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B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Fifth Semester

18BTE317T - ENVIRONMENTAL BIOTECHNOLOGY

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks) — Answer **all** Questions

		Marks	BL	CO
1.	The process of eutrophication in water will develop as a result of the over growth of (A) Zooplankton (B) Phytoplankton (C) Bacterial (D) Fungi	1	2	1
2.	What kind of pollutant is prevalent in the air? (A) Carbon monoxide (B) Sulphur dioxide (C) Nitrous oxide (D) Nitric oxide	1	3	1
3.	Which bacterial species can withstand radiation? (A) Dactylosporangium (B) Desulfomonas (C) Deinococcus (D) Dermatophilus	1	1	1
4.	The pore size of a reverse osmosis filter is about (A) 1 micron (B) 0.7 micron (C) 0.005 micron (D) 0.0001 micron	1	4	1
5.	What is the second step in conversion of organic material to biogas? (A) Methanogenesis (B) Hydrolysis (C) Acidogenesis (D) Acetogenesis	1	2	2
6.	Methane forming Archaebacteria is sensitive to (A) O_2 (B) CO_2 (C) SO_2 (D) NO_2	1	2	2
7.	Phosphate accumulating organisms can break (A) Poly-D bond (B) Poly-C bond (C) Poly-U bond (D) Poly-P bond	1	1	2
8.	TOL catabolic plasmid available in which bacteria ? (A) Bacillus (B) Pseudomonas (C) Agrobacterium (D) E.coli	1	2	2
9.	What type of lipids affects biofilm formation in bacteria? (A) Rhamnolipid (B) Glycolipid (C) Phospholipid (D) Proteolipid	1	4	2
10.	Which of the following compound is resistant for aerobic biodegradation ? (A) DCE (B) TCE (C) PCE (D) VC	1	2	3
11.	Dispersants application is common for (A) Nitric gas removal (B) Heavy metal removal (C) Solid waste removal (D) Oil spill removal	1	4	3

12.	Which organophosphorus pesticide has the longest soil half-life? (A) Diazinon (B) Ethoprophos (C) Coumaphos (D) Monocrotophos	1	1	3
13.	Which is the key essential component involved in numerous metabolic processes? (A) Acetoacetyl CoA (B) Acetyl-CoA (C) Succinyl CoA (D) Methylmalonyl-CoA	1	2	3
14.	Glutathione s transferase involved in (A) Glutathione conjugation (B) Acetylation (C) Oxidation (D) Hydration	1	2	4
15.	P-type ATPases may transport zinc in (A) Both direction (B) Inside (C) Outside (D) No transport	1	4	4
16.	Formation of metal ion complexes is called (A) Oxidation (B) Reduction (C) Non-chelation (D) Chelation	1	1	4
17.	Bioaccumulation of hydrophobic organic chemicals through (A) Active exchange (B) Passive exchange (C) Both active and Passive exchange (D) Non of the above	1	2	4
18.	Which of the following is non essential metal ? (A) Cu (B) Zn (C) Co (D) Ba	1	5	4
19.	What are most common types of bioplastics? (A) Polysulphone (B) Polyether sulphone (C) Soy-based plastics (D) Polyethererther sulphone	1	2	5
20.	What enzymes are used to soften leather? (A) Oxidases (B) Pectinases (C) Kinases (D) Proteases	1	2	6

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	Define chemistry of coagulation with examples	4	3	1
22.	Define chemical oxygen demand and biological oxygen demand of biosolids?	4	3	2
23.	Explain hydrolysis process of complex organic wastes.	4	2	2
24.	Mechanism of monooxygenases in hydrocarbon degradation ?	4	2	3
25.	What are recalcitrant xenobiotics? Explain with examples?	4	1	3
26.	What is siderophore? Explain siderophore role in heavy metals removal?	4	3	4
27.	Explain about the various leather processing enzymes with neat diagram	4	1	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) Explain in detail about the adsorption and ion exchange process used in wastewater treatment.	12	4	1
	(OR)			
	(b) Describe in detail about radioactive waste management and also explain about metal resistance mechanisms in bacteria.			

29.	(a) Describe in detail about nitrification and denitrification in nitrogen cycle	12	2	2
	(OR)			
	(b) Explain about the various applications of genetically engineered organisms in industrial waste management and wastewater treatment			
30.	(a) Describe about microbial (bacteria, fungi, yeast and algae) assisted degradation of aromatic compounds with metabolic pathways	12	2	3
	(OR)			
	(b) Describe microbial (bacteria, fungi, yeast and algae) assisted degradation of aliphatic compounds with metabolic pathways			
31.	(a) Explain in detail about biosorption and bioleaching in heavy metal removal.	12	1	4
	(OR)			
	(b) Explain in detail about the protein families involved in microbial (bacteria, fungi, yeast and algae) metabolism of heavy-metals			
32.	(a) Explain in detail about extraction of enzymes from slaughterhouse waste and its industrial applications.	12	2	5
	(OR)			
	(b) Explain in detail about the use of anaerobic digestate, activated sludge and biosolids for land application.			

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