

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2024

Subject Code:3150410

Date:25-11-2024

Subject Name:Concepts in Environmental Biotechnology

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define Environmental Biotechnology	03
	(b) Explain the importance of environmental preservation from a biotechnology viewpoint	04
	(c) Analyze how biotechnology can be integrated into renewable energy production, emphasizing the role of biomass and microorganisms.	07
Q.2	(a) List any two renewable sources of energy mentioned in environmental biotechnology.	03
	(b) Describe the role of microorganisms in energy production, such as hydrogen and hydrocarbon production.	04
	(c) Evaluate the effectiveness of micropropagation and stress-tolerant plants in restoring degraded lands. Provide examples to support your analysis.	07
	OR	
	(c) Assess the role of sanitary landfills in waste management, highlighting the environmental challenges of leachate and long-term stability.	07
Q.3	(a) What are the key components of sanitary landfilling?	03
	(b) Differentiate between aerobic and anaerobic wastewater treatment processes with examples of bioreactors used.	04
	(c) Examine the environmental implications of bioplastic production and discuss the potential of this technology as a sustainable alternative to conventional plastics.	07
	OR	
Q.3	(a) What is biogas? Mention one advantage of biogas production.	03
	(b) Discuss how mycorrhizae contribute to the reforestation of degraded lands.	04
	(c) Evaluate the impact of biotechnology on reducing industrial effluent pollution through cleaner technologies, using specific industries as case studies.	07
Q.4	(a) State the role of mycorrhizae in reforestation.	03
	(b) Compare the advantages and disadvantages of biogas reactors used in Indian models.	04
	(c) Critically analyze the role of biosensors in detecting environmental pollutants, discussing their limitations and applications.	07
	OR	
Q.4	(a) Identify two major global environmental issues related to climate change.	03
	(b) Illustrate the role of biotechnology in composting organic waste and its impact on waste management.	04
	(c) Assess the strategies to mitigate global environmental issues, such as climate change and greenhouse gases, from a biotechnological perspective.	07
Q.5	(a) What are bioplastics? Provide a brief definition.	03
	(b) Analyze the role of genetically engineered microbes (GEM) in bioremediation processes.	04

- (c) Analyze the challenges and benefits of using bioreactors for environmental cleanup, focusing on high-rate anaerobic treatment processes. **07**

OR

- Q.5** (a) Name any two bioreactors used for environmental cleanup in wastewater treatment systems. **03**
- (b) Explain the concept of cleaner technologies in industries and their significance in reducing environmental impacts. **04**
- (c) Analyze the potential of bioremediation using genetically engineered microbes (GEM) in addressing oil spills and environmental contamination. **07**
