Roll No……..….. **Total No. of Printed Pages: 1**
Total No. of Questions: [11]

M. Sc. Microbiology (Semester – 3rd)
ENVIRONMENTAL BIOTECHNOLOGY
Subject Code: MMBLS1302
Paper ID: 21221413

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It carries 16 marks. It consists of 4 questions of 4 marks each.
2. Section B consist of 4 questions of 8 marks each. The student has to attempt any 3 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(4 marks each)**

Q1. Write a short note on microbiological water analysis?
Q2. What are the various methods of solid waste treatment? Explain any two of them in detail.
Q3. What are the major events of evolution of life on earth?
Q4. Write a short note on biodegradation of hydrocarbons?

Section – B **(8 marks each)**

Q5. Describe in detail the molecular methods for the assessment of air quality?
Q6. Explain the process of biodeterioration of pulpwood? Which microorganisms are majorly involved in this process?
Q7. Write short notes on any **two** of the following:
a) Nutrient dynamics in lakes, rivers and estuaries? (4)
b) Define allergy. What are the various causes of allergy? (4)
c) Explain the different zones of the water ecosystem? (4)
Q8. Which microorganisms play a foundational/ major role in aquatic ecosystems? Explain in detail.

Section – C **(10 marks each)**

Q9. (a) Explain the process of biodegradation of soil, air and water using microorganisms. Write relevant examples. (6)
(b) Define Bioleaching. How it is used for recovery of copper, uranium and gold? (4)
Q10. (a) Define biofilm? (2)
(b) What are the various processes involved in the sewage treatment? (3)
(c) What is endotoxin in air pollution? (2)
(d) What are the various methods of life detection? Explain any of them in detail? (3)
Q11. (a) Define microbial ecology. (1)
(b) What are the various habitats of microbes? (4)
(c) Define any five from following**:** (5)
(i) Phytoplankton
(ii) Zooplankton
(iii) Biome
(iv) Autology
(v) Synecology
(vi) Population