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B.Tech. DEGREE EXAMINATION, JUNE 2023

Fifth Semester

18BTE317T - ENVIRONMENTAL BIOTECHNOLOGY

(For the candidates admitted during the academic year 2018-2019 to 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 40 minutes.
ii. **Part - B** and **Part - C** should be answered in answer booklet.

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

Part - A (20 × 1 Marks = 20 Marks)
Answer **All** Questions

		Marks	BL	CO
1.	In Waste Water Treatment, AOP are used to destroy (A) Dissolved organic contaminants (B) Dissolved inorganic contaminants (C) Un-dissolved organic contaminants (D) Un-dissolved inorganic contaminants	1	1	1
2.	Which one is the best catalyst used in Ozonation reactions? (A) Fe^{3+} (B) Fe2+ (C) TiO2 (D) Mn2+	1	1	1
3.	Zeta Potential describes (A) Electrostatic Interactions (B) Ionic Interactions (C) Hydrogen Interactions (D) Covalent Interactions	1	2	1
4.	To increase treatment capacity by adding microorganisms is called (A) Biostimulation (B) Bioaugmentation (C) Insitu Bioremediation (D) Exsitu Bioremediation	1	1	1
5.	Which one is the correct time for COD reflux experiment? (A) Oxidation is brought under acidic conditions at temperature 150 C for 2 hours (B) Oxidation is brought under alkaline conditions at temperature 150 C for 4 hours (C) Reduction is brought under acidic conditions at temperature 300 C for 1 hour (D) Reduction is brought under alkaline conditions at temperature 300 C for 1 hour	1	2	2
6.	The BOD experiment is based on DO concentrations. Which statement is correct? (A) The recycled effluent dilutes the Influent BOD and Increases DO concentrations (B) The recycled effluent dilutes the Influent BOD and Decreases DO concentrations (C) The recycled effluent dilutes the Influent BOD and COD into 1:1 ratios (D) The recycled effluent dilutes the Influent BOD: COD into 1:3 ratios	1	2	2
7.	The C: N ratio of Waste Activated Sludge (WAS) to Green Waste (GW) required to be (A) C: N ratio of 1:20 (B) C: N ratio of 20: 1 (C) C: N ratio of 10:30 (D) C: N ratio of 30:10	1	2	2
8.	The Hydraulic Retention Time for high rate Anaerobic Digester Processes are (A) 10 days (B) 15 days (C) 30 days (D) More than 90 days	1	2	2

9.	The substrate n-alkane is oxidized to alcohol by substrate-specific terminal (A) Monooxygenases/hydroxylases (B) Dioxygenases/hydroxylases (C) Monooxygenases (D) Dioxygenases	1	1	3
10.	Dicarboxylic acid formation from halogenated catechol occurs in.....degradation mechanism. (A) Reductive (B) Oxidative (C) Hydrolytic (D) Transesterification	1	2	3
11.	Which of the following is NOT the characteristic feature of recalcitrant compounds? (A) Condensed benzene rings (B) Three-fold substituted N atoms (C) Quaternary C atoms (D) High solubility in water	1	2	3
12.	Precipitation of metal species by microorganisms depends upon (A) single-oxidation-state metals with Stable forms (B) Single oxidation with soluble form (C) Double oxidation state metals with stable procedures (D) Double oxidation state metals with soluble forms	1	1	3
13.	Which of the following is NOT a biosorption process? (A) Microprecipitation (B) Electrostatic interaction (C) Chelation (D) Electrolysis	1	1	4
14.	The function of Biosurfactant is mainly (A) Bio emulsifier (B) Bio stimulator (C) Bio augmenter (D) Biocatalysts	1	1	4
15.	The enzyme Laccase oxidizes the substrate with the help of (A) O_2 to H_2O (B) O_2 to CO_2 (C) CO_2 to CO (D) CO_2 to CH_3	1	1	4
16.	Dye decolorization is an ---------- process (A) Extracellular reduction (B) Intracellular reduction (C) Extracellular Oxidation (D) Intracellular Oxidation	1	1	4
17.	Bio ethanol is denatured alcohol that is also called as _____ (A) Ethylene (B) Methylated spirit (C) Ethylene glycol (D) Methylene	1	1	5
18.	Which of the following is not a biofuel? (A) Ethanol (B) Methanol (C) Butanol (D) Natural Gas	1	1	5
19.	Which of the integrated waste management is reduced on an individual level? (A) Source reduction (B) Recycling (C) Disposal (D) Burning	1	1	5
20.	Trenches are used for (A) Incineration (B) Landfilling (C) Composting (D) Pulverization	1	1	5

Part - B (5 × 4 Marks = 20 Marks)
Answer **any 5** Questions

		Marks	BL	CO
21.	Briefly discuss the importance of Zeta Potential.	4	3	1
22.	Briefly Ion Exchange processes with suitable examples.	4	1	1
23.	List out the factors affecting anaerobic digestion processes.	4	1	2
24.	Write a short note on Enhanced Biological Phosphate Removal (EBPR) Technology.	4	3	2
25.	Briefly describe Metal Resistant Bacteria with examples.	4	2	4
26.	Write a short note on rhamnolipids and its role in bioremediation.	4	3	4
27.	Write a short note on Nano catalyst used for bioremediation.	4	3	5

Part - C (5 × 12 Marks = 60 Marks)
Answer **All** Questions

		Marks	BL	CO
28.	a. Give a detailed account on Advanced Oxidation Process for Waste Water Treatment. **(OR)** b. Compare and Contrast Physical, Chemical and Biological Methods for Waste Water Treatment.	12	1	1
29.	a. Describe the basic theory of Enhanced Biological Phosphorus Removal (EBPR). **(OR)** b. Describe and show the different treatment configurations used for biological phosphorus removal.	12	3	2
30.	a. Give a detailed account on Aliphatic Biodegradation Pathways. **(OR)** b. Give a detailed account on Aromatic Biodegradation Pathways.	12	3	3
31.	a. Give a detailed account on Microbial heavy metal removal-mechanisms with neat sketch. **(OR)** b. Give a detailed account on Biosurfactants and its applications in Bioremediation Program.	12	3	4
32.	a. Give a detailed account on Value Added Products from Wastes. **(OR)** b. Elaborate Wealth from Waste with examples.	12	3	5

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