

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2025

M.Sc.-II Semester (Biotechnology)

COURSE CODE (CREDITS): 20MSWBT232 (02)

MAX. MARKS: 25

COURSE NAME: Environmental Biotechnology

COURSE INSTRUCTORS: Ashok Kumar Nadda

MAX. TIME: 1.5 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	CO	Marks
Q1	(a) What is the role of siderophores in microbial metal interactions?		1
	(b) What are biopumps, and how do they function in bioremediation?		1
	(c) How do biofilms contribute to the immobilization of radioactive elements in contaminated sites?		1
	(d) How does pH influence microbial metal uptake?		1
	(e) How do Rhizobium bacteria enhance soil fertility?		1
	Section II		
Q2	How do bacteria like <i>Shewanella</i> and <i>Geobacter</i> help in uranium bioremediation? Explain diagrammatically.		1.5
Q 3	How can mycorrhizal fungi improve nutrient uptake in plants? Discuss the various types of mycorrhizal association.		1.5
Q4	Can white rot fungi (WRF) break down persistent organic pollutants (POPs), such as polychlorinated biphenyls (PCBs)? Discuss the mechanism of removal of PCBs using WRF.		2.0
Q5	How do biopolymers help in the removal of heavy metals from contaminated water? Can biopolymer-based materials be used to recover valuable metals from industrial waste?		2.5
Q6	What are electrogenic microbes, and how do they generate electricity? How can microbial electrochemical systems be used for wastewater treatment?		2.5

	Section III		
Q7	How do bacteria and fungi help in bioremediation of metal-contaminated sites? What mechanisms do microbes use to remove heavy metals from environment?		3
Q8	How do hyperaccumulator plants help in removing heavy metals from soil? What are the best plant species for remediating lead, mercury, or arsenic contamination?		3
Q9	What enzymes do white rot fungi produce that help degrade pollutants? How do white rot fungi differ from brown rot and soft rot fungi in biodegradation?		4
	Total		25