liver
   b. Brain
   c. Lungs
   d. Intestines

9. Which microorganism is primarily responsible for forming actinorhizal nodule?
   a. Rhizobium
   b. Frankia
   c. Azotobacter
   d. Nitrosomonas

10. Which of the following best describes as aerosol?
   a. A gas dissolve in solid mixture
   b. A suspension of solid or liquid particles in a gas
   c. A mixture of two immiscible liquids
   d. A solid dispersed in another solid

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Descriptive

Time : 1 hr. 15 mins. Marks: 25

[Answer question no.1 & any two (2) from the rest]

1. Describe the biogeochemical cycling of carbon. 5

2. **Write short notes:** 5 + 5 = 10
   (a) Oxidation ponds
   (b) Eutrophication

3. **Write short notes:** 5 + 5 = 10
   (a) Microbial assessment of water quality
   (b) Mycorrhizal fungi and its effect on plants

4. Highlight the microbial interactions in relevance to both positive and negative aspects. 10

5. Explain the significance of root nodule symbiotic bacteria and leghemoglobulin in forming the root nodules 10

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