U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**

Branch: Civil Engineering **Duration: 3 hrs.**

Course Code: 23CV4PCENV **Max Marks: 100**

Course: Environmental Engineering - I

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	With the help of following data, estimate the future population of town in the year 2030, 2040 and 2050 using Arithmetic, Geometrical and incremental increase method Year: 1990, 2000, 2010, 2020 Population: 8000, 12000, 17000, 22500	CO1	PO 1	**10**
	b)	With neat diagram explain the variations in water demand	CO1	PO1	**10**
		OR			
2	a)	Define per capita water demand and explain the factors affecting per capita demand.	CO1	PO1	**10**
	b)	Describe fire demand? Calculate the fire demand of a city having a population of 250000 using Kuichling's formula	CO1	PO1	**4**
	c)	Explain the various types of water demands required for planning a water supply scheme for a city	CO1	PO1	**6**
		UNIT - II			
3	a)	Illustrate with a sketch, the most economical diameter of pumping main?	CO2	PO1	**6**
	b)	With neat diagram explain reservoir intake structure.	CO2	PO1	**8**
	c)	From a clear water reservoir 2.5 m deep at level 32, water is pumped to an elevation of RL 80 at a constant rate of 810000 liters for a length of 1200 m. Take f = 0.04. Determine the economical diameter of pipe and total head	CO2	PO1	**6**
		OR			
4	a)	Give the maximum acceptable limits for the following water quality parameters as per IS 10500: 2012, also discuss their undesirable health effects, if they exceed the prescribed limit in public water supply. (i) pH (ii) Nitrate (iii) Chlorides (iv) Iron (v) Fluorides	CO2	PO1	**10**

		b)	Explain the physical, chemical and biological characteristics of water	*CO2*	*PO1*	**10**
			UNIT - III			
	5	a)	Design a rectangular sedimentation tank to treat 2.4 ML of raw water per day. The detention period may be assumed as 3 hours.	*CO2*	*PO1*	**8**
		b)	With a neat sketch, explain the working principle of circular sedimentation tank,	*CO2*	*PO1*	**8**
		c)	Define co agulation and flocculation.	*CO2*	*PO1*	**4**
			OR			
	6	a)	With a neat sketch, explain the working principle of slow sand filters	*CO2*	*PO1*	**10**
		b)	Design six slow sand filter beds from the following data: Population to be served: 50,000 persons Per capita demand: 150 L/head/day Rate of filtration: 180 L/hr/sq.m Length of each bed: twice the breadth. Assume maximum demand as 1.8 times the average daily demand. Also assume one unit out of six to be kept as standby.	*CO2*	*PO1*	**10**
			UNIT - IV			
	7	a)	Define (i) Double chlorination (ii) Residual chlorine (iii) De chlorination (iv) Pre chlorination	*CO2*	*PO1*	**4**
		b)	With the help of neat diagram describe the process of Break point chlorination	*CO2*	*PO1*	**6**
		c)	Explain in detail Micro filtration and Ultrafiltration	*CO2*	*PO1*	**10**
			OR			
	8	a)	Explain in detail Nano filtration and Reverse osmosis	*CO2*	*PO1*	**10**
		b)	With the help of neat diagram explain Zeolite process for water softening	*CO2*	*PO1*	**10**
			UNIT - V			
	9	a)	Explain in detail radial system, dead end system and Gridiron system of water distribution system with neat diagram	*CO3*	*PO1*	**10**
		b)	Explain in detail grey water recycling and rain water harvesting	*CO3*	*PO1*	**10**
			OR			
	10	a)	Explain the various joints in sewer	*CO3*	*PO1*	**10**
		b)	With a neat diagram explain the plumbing system in building	*CO3*	*PO1*	**10**

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