

**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT**

**TEST -3 EXAMINATIONS- 2025**

**M.Sc.-II Semester (Biotechnology)**

COURSE CODE (CREDITS): 20MSWBT232 (02)

MAX. MARKS: 35

COURSE NAME: Environmental Biotechnology

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	Questions	Marks
Q1	(a) What is the role of fungi in bioleaching? Among bacteria and fungi which one is better for bioleaching of metal from natural ores and why?	1
	(b) Explain phosphate-solubilizing microorganisms with a suitable example.	1
	(c) Which microorganisms are involved in biohydrogen generation? Give examples.	1
	(d) What is the role of <i>Azospirillum</i> and <i>Azotobacter</i> in agriculture?	1
	(e) What are the various functions of plant growth promoting rhizobacteria (PGPRs)? Give two examples of PGPRs.	1
	<b>Section II</b>	
Q2	Describe the various stages of biogas production. Name the microorganisms involved in anaerobic digestion?	2.5
Q 3	Give a brief account of different value-added metabolites produced by white-rot fungi grown on lignocellulosic wastes and their applications.	2.5
Q4	How do microbes help in increasing oil recovery from reservoirs? What is the role of biosurfactants in MEOR?	2.5
Q5	What are polyhydroxyalkanoates (PHAs)? How are they produced? Describe the process of bioplastic synthesis from starch and give examples of two microorganisms involved in bioplastic production.	2.5
Q 6	Name two metals commonly extracted using bioleaching. Which microorganisms are involved in the bioleaching process?	2.5



Q 7	What are the various types of biofungicides used to control the fungal pathogens. Discuss their mechanism of action and give two examples.	2.5
	<b>Section III</b>	
Q8	What are the major feedstock materials used in bioethanol production in India. Describe the major steps involved in bioethanol production. Enlist the microorganisms commonly used for ethanol production.	5
Q9	Name three microbial agents used as biopesticides and their target pests.	5
	What are the Implications of genetically modified crops vs. sprayed <i>Bacillus thuringiensis</i> formulations? What role do viruses play in pest control?	
Q10	Give a detailed account of symbiosome formation in the root nodules of the leguminous plants. Why is symbiosome compartmentalization essential for effective nitrogen fixation, and what could happen if the peribacteroid membrane is defective or absent?	5
	<b>Total</b>	<b>35</b>