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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S4 (PT) (S) Examination January 2024 (2019 Scheme)

Course Code: CET304

Course Name: ENVIRONMENTAL ENGINEERING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1		Justify the necessity for water treatment in a public health perspective.	(3)
2		Differentiate between dry weather flow and storm water flow.	(3)
3		List out the criteria for selection of site for a water treatment plant.	(3)
4		Explain the four types of settling.	(3)
5		Enlist and explain any three factors affecting the efficiency of chlorination	(3)
6		Discuss the different methods of water distribution	(3)
7		Draw the layout of a wastewater treatment plant and indicate primary secondary and tertiary treatment units	(3)
8		Explain the methods of aeration employed in activated sludge process.	(3)
9		Describe the wastewater treatment using root zone systems	(3)
10		Discuss the different methods of sludge thickening	(3)

PART B

Answer one full question from each module, each carries 14 marks.

Module I

11	a)	A town of area 0.5 sq km has a population of 72,000. 30% of the area consists of roof tops having an impermeability coefficient of 0.9, 25% of the area consists of paved surface of houses having an impermeability coefficient of 0.8, 35% of the area consists of gardens having an impermeability coefficient of 0.5, 10% of the area is unpaved having an impermeability coefficient of 0.25. Design the discharge of a combined sewerage system if the time of concentration of the rain is 30 min. The per capita demand of water supply may be assumed as 150 lpcd.	(10)
	b)	Differentiate separate and combined systems of sewerage	(4)

OR

12 A water supply system is proposed to be designed for a city having a per capita demand of 135 lpcd. Determine the maximum demand and coincident draft to which the water supply system may be designed considering an average design period as 30 years. Adopt Arithmetic increase method. (14)

Year	1971	1981	1991	2001	2011
Population	129163	275500	307600	485208	635375

Module II

13 a) What are the distinctive features and mechanisms of various types of coagulants employed in purification of water? Give advantages and disadvantages. (10)

b) Explain any two types of aerators used in water treatment (4)

OR

14 a) Design a continuous flow rectangular sedimentation tank for a population of 20,000 persons with an average per capita demand of 120 litres per day. Assume detention period of 6 hours. (10)

b) Derive the expression for velocity of settling using stokes law (4)

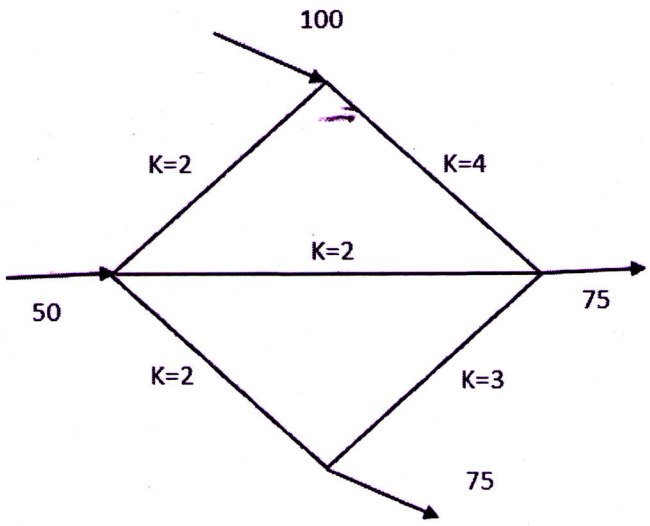
Module III

15 a) With a neat sketch explain the working of a rapid sand filter (10)

b) Explain any two methods used for the disinfection of water (4)

OR

16 Determine the distribution of flow in the pipe network shown in figure. The head loss h_L may be assumed as KQ^2. The value of K for each pipe is indicated in the figure. Use Hardy-Cross method. Limit to three iterations (14)



Module IV

17 a) Explain the aerobic and anaerobic methods of wastewater treatment with suitable examples of treatment units (10)

b) Explain the role of equalization tank in wastewater treatment. (4)

OR

18 a) Describe any three unit operations in a wastewater treatment plant (9)

b) What is meant by Ponding nuisance in a trickling filter? How to prevent it? (5)

Module V

19 a) With a neat sketch, discuss the functioning of a UASB (8)

b) Explain in detail any two types of sludge disposal (6)

OR

20 Design the dimensions of a septic tank and soak pit for a community of 200 people. The water supply rate is 135 litres/person/day. Assume any other suitable data required. Provide a neat sketch of the designed septic tank (14)

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