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

Autonomous Institute Affiliated to VTU

February 2025 Semester End Main Examinations

Programme: B.E.

Branch: Civil Engineering

Course Code: 23CV4PCENV / 22CV4PCENV

Course: Environmental Engineering -1

Semester: IV

Duration: 3 hrs.

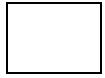
Max Marks: 100

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.

UNIT - I			CO	PO	Marks
1	a)	Define Per Capita Demand. Explain the Factors effecting per capita Demand	<i>CO1</i>	<i>PO1</i>	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.	<i>CO1</i>	<i>PO1</i>	08
	c)	Define (i) Wholesome water (ii) Design Period (iii) Fire Demand (iv)Safe Water (v) Palatable Water (iv) Water Demand	<i>CO1</i>	<i>PO1</i>	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.	<i>CO1</i>	<i>PO1</i>	06
	b)	What is design period? Discuss on the variations in rate of water demand.	<i>CO1</i>	<i>PO1</i>	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.	<i>CO1</i>	<i>PO2</i>	08
		UNIT - II			
3	a)	With the help of diagram, explain Reservoir intake	<i>CO2</i>	<i>PO1,2</i>	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.	<i>CO2</i>	<i>PO1,2</i>	08
	c)	Explain the importance of priming in centrifugal pump	<i>CO2</i>	<i>PO1,2</i>	04
		OR			

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.

	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



B.M.S.C.E. - ODD SEM 2024-25