JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2024

M.Sc.-III Semester (Microbiology)

COURSE CODE (CREDITS): 20MS1MB311 (03)   MAX. MARKS: 35

COURSE NAME: Environmental Microbiology

COURSE INSTRUCTORS: Ashok Kumar Nadda   MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

  (b) The candidate is allowed to make Suitable numeric assumptions wherever required

  for solving problems

Q.No	Question	Marks
	Section I	
Q1	a) Can you provide examples of living organisms commonly used in the production of bioplastic?	1
	b) Name the algal species commonly used in water quality assessments? How does the quality of water can be measured using different bioindicators?	1
	c) Give the examples of microorganisms used in the production of biogas and bioethanol?	1
	d) Provide examples of natural sources of biopesticides. How does biopesticides are better in comparision to conventional pesticides?	1
	e) What is Microbial Enhanced Oil Recovery (MEOR), and how does it differ from traditional oil recovery methods?	1
	Section II	
Q2	How can lichen be used as a bioindicator of air pollution, especially sulfur dioxide levels? What role do bioindicators play in detecting heavy metal contamination in soil? Discuss the use of freshwater macroinvertebrates as bioindicators for evaluating water quality?	3
Q3	Describe the mechanisms through which microbes increase oil recovery in depleted reservoirs. How can genetically modified microorganisms be used to improve the effectiveness of MEOR? Discuss the role of nutrient injection in stimulating microbial activity for MEOR.	3
Q 4	Discuss the role of various microorganisms in the fermentation processes leading to biohydrogen production. What are the main biological processes for biohydrogen production? Discuss the advantages of biohydrogen over fossil fuel-derived hydrogen.	3
Q 5	Can you explain the key components of a biosensor and their roles in the sensing process? Discuss the role of biosensors in detecting environmental pollutants. Describe the use of biosensors in monitoring microbial	3

		contamination in water.	
Q 6		Describe the process of manufacturing bioplastics from renewable resources. What is the role of microorganisms in bioplastic production? How does the production of bioplastics impact the environment compared to petroleum-based plastics?	3
		Section III	
Q7		What are the advantages of using cell-based bioassays over traditional chemical testing methods in environmental monitoring? What types of environmental contaminants can be detected using cell-based bioassays?	3
Q8		How do first-generation biofuels differ from second-generation biofuels in terms of feedstocks and production methods? Can you discuss the potential role of biofuels in mitigating climate change and reducing dependence on fossil fuels?	4
Q9		Explain the mechanism by which white rot fungi degrade organic pollutants. What are the advantages of using white rot fungi for bioremediation compared to other microorganisms? How do white rot fungi break down lignin and other complex organic compounds in the environment?	4
Q10		Can you describe the fundamental mechanism behind bioluminescence in organisms? How do luciferases and luciferins contribute to the emission of light in bioluminescent organisms?	4
		Total marks	35