



Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET UNIVERSITY)

M.Sc. (Fourth Semester – Regular/ Supplementary) Examinations, April – 2026
24MBIPC24001– Environmental Biotechnology
(Biotechnology)

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions**(The figures in the right-hand margin indicate marks)****PART – A****(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Differentiate between in situ and ex situ conservation.	CO1	K2
b. What is particulate matter, and what are the types of PM?	CO2	K1
c. Which microorganism is commonly used to reduce hexavalent chromium (Cr ⁶⁺) to trivalent chromium (Cr ³⁺)?	CO3	K1
d. What antifungal metabolites are produced by <i>Pseudomonas fluorescens</i> ?	CO4	K1
e. What is the role of xylanase in paper production?	CO5	K2

PART – B**(10 x 5 = 50 Marks)**Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Describe the role of microorganisms in the carbon and nitrogen cycle.	5	CO1	K2
b. Write the sources of Water pollution.	5	CO1	K1
(OR)			
c. Discuss solid and hazardous waste management strategies.	5	CO1	K2
d. Describe the kinetics of microbial growth.	5	CO1	K2
3.a. Write any two effects of Air pollution.	5	CO2	K1
b. Explain Bioremediation. Discuss in situ and ex situ techniques with examples.	5	CO2	K3
(OR)			
c. Describe the mechanisms by which microorganisms remediate Mercury (Hg).	5	CO2	K3
d. Explain how organic pollutants Polychlorinated Biphenyls are degraded by microorganisms.	5	CO2	K2
4.a. Differentiate white rot fungi and specialized degrading bacteria in terms of their uses, advantages and disadvantages.	5	CO3	K4
b. Write short notes on phytoaccumulation, phytovolatilization, rhizofiltration, and phytostabilization.	5	CO3	K2
(OR)			
c. Define phytoremediation and explain its significance in the degradation of pollutants.	5	CO3	K2
d. Describe the applications of specialized degrading bacteria in environmental cleanup with examples and limitations.	5	CO3	K3
5.a. Explain nitrogen-fixing symbiosis with suitable examples of legume–Rhizobium interaction.	5	CO4	K2
b. Define PGPR and discuss their uses in agriculture.	5	CO4	K2
(OR)			

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| c. | Describe the role of mycorrhizal fungi in plant nutrition and soil health. | 5 | CO4 | K2 |
| d. | Explain how <i>Pseudomonas fluorescens</i> acts as a biofungicide and plant growth promoter. | 5 | CO4 | K3 |
| 6.a. | Explain the microbial fermentation process used in bioethanol production. | 5 | CO5 | K2 |
| b. | Discuss the production of biodiesel, including raw materials and the microbial role in it. | 5 | CO5 | K2 |

(OR)

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| c. | Describe the process of bioleaching for metal extraction from ore. | 5 | CO5 | K2 |
| d. | Explain the concept of microbiologically enhanced oil recovery (MEOR) and its applications. | 5 | CO5 | K3 |

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