

**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR  
(GIET UNIVERSITY)**

M. Sc. (Fourth Semester) Regular Examinations, April- 2025

**22BTPC401 - Environmental Biotechnology  
(Biotechnology)**



Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

**PART – A**

**(2 x 10 = 20 Marks)**

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Classify the microbes based on their energy and carbon source.	CO1	K1
b. What are bioindicators? Give one example.	CO1	K1
c. Differentiate between in situ and ex-situ bioremediation.	CO2	K2
d. What are the essential environmental conditions for effective biostimulation?	CO2	K2
e. Mention two significant advantages and disadvantages of white rot fungi over Specialized Degrading Bacteria.	CO3	K2
f. State one genetic modification applied to enhance the efficacy of <i>Bacillus thuringiensis</i> .	CO3	K1
g. What is the role of <i>Trichoderma</i> spp. in controlling plant fungal diseases?	CO4	K1
h. Give an example of nitrogen-fixing symbiosis between a plant and a microorganism.	CO4	K1
i. What are genetic modifications applied to enhance the efficacy of Baculoviruses?	CO5	K1
j. Write the causes of ATP loss during aerobic respiration in eukaryotes.	CO5	K2

**PART – B**

**(10 x 5 = 50 Marks)**

Answer **ANY FIVE** questions

	Marks	CO #	Blooms Level
2. a. Elaborate any two effects of Air pollution.	5	CO1	K1
b. Describe the kinetics of microbial growth.	5	CO1	K2
3.a. Describe the role of microorganisms in the sulfur and nitrogen cycle.	5	CO1	K1
b. Describe the pathways of microbial energy metabolism.	5	CO1	K2
4. a. Discuss the difference between biostimulation and bioaugmentation. Provide suitable examples for each.	5	CO2	K2
b. Describe the mechanisms by which microorganisms remediate Mercury (Hg).	5	CO2	K2
5.a. Describe the aerobic biodegradation of Polycyclic Aromatic Hydrocarbons.	5	CO2	K2
b. Explain how organic pollutants Polychlorinated Biphenyls are degraded by microorganisms.	5	CO2	K2
6. a. Differentiate white rot fungi and specialized degrading bacteria in terms of their uses, advantages and disadvantages.	5	CO3	K1
b. Define phytoremediation and explain its significance in the degradation of pollutants.	5	CO3	K1
7.a. Describe the mode of action of Baculoviruses as bioinsecticides.	5	CO4	K2
b. Explain nitrogen-fixing symbiosis with suitable examples of legume–Rhizobium interaction.	5	CO4	K2
8. a. Write the use of xylanases and white rot fungi in the production of paper.	5	CO5	K2
b. Explain the microbial fermentation process used in bioethanol production.	5	CO5	K1

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