

**THE KAVERY ENGINEERING COLLEGE***(An Autonomous Institution)***M.E DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025*****First Semester******Environmental Engineering*****PEVT2402 - Environmental Microbiology*****Regulations - 2024******Duration : 3 Hrs******Maximum : 100 Marks******PART – A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)***

| <b>Q.No</b> | <b>Questions</b>                                                         | <b>BLT</b> | <b>CO</b> | <b>Marks</b> |
|-------------|--------------------------------------------------------------------------|------------|-----------|--------------|
| 1.          | Define recombinant DNA technology.                                       | L1         | 1         | 2            |
| 2.          | Mention the role of helminths in the transmission of parasitic diseases. | L2         | 1         | 2            |
| 3.          | What are archae bacteria?                                                | L1         | 2         | 2            |
| 4.          | How do microorganisms contribute to the sulfur cycle?                    | L2         | 2         | 2            |
| 5.          | Define the term Kreb's cycle.                                            | L1         | 3         | 2            |
| 6.          | What are environmental factors affecting microbial growth?               | L1         | 3         | 2            |
| 7.          | State the role of indicator organisms in assessing water quality.        | L2         | 4         | 2            |
| 8.          | Outline significance of phosphate removal in wastewater treatment.       | L2         | 4         | 2            |
| 9.          | Define toxicants and give two examples.                                  | L1         | 5         | 2            |
| 10.         | Name any two factors that can influence the toxicity of a chemical.      | L1         | 5         | 2            |

***PART – B (ANSWER ALL QUESTIONS) (Marks 5\*16 = 80)***

| <b>Q.No</b> | <b>Questions</b>                                                                                                                                     | <b>BLT</b> | <b>CO</b> | <b>Marks</b> |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 11.         | a Explain the process of DNA replication in microorganisms and its significance for cell division and genetic inheritance.                           | L3         | 1         | 16           |
|             | <b>Or</b>                                                                                                                                            |            |           |              |
|             | b Explain the classification and transmission of water, soil, and airborne pathogens. How do these pathogens affect human, animal, and plant health? | L3         | 1         | 16           |
| 12.         | a i Explain the sulfur cycle.                                                                                                                        | L3         | 2         | 8            |
|             | ii Explain the problems associated with microbial contamination of water supplies.                                                                   | L3         | 2         | 8            |
|             | <b>Or</b>                                                                                                                                            |            |           |              |
|             | b i Explain the types of microorganisms found in freshwater and marine ecosystems.                                                                   | L3         | 2         | 8            |
|             | ii Explain the role of microorganisms in the carbon cycle. How do they contribute to carbon sequestration and release?                               | L3         | 2         | 8            |

|           |     |                                                                                                                                           |    |   |    |
|-----------|-----|-------------------------------------------------------------------------------------------------------------------------------------------|----|---|----|
| 13.       | a   | Compare aerobic and anaerobic respiration in microorganisms. What are the differences in energy yield and metabolic pathways used?        | L2 | 3 | 16 |
| <b>Or</b> |     |                                                                                                                                           |    |   |    |
|           | b   | Explain the process of fermentation in microorganisms.                                                                                    | L3 | 3 | 16 |
| 14.       | a i | Describe how aerobic processes rely on oxygen for the growth of microorganisms that break down organic matter.                            | L2 | 4 | 8  |
|           | ii  | Explain the processes of nitrification and denitrification in wastewater treatment.                                                       | L3 | 4 | 8  |
| <b>Or</b> |     |                                                                                                                                           |    |   |    |
|           | b i | Explain the pathways of $\alpha$ -oxidation and $\beta$ -oxidation in microorganisms, describing how they degrade fatty acids for energy. | L3 | 4 | 8  |
|           | ii  | Explain bioleaching and its role in the recovery of metals from ores.                                                                     | L3 | 4 | 8  |
| 15.       | a   | Examine the potential effects of toxicants on specific test organisms.                                                                    | L4 | 5 | 16 |
| <b>Or</b> |     |                                                                                                                                           |    |   |    |
|           | b   | Analyze the challenges faced in ecotoxicology testing and research. What are the limitations of laboratory and field-testing methods.     | L4 | 5 | 16 |