B.Tech. DEGREE EXAMINATION, MAY 2023
Fourth Semester

18CEC208T – ENVIRONMENTAL ENGINEERING AND DESIGN
(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 & 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	PO

1. Which one of the following would contain water with maximum amount of turbidity?   1   1   1   1
   (A) Lakes   (B) Oceans
   (C) Rivers   (D) Wells

2. The suitable layout of a distribution system for irregularly growing town is   1   1   1   1
   (A) Dead and system   (B) Grid iron system
   (C) Radial system   (D) Circular system

3. Water losses in water supply system are assumed as   1   1   1   1
   (A) 5%   (B) 10%
   (C) 15%   (D) 20%

4. The average domestic water consumption per capita for an Indian city as per the standard is   1   1   1   1
   (A) 125 l/c/d   (B) 135 l/c/d
   (C) 145 l/c/d   (D) 155 l/c/d

5. The only disinfection in solid, liquid and gaseous from   1   1   2   1
   (A) Chlorine   (B) Bromine
   (C) Iodine   (D) Fluorine

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

7. The rate of filtration in slow sand filter ranges from   1   1   2   1
   (A) 1000 to 2000 l/hr/m^2 (B) 100 to 200 l/hr/m^2
   (C) 1500 to 3000 l/hr/m^2 (D) 3000 to 6000 l/hr/m^2

8. Which is called as universal coagulant?   1   1   2   1
   (A) Aluminium sulphate   (B) Sodium sulphate
   (C) Copper   (D) Magnesium sulphate

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

10. Sewers are laid straight from their   1   1   3   1
    - (A) Off-take point
    - (B) Out fall point
    - (C) Mid point
    - (D) Any point

11. For the combined sewerage system egg shaped sewers are preferred because   1   1   3   1
    - (A) Construction is economical
    - (B) Structurally more stable
    - (C) Maintenance is easier
    - (D) Offer good velocity of flow in dry season

12. The sewer which carries the sewage to waste water treatment plant is   1   1   3   1
    - (A) House sewer
    - (B) Main sewer
    - (C) Out fall sewer
    - (D) Outlet sewer

13. Which one of the following is primary lake pollutant?   1   1   4   1
    - (A) Iodine
    - (B) Phosphorus
    - (C) Potassium
    - (D) Sodium

14. In which pollution zone of river, growth of algae reappear   1   1   4   1
    - (A) Zone of degradation
    - (B) Zone of recovery
    - (C) Zone of active decomposition
    - (D) Zone of clean water

15. Energy may be recovered from sludge as   1   1   4   1
    - (A) Hydrogen gas
    - (B) Methane gas
    - (C) Air fuel
    - (D) Liquid hydrogen

16. Reducing sludge volume increases   1   1   4   1
    - (A) pH
    - (B) Temperature
    - (C) Concentration
    - (D) Water

17. What is the dB of threshold pain?   1   1   5   1
    - (A) 100
    - (B) 110
    - (C) 120
    - (D) Above 140

18. Which pollution cause hearing loss in organisms?   1   1   5   1
    - (A) Air pollution
    - (B) Noise pollution
    - (C) Soil pollution
    - (D) Water pollution

19. In which method of disposal of MSW, the waste is dumped in soil?   1   1   5   1
    - (A) Incineration
    - (B) Composting
    - (C) Land filling
    - (D) Shredding

20. Which one of the following is the most expensive component of solid waste handling?   1   1   5   1
    - (A) Collection
    - (B) Storage
    - (C) Treatment
    - (D) Separation

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

	Marks	BL	CO	PO
21. What are the factors affecting per capita demand?	4	2	1	1
22. Briefly explain artesian spring and gravity spring.	4	2	1	1
23. What are the different types of coagulant used in water treatment?	4	2	2	1
24. Explain the principle of aerobic and anaerobic treatment systems.	4	3	3	1
25. Write briefly about sewage sickness and remedial measures.	4	3	4	1
26. How energy could be recovered from sludge?	4	3	5	1
27. Explain the importance of source reduction in MSW management.	4	3	5	1

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

Marks   BL   CO   PO

28. a. Estimate the population for the year 2020, 2030 and 2040 using the following data by arithmetical increase method.   12   2   1   1

Year	1970	1980	1990	2000	2010
Population	25000	28000	34000	42000	47000

(OR)

b. Explain about variation in demand of water and their effects on the design of various components of a water supply scheme.   12   2   1   1

29. a. Write about the working and function of slow and filter with a neat sketch.   12   2   2   1

(OR)

b. Design a rectangular sedimentation tank to treat 2.4 millions litres of raw water per day. Assume the detention period as 3 hours.   12   2   2   1

30. a. Explain in detail on activated sludge process with a neat sketch and also its principles involved.   12   2   3   1

(OR)

b. Design a grit chamber for a maximum flow of 120 MLD with a settling velocity of 1.25 m/min. Assume the average flow equal to half of the maximum flow.   12   3   3   1

31. a. Explain in detail about different zones of pollution in a river stream.   12   2   4   1

(OR)

b. Explain in detail about oxygen sag curve with neat sketch.   12   2   4   1

32. a. Explain the various methods of solid waste disposal.   12   2   5   1

(OR)

b. Write in detail about the major air pollutants and its effects.   12   2   5   1

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