Reg. No.															

B.Tech. DEGREE EXAMINATION, DECEMBER 2023

Fourth Semester

18CEC208T – ENVIRONMENTAL ENGINEERING AND DESIGN

(For the candidates admitted from 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 & Part - C** should be answered in answer booklet.

Time: 3 hours | Max. Marks: 100

	Marks	BL	CO	PO

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

1. The average domestic water consumption per capita per day for an Indian city as per standards. | 1 | 1 | 1 | 1
   (A) 132 lpcd (B) 145 lpcd
   (C) 155 lpcd (D) 165 lpcd

2. Water losses in water supply system are assumed as | 1 | 1 | 1 | 1
   (A) 5% (B) 7.5%
   (C) 15% (D) 25%

3. The suitable layout for a water supply distribution system for an irregularly grown town is | 1 | 1 | 1 | 1
   (A) Dead end system (B) Grid end system
   (C) Ring system (D) Radial system

4. Which one of the following practices causes reduction in the per capita water consumption? | 1 | 1 | 1 | 1
   (A) Good quality of water (B) Hotter climate
   (C) Modern living (D) Metering system

5. Which removes very fine colloidal suspended particles and microorganisms? | 1 | 1 | 2 | 1
   (A) Filtration (B) Sedimentation
   (C) Sedimentation with coagulation (D) Aeration

6. Which is called as universal coagulant? | 1 | 1 | 2 | 1
   (A) Aluminium sulphate (B) Coppers
   (C) Sodium aluminate (D) Magnesium

7. The rate of filtration in slow and filters in between | 1 | 1 | 2 | 1
   (A) 1000 – 2000 l/m^2/hr (B) 100 – 200 l/m^2/hr
   (C) 1500 – 3000 l/m^2/hr (D) 3000 – 6000 l/m^2/hr

8. The treatment of water with bleaching power is known as | 1 | 1 | 2 | 1
   (A) Pre-chlorination (B) De-chlorination
   (C) Super chlorination (D) Hypo-chlorination

9. A manhole is generally classified as a deep manholes, if its depth more than 1 1 3 1
   (A) 0.9 m (B) 1.2 m
   (C) 1.5 m (D) 2.0 m

10. The pipe in house plumbing, which carries the discharge from kitchen, bathrooms etc is 1 1 3 1
   (A) Waste pipe (B) Soil pipe
   (C) Hume pipe (D) Vent pipe

11. The rate of sludge accumulation in a septic tank is generally of the order of 1 1 3 1
   (A) 20 litres/ head / day (B) 30 litres/ head / day
   (C) 35 litres/ head / year (D) 30 litres/ head / year

12. The detention period for grit chamber is 1 1 3 1
   (A) One second (B) Sixty seconds
   (C) Thirty seconds (D) Twenty seconds

13. The dissolved oxygen sag curve manifests 1 1 4 1
   (A) BOD demand (B) Dissolved oxygen deficit
   (C) Variation of dissolved oxygen saturation (D) BOD deficit

14. At least _____ of dissolved oxygen must be present in heated wastewater while discharging it into another water body. 1 1 4 1
   (A) 7 ppm (B) 2 ppm
   (C) 6 ppm (D) 4 ppm

15. What is the first step in the sludge treatment process? 1 1 4 1
   (A) Thickening (B) Dewatering
   (C) Digestion (D) Phosphorus recovery

16. Reducing the sludge volume increase _____. 1 1 4 1
   (A) pH (B) Temperature
   (C) Concentration (D) Water

17. Which is the most widely used technique for removing particulate matter? 1 1 5 1
   (A) Loud speakers (B) Growing trees
   (C) Electrostatic precipitators (D) Magnets

18. The gas that is mainly produced due to the incomplete burning of wood is _____. 1 1 5 1
   (A) NO_2 (B) CO
   (C) NO_3 (D) SO_2

19. Which of the below is not an idea behind solid waste management? 1 1 5 1
   (A) Control of waste generation (B) Storage and collection
   (C) Disposal (D) Stop waste generation

20. How many types of landfills are there? 1 1 5 1
   (A) Two (B) Three
   (C) Four (D) Five

PART – B (5 × 4 = 20 Marks)
Answer **ANY FIVE** Questions

		Marks	BL	CO	PO
21.	Write short notes on water borne diseases.	4	2	1	1
22.	Explain about theory of filtration.	4	2	2	1
23.	Write short notes on activated sludge process.	4	2	3	1
24.	What do you mean by self-purification of rivers?	4	2	4	1
25.	How to quantity the solid waste generated in cities? Brief.	4	2	1	1
26.	Discuss on various types of water demand.	4	2	1	1
27.	Write short notes on control measures for air pollution.	4	2	5	1

PART – C (5 × 12 = 60 Marks)
Answer **ALL** Questions

		Marks	BL	CO	PO
28. a.	The population of fire decades 1930, 1940, 1950, 1960 and 1970 are 25,000, 28,000, 34,000, 42,000 and 47,000 respectively. Calculate the population for the year 1980, 1990 and 2000, using three standard methods.	12	4	1	1
	(OR)				
b.	Explain in detail about the various surface and subsurface sources of water available for public supplies with salient features.	12	3	1	1
29. a.	Design six slow sand filter beds from the following data: Population to be served = 50,000 Per capita demand = 150 lpcd Rate of filtration = 180 l/m^2/hr Length of each bed = twice the breadth Assume max demand as 1.8 times the average daily demand. Also assume that one unit, out of sixone will be kept as stand by.	12	4	2	1
	(OR)				
b.	Explain in detail about the types of sedimentation tanks and its design features with neat sketches.	12	3	2	1
30. a.	Design a suitable bar screens for treating 60 million litres of sewage per day. Assume relevant data required.	12	4	3	1
	(OR)				
b.	Explain in detail about the working principle of septic tanks with a neat sketches.	12	3	3	1
31. a.	Discuss in detail about the oxygen sag curve with a neat sketch and also brief about self purification of rivers.	12	3	4	1
	(OR)				

b.	Explain in detail about the treatment and disposal of sludge generated in treatment plant with a neat flow sheet.	12	3	4	1
32. a.	Discuss in detail about the various methods of disposal of solid waste generated.	12	3	5	1
	(OR)				
b.	Explain in detail about the various control measures or methods of noise pollution.	12	3	5	1

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