U.S.N.										

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

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 19CV4PCWSE **Max Marks: 100**
Course: Water Supply Engineering

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

			CO	PO	Marks
		UNIT – I			
1	a)	Explain the importance and need for protected water supply.	*CO* 1	*PO1,2*	**06**
	b)	Describe fire demand? Calculate the fire demand of a city having a population of 300000 using various formulae	*CO* 1	*PO1,2*	**06**
	c)	Predict the population for the year 2021 and 2031 from the following population data using a) Arithmetical Increase method, b) Geometrical Increase method, and c) Incremental Increase method.	*CO* 1	*PO1,2*	**08**

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

		UNIT – II			
2	a)	Describe an Intake structure. Illustrate with a neat sketch, a reservoir intake structure along with various components	*CO* 1	*PO1,2*	**10**
	b)	A city has a population of 1,50,000. Water is to be supplied at the rate of 160 litres per head per day. If the static lift of the pump is 40m, calculate the BHP of 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	*PO1,2*	**10**
		UNIT - III			
3	a)	Explain the methods of sampling.	*CO* 2	*PO1,2*	**04**
	b)	Enumerate the drinking water quality standards for the following parameters as per IS 10500-2003 and discuss their effects when they are not in their limits. (i) Fluoride (ii) Nitrate (iii) Hardness	*CO* 2	*PO1,2*	**06**
	c)	Enumerate various water borne diseases and suggest preventive measures employed.	*CO* 2	*PO1,2*	**10**
		OR			

	4	a)	Explain briefly the complete sequence of water treatment plant with the help of flow diagram.	***CO*** 2	***PO1,2***	**10**
		b)	Explain the Different physical, chemical and biological tests conducted on water.	***CO*** 2	***PO1,2***	**10**
			UNIT – IV			
	5	a)	A rectangular settling tank without mechanical equipment is to treat 1.8 million litters per day of raw water. The sedimentation period is to be 4 hours, the velocity of the flow is 8 cm/min, and the depth of the water and sediment is 4.2 m, if an allowance of 1.2 m for sediment is made, what should be a) length of basin b) width of basin.	***CO*** 3	***PO2,3***	**10**
		b)	Explain the importance of sedimentation aided with coagulation. With the help of chemical equations discuss the use of ALUM as coagulant. Determine the quantity of alum required in order to treat 15 million liters of water per day at a treatment plant, where 12ppm of alum dose is required. [AL = 27; S = 32; O = 16; H = 1; Ca = 40; C = 12]	***CO*** 3	***PO2,3***	**10**
			UNIT – V			
	6	a)	Differentiate between a slow sand filter and rapid sand filter.	***CO*** 3	***PO2,3***	**10**
		b)	Design a set of three rapid gravity filters for treating the water at a water works, which has to supply water to a Population of 100000. The per capita demand of the town is 270 liters/head /day. The rate of filtration is 4500 liters/hr/m^2.	***CO*** 3	***PO1,2***	**10**
			OR			
	7	a)	Illustrate the various types of chlorination	***CO*** 3	***PO2,3***	**04**
		b)	Explain briefly the following methods of treatment of water. i) Membrane filter technique ii) Reverse osmosis	***CO*** 3	***PO1,2***	**06**
		c)	With the help of neat sketch, explain ground water recharge and roof top harvesting	***CO*** 3	***PO1,2***	**10**

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