Reg. No															

B.Tech DEGREE EXAMINATION, MAY 2024

Fifth Semester

18BTE318T - INDUSTRIAL WASTE MANAGEMENT

(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 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.	Which one of the following is an example of large scale industries? (A) Cotton mills (B) Rice processing units (C) Vegetable oil extraction units (D) Dairy processing industries	1	1	1
2.	A steel industry is termed as 'heavy' industry because of (A) Raw materials and products (B) Cost and products (C) Cost and raw materials (D) Cost	1	2	1
3.	Which is least preferred option of an (inverted) waste management pyramid? (A) Recycle (B) Reuse (C) Recover (D) Dispose	1	2	1
4.	When you are working in an Laminar air flow chamber for 20 min, accidently UV light was kept switched on during your work. What kind of toxicity could have happened? (A) Acute (B) Chronic (C) Sub-acute (D) Sub-chronic	1	3	1
5.	Which form of waste most described as 'COD' (A) Organic (B) Inorganic (C) Floatable solids (D) Sedimentable solids	1	1	2
6.	The best example for widely employed 'Aerobic process' (A) UASB (B) Aerobic Lagoons (C) Activated sludge process (D) Sequential Batch Aerobic Reactor	1	2	2
7.	In sugar industry, the following pattern exist. (A) COD>BOD (B) BOD>COD (C) BOD=COD (D) No BOD	1	4	2
8.	Amongst the following stages, which one is employed for removal dyes and VOCs? (A) Preliminary (B) Primary (C) Secondary (D) Tertiary	1	2	2
9.	The term 'digestion' is best applied for (A) Aerobic process (B) Anaerobic process (C) Dye removal (D) VOCs removal	1	1	3
10.	_____gas is a product of anaerobic digestion that have the property of fuel (A) Nitrogen dioxide (B) Carbon di oxide (C) Methane (D) Hydrogen sulphide	1	2	3

11.	In which stage of anaerobic digestion, complex organic materials are broken into simpler molecules (A) Acidogenesis (B) Acetogenesis (C) Methanogenesis (D) Hydrolysis	1	2	3
12.	The correct order of sequential batch reactor is (A) Draw-Fill-React-Settle-Idle (B) React-Fill-Draw-Idle (C) Fill-React-Draw-Settle-Idle (D) Fill-React-Settle-Draw-Idle	1	2	3
13.	Which metal is an important component of tannery industry effluent? (A) Copper (B) Chromium (C) Iron (D) Sulphur	1	1	4
14.	The best way of handling nuclear waste is (A) Aerobic bioremediation (B) Anaerobic digestion (C) Disposal in the ocean beds (D) Space disposal	1	1	4
15.	Which one of the following is a major contributor of radioactive wastes (A) Medical (B) Mining (C) Nuclear power station (D) Batteries	1	1	4
16.	What might the distance under the ground for deep geological reservoir of nuclear wastes? (A) 5 m (B) 50 m (C) 50 km (D) 5 km	1	1	5
17.	In algal based wastewater treatment, at what stage the algae can be added? (A) Preliminary (B) Primary (C) Secondary (D) Tertiary	1	3	5
18.	Which one of the following is not a factor for growth of algae in a reactor (A) Light (B) Mixing (C) CO_2 (D) COD	1	2	5
19.	Xenobiotics include the following pollutants except (A) Oil sludge (B) Paint sludge (C) Activated sludge (D) Salt sludges	1	2	6
20.	The three components of bioremediation mechanism include the following except (A) Bioavailability (B) Biodegradability (C) Physiological requirements (D) Nitrogen content	1	1	6

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	What are types of toxicity based on exposure?	4	1	1
22.	Schematically explain the waste management pyramid.	4	2	2
23.	What is the difference between preliminary and primary treatment of wastewater and its importance?	4	1	2
24.	Differentiate between aerobic and anaerobic waste treatment with suitable examples.	4	1	3
25.	Explain the air stripping strategy of removal of volatile organic compounds.	4	4	4
26.	Differentiate between *In situ* bioremediation and *Ex situ* bioremediation.	4	4	5
27.	How MFC could solve the energy crisis and water treatment?	4	2	6

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO

28.	(a) Industrial wastes can be classified into two groups. Explain it with an emphasis on effects of industrial pollution.	12	4	1
	(OR)			
	(b) According to your views, what are all the causes of industrial pollution? Describe it categorically.			
29.	(a) Explain the stages of wastewater treatment with a neat flow diagram.	12	4	2
	(OR)			
	(b) Describe the activated sludge process with a schematic representation.			
30.	(a) Compare aerobic and anaerobic digestion process with neat diagrams	12	3	3
	(OR)			
	(b) Is anaerobic digestion is single step or a multi-stage process? Explain the process with schematic representation.			
31.	(a) Explain the advanced oxidation process with suitable examples.	12	3	4
	(OR)			
	(b) What is zero liquid discharge system? Conceptually explain with a neat diagram.			
32.	(a) What are nuclear wastes? How it can be managed through scientific way?	12	3	5
	(OR)			
	(b) Explain the phytoremediation technology for management of hazardous wastes *in-situ*.			

* * * * *