U.S.N.										

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

Autonomous Institute Affiliated to VTU

September / October 2023 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 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.

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)		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: 1972, 1982, 1992, 2002, 2012 Population: 81,420, 12,5000, 1,70,000, 2,20,000, 2,30,000			
	c)		Define (i) Wholesome water (ii) Design Period (iii) Fire Demand	CO1	PO1	**06**
			UNIT - II			
2	a)		With the help of diagram, explain twin well type of river 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)		With a sketch, illustrate economical diameter of rising main.	CO2	PO1,2	**04**
			OR			
3	a)		Give the maximum permissible limits as per the BIS for the following water quality parameters. Also indicate their health significance i) Fluoride ii) pH iii) Total hardness iv) Nitrate v) Turbidity	CO2	PO1,2	**10**
	b)		In a water quality testing center, the following data is obtained on E-coli bacteria. Determine the MPN value and comment on the result obtained. Sample size: 10ml, 1ml, 0.1ml, 0.01ml portions: 5, 5, 5, 5 Positive No: 5, 4, 2, 1	CO2	PO1,2	**04**

BMSCE - EVEN SEM 2022-23

	c)	Briefly explain water borne diseases.	*CO2*	*PO1,2*	**06**
		UNIT - III			
4	a)	With help of the neat labelled diagram, explain the working of circular sedimentation tank.	*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)	Explain Coagulation and flocculation process.	*CO2*	*PO1,2*	**04**
		OR			
5	a)	With help of the neat labelled diagram, explain the working of Rapid sand filter	*CO2*	*PO1,2*	**08**
	b)	Design a co-agulation sedimentation tank with continuous flow for treating water for a population of 45000 persons with average daily consumption of 135 L/person. Assume surface loading rate of 0.9 $m^3/m^2/hr$. and that weir loading rate is within acceptable limits.	*CO2*	*PO1,2*	**08**
	c)	With diagram explain cascade type of aerator.	*CO2*	*PO1,2*	**04**
		UNIT - IV			
6	a)	With diagram illustrate break point chlorination.	*CO3*	*PO1*	**06**
	b)	Explain reverse osmosis process with the help of neat sketch.	*CO3*	*PO1*	**06**
	c)	Define (i) Microfiltration (ii) De-chlorination (iii) Super chlorination (iv) Ultrafiltration	*CO3*	*PO1*	**08**
		UNIT - V			
7	a)	Illustrate with diagram different distribution network systems.	*CO3*	*PO1*	**08**
	b)	Explain (i) Bell and Spigot joint (ii)Collar joints (iii) Simplex joints	*CO3*	*PO1*	**06**
	c)	Explain any two water conservation techniques.	*CO3*	*PO1*	**06**

B.M.S.C.E. - EVEN SEM 2022-23

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