U.S.N.										

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

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 23CV4PCENV **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)	Calculate the fire demand for the water supply scheme that is designed for population having 2,000,00 by using (i)Kuching's formula (ii)Freeman formula (iii)National board of fire under writer's formula. Also calculate the Coincident draft for average water consumption of 135 lpcd (Assume maximum daily draft as 45 Million litres per day).	*CO* 1	*PO1*	**10**
	b)	With the help of following data, estimate the future population of town in the year 2021 and 2031 using Arithmetic, Geometrical and incremental increase method Year: 1951, 1961, 1971, 1981, 1991, 2001 Population: 40000, 47500, 60000, 68000, 72000, 98000	*CO* 1	*PO1*	**10**
		UNIT – II			
2	a)	With neat diagram explain twin well type river intake structure.	*CO* 1	*PO1*	**10**
	b)	A city has a population of 1,50,000. Water is to be supplied at the rate of 160 Liters per head per day. If the static lift of the pump is 40 m, Calculate the BHP of the Motor. The rising main is 300 m long and its diameter is 50 cm. Assume that motor efficiency is 85 %, Pump efficiency is 60 %, f = 0.01 and the peak hour demand is 1.5 times the average demand.	*CO* 1	*PO1*	**10**
		OR			
3	a)	Mention the acceptable limits for the following as per IS 10500:2012 and also explain their undesirable health effects, if the limit is exceeded in drinking water supply: (i)Turbidity (ii) Fluorides (iii) Lead (iv) Nitrate, (v) Iron	*CO* 1	*PO1*	**10**
	b)	With a neat sketch, explain the working principle of circular sedimentation tank	*CO* 1	*PO1*	**10**
		UNIT - III			
4	a)	With the help of neat diagram explain the working principle of slow sand filter.	*CO* 2	*PO1*	**10**

		b)	A coagulation sedimentation tank purifies 50 ML of water per day. The raw water has an alkalinity of 4 mg/L of $CaCO_3$. Filter alum required is 20 mg/L. Determine the alum and quick lime (Containing 85 % of CaO) required per year by the plant. Take the following molecular weights: Al = 27, S = 32, O = 16, Ca = 40, C = 12	***CO*** 2	***PO1***	**10**
			OR			
	5	a)	Define Aeration. List the various types of Aerators and explain in detail Cascade Aerator with neat diagram	***CO*** 2	***PO1***	**06**
		b)	Design a rectangular sedimentation tank to treat 2 MLD with detention period of 2 hours and overflow rate less than 45000 L/D/m^2. 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.	***CO*** 2	***PO1***	**10**
		c)	Differentiate between slow sand and rapid sand filters.	***CO*** 2	***PO1***	**04**
			UNIT – IV			
	6	a)	With the help of neat diagram explain Zeolite process for water softening	***CO*** 3	***PO1***	**10**
		b)	Define (i) Post chlorination (ii) Residual chlorine (iii) De chlorination (iv) Pre chlorination	***CO*** 3	***PO1***	**04**
		c)	With the help of neat diagram describe the process of Break point chlorination	***CO*** 3	***PO1***	**06**
			UNIT – V			
	7	a)	Explain in detail radial system, dead end system and Gridiron system of water distribution system with neat diagram	***CO*** 3	***PO1***	**12**
		b)	Explain in detail grey water recycling and rain water harvesting	***CO*** 3	***PO1***	**8**

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