U.S.N.										

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

Autonomous Institute Affiliated to VTU

February 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 23CV4PCENV / 22CV4PCENV **Max Marks: 100**
Course: Environmental Engineering -1

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. UNIT II AND UNIT III HAS CHOICE.

				CO	PO	Marks
			UNIT - I			
1	a)		Define Per Capita Demand. Explain the Factors effecting per capita Demand	CO1	PO1	**06**
	b)		For the following data given below, estimate the future population of a city in the year 2042 by (i) AIM, (ii) GIM, and (iii) IIM. Comment on their relative merits and demerits of each method.	CO1	PO1	**08**

Year	1931	1941	1951	1961	1971	1981	1991
Population	12000	16500	26800	41500	57500	68000	74100

	c)		Define (i) Wholesome water (ii) Design Period (iii) Fire Demand (iv)Safe Water (v) Palatable Water (iv) Water Demand	CO1	PO1	**06**
			OR			
2	a)		As a public health officer, you are responsible for ensuring the safety of drinking water in a community. Explain the key differences between safe, wholesome, and palatable water and outline the regulatory measures you would implement to achieve these goals.	CO1	PO1	**06**
	b)		What is design period? Discuss on the variations in rate of water demand.	CO1	PO1	**06**
	c)		The population of 5 decades from 1930 to 1970 are given below in table. Estimate the population after one, two and three decades beyond last known decade, by arithmetic increase and geometric increase method.	CO1	PO2	**08**

Year	1930	1940	1950	1960	1970
Population	25000	28000	34000	42000	47000

			UNIT - II			
3	a)		With the help of diagram, explain Reservoir intake	CO2	PO1,2	**08**
	b)		A Centrifugal pump is driven by electric motor which lifts water to a total height of 50 m from the reservoir to discharge end. The pump efficiency is 77 % and the motor efficiency is 85 %. The lift is 300 m long and 10 cm diameter pipe and the pumping rate is 1500 L/min. If 4f = =0.025 and power cost is 25 paisa/ KW, what is the cost of power for pumping 4 ML of water.	CO2	PO1,2	**08**
	c)		Explain the importance of priming in centrifugal pump	CO2	PO1,2	**04**
			OR			

4	a)	Give the maximum permissible limits as per the BIS for the following water quality parameters. Also indicate their health significance i) Chlorides ii)Magnesium iii) Calcium iv) Lead v) Turbidity	*CO2*	*PO1,2*	**10**
	b)	Define Sampling. Explain the various types of sampling.	*CO2*	*PO1,2*	**06**
	c)	Enumerate the necessity of Microbiological examination of water.	*CO2*	*PO1,2*	**04**
		UNIT - III			
5	a)	With help of the neat labelled diagram, explain the working of Clarifloculator.	*CO2*	*PO1,2*	**08**
	b)	Design a sedimentation tank rectangular in shape to treat 2 million liters of raw water with detention period of 2 hours and overflow rate less than 45,000 liters per day per unit surface area. The water contains 700 mg/L of suspended solids, 35% of which are settleable, calculate the volume of sludge storage for one month cleaning period	*CO2*	*PO1,2*	**08**
	c)	Define co-agulation and list the various co-agulants commonly used in water treatment process.	*CO2*	*PO1,2*	**04**
		OR			
6	a)	With help of the neat labelled diagram, explain the working of Slow sand filter	*CO2*	*PO1,2*	**08**
	b)	Design a rapid sand filter for treating water required for a population of 50000. The rate of supply being 180 L/D/P. The filters are rated to work at 5000 L/hr/m^3. Assume the necessary data.	*CO2*	*PO1,2*	**08**
	c)	With diagram explain cascade type of aerator	*CO2*	*PO1,2*	**04**
		UNIT - IV			
7	a)	Define chlorination. Explain in detail any two methods of chlorination	*CO3*	*PO1*	**06**
	b)	Explain reverse osmosis process of water softening	*CO3*	*PO1*	**06**
	c)	Define (i) Microfiltration (ii) Nano - Filtration (iii) Lime Soda process(iv) Ultrafiltration	*CO3*	*PO1*	**08**
		OR			
8	a)	In a distribution network, the residual chlorine levels are consistently below the recommended threshold. Describe the potential causes of low residual chlorine and the health risks associated with inadequate disinfection. Outline the corrective actions you would take to address this issue.	*CO2*	*PO1*	**06**
	b)	Explain Briefly break point and super chlorination.	*CO2*	*PO1*	**06**
	c)	Differentiate between lime soda process and zeolite process	*CO2*	*PO1*	**08**
		UNIT - V			
9	a)	Illustrate and explain with diagram Radial and dead end distribution network systems	*CO3*	*PO1*	**08**
	b)	Explain requirements of a good sewer joint.	*CO3*	*PO1*	**06**
	c)	Explain any two water conservation Techniques.	*CO3*	*PO1*	**06**
		OR			
10	a)	Illustrate with sketches the different types of layouts of pipe systems in distributing water and compare their merits and demerits.	*CO3*	*PO1*	**10**
	b)	Discuss the various types of water piping systems that may be employed in buildings for fulfilling the water demands of its residents, giving merits and demerits of each system.	*CO3*	*PO1*	**10**

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