Register No.:　　.................................　　Name:　　..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)
(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)
SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R,S), MAY 2024
CIVIL ENGINEERING
(2020 SCHEME)

Course Code:	**20CET304**
Course Name:	**Environmental Engineering**
Max. Marks:	**100** 　　　　　　　　　　　　**Duration: 3 Hours**

PART A
(Answer all questions. Each question carries 3 marks)

1. Differentiate dry weather flow and storm water flow.
2. Explain various systems of sewerage.
3. Explain the theory of sedimentation.
4. Explain various types of settling.
5. Explain various types of pipe networks.
6. Describe Hardy-Cross method for the analysis of complex pipe networks.
7. Discuss the suitability of activated sludge unit for a very small town.
8. Explain the operational troubles of trickling filter.
9. Describe lagooning in detail.
10. Explain composting with advantages.

PART B
(Answer one full question from each module, each question carries 14marks)

MODULE I

11. a) The following is the population data of a city available from past census records. Determine the population of the city in 2021 using 1) arithmetic increase method 2) geometric increase method 3) incremental increase method. (9)

Year	1951	1961	1971	1981	1991	2001	2011
Population	13000	16500	27000	42000	58000	68000	73500

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    b) Describe fire demand and enlist different empirical formulae for the determination of fire demand. (5)

OR

12. a) Differentiate gravity flow and pressure flow. (4)
    b) Explain various factors governing the location of intake structures. Illustrate a river intake structure with figure. (10)

MODULE II

13. a) Derive Stoke's law. (7)

    b) Explain the principle behind coagulation. Describe various coagulants. (7)

OR

14. a) Classify different screens used for water treatment and also explain the need of screening. (7)

    b) Design the dimensions of a plain sedimentation tank to treat 6 MLD of water assuming a detention period of 6 hours and velocity of flow 20cm per minute. Also draw a neat sketch. (7)

MODULE III

15. a) Compare slow sand gravity filter and rapid sand gravity filter. (7)

    b) Explain the working of a slow sand filter with a neat sketch. (7)

OR

16. a) Design the dimensions of a set of rapid sand filters for treating water required for a population of 50000, the rate of supply being 180 litres per day per person. The filters are rated to work 6000 litres per hour per square metre. Make suitable assumptions wherever necessary. (7)

    b) Explain various methods of disinfection. (7)

MODULE IV

17. a) Design an activated sludge plant to treat domestic sewage with diffused air aeration system for the following data:

> Population = 65,000
> Sewage flow = 210 lpcd
> BOD of sewage = 210 mg/l
> BOD removed in primary treatment = 40%
> Overall BOD reduction desired = 90%

(10)

    b) Explain various types of trickling filters. (4)

OR

18. a) Explain the `principle and constructional details of a trickling filter with a neat sketch. (9)

    b) Compare aerobic and anaerobic systems of waste treatment. (5)

MODULE V

19. a) Explain construction details of a septic tank with necessary sketches. (9)

    b) Design the dimensions of a septic tank for a small colony of 50 persons provided with an assured water supply from the municipal (5)

headwork at the rate of 60 lpcd. Assume any data if required.

OR

20. a) Explain the functioning of a soak pit with a neat sketch. (7)
     b) Explain anaerobic digestion and UASB. (7)

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