

**RAN-2203080601030003****M.Sc. (Sem. I) Examination November - 2025****Microbiology : Core Paper - III (CE - 1) Environmental Microbiology and Biofuels****Time: 3 Hours]****[Total Marks: 70****સૂચના : / Instructions**

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book.
- (2) Figures to the right indicate full marks of the question.
- (3) Draw neat and labelled diagrams whenever necessary.

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Student's Signature

Q. 1. Answer the following (Any two).**(18)**

1. Define microbial mats and explain their major types with examples.
2. Describe: strategic approach to study a microbial ecology with an example of industrial wastewater site.
3. Explain harmful algal blooms in terms of causes, ecological effects, and control measures.

Q. 2. Answer the following (Any two).**(18)**

1. List the primary organic and inorganic constituents typically found in municipal wastewater. Describe the methods of analysis for the same.
2. Explain the difference between aerobic and anaerobic biological processes and describe where each is applied in wastewater treatment.
3. Analyze how capacity planning affects the design and long-term efficiency of Common Effluent Treatment Plants (CETPs).

Q. 3. Answer the following (Any two).**(18)**

1. Compare and contrast biodegradation and bioremediation. Give two examples of each.
2. Explain the principle and process of biodesulfurization used for desulfurizing petroleum hydrocarbons.
3. Analyse how microorganisms detoxify heavy metals using different mechanisms.

Q. 4. Answer the following (Any two).**(16)**

1. Explain the Transesterification process for biodiesel manufacturing and analyze key factors affecting conversion efficiency.
2. Enlist major methods for algal oil extraction. Explain Expeller pressing extraction and Enzymatic extraction in detail.
3. Discuss Solvent extraction of algal oil in detail with its advantages and limitations.