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Third Semester B.E./B.Tech. Degree Examination, June/July 2026
Water Supply and Wastewater Engineering

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.



Module – 1			M	L	C										
Q.1	a.	List out various types of water demands. Explain any two of them in detail.	10	L2	CO1										
	b.	The following data are available for a town. Estimate the probable population in the year 2031 and 2041 by Incremental Increase Method (IIM). <table><tr><td>Year</td><td>1991</td><td>2001</td><td>2011</td><td>2021</td></tr><tr><td>Population</td><td>80000</td><td>120000</td><td>168000</td><td>228000</td></tr></table>	Year	1991	2001	2011	2021	Population	80000	120000	168000	228000	10	L3	CO1
Year	1991	2001	2011	2021											
Population	80000	120000	168000	228000											
OR															
Q.2	a.	Explain the factors affecting the per capita demand of a town.	10	L2	CO1										
	b.	Compute the fire demand for a city having population 2,00,000 using five available formulae.	10	L3	CO1										
Module – 2															
Q.3	a.	Mention the objectives of Aeration. Classify the aerators and explain any tow of them.	10	L2	CO2										
	b.	Design slow sand filters with 5 units for a city to treat 5 MLD of water. Maximum demand may be assumed to be 2 times the average daily demand. Rate of filtration may be taken as 150 lts/hr/m ² .	10	L3	CO2										
OR															
Q.4	a.	With the aid of neat sketch explain the working and back washing of rapid sand filter unit.	10	L2	CO2										
	b.	A rectangular settling tank without mechanical equipment is to treat 1.8 million liters per day of raw water. The sedimentation period is to be 4 hrs the velocity of flow 8 cm/minute, and the depth of water and sediment is 4.2 m. If an allowance of 1.2 m for sediment is made, compute the size of the sedimentation tank.	10	L3	CO2										
1 of 3															

Module – 3

Q.5	a.	List out various methods adopted to disinfect the raw water. Explain any four methods along with merits and demerits.	10	L2	CO3
	b.	With the aid of chemical reactions explain the methods of removing permanent hardness.	10	L2	CO3

OR

Q.6	a.	Define the following terms : i) Garbage ii) Rubbish iii) Sullage iv) Sewage v) Dry weather flow.	10	L1	CO3
	b.	Explain the different types of water carriage systems of sewerage along with merits and demerits.	10	L2	CO3

Module – 4

Q.7	a.	Write a flow chart of a typical wastewater treatment plant and explain the role of each unit.	10	L2	CO4
	b.	Design a suitable Grit chamber for a sewage treatment plant getting a dry weather flow from a separate sewerage system at 400 lit/sec. Assume the flow velocity through the tank as 0.2 m/sec and detention period of 2 min. The maximum flow may be assumed to be 3 times the daily DWF.	10	L3	CO4

OR

Q.8	a.	Explain the Activated Sludge Process as a biological treatment adopted to treat municipal sewage.	10	L2	CO4
	b.	An average operating data for conventional activated sludge treatment plant is as follows : i) Waste water flow = 50000 m ³ /d ii) Volume of aeration tank = 15500 m ³ iii) Influent BOD = 200 mg/lt iv) Effluent BOD = 25 mg/lt v) MLSS = 3000 mg/lt vi) Effluent suspended solids = 40 mg/lt vii) Waste sludge suspended solids = 12000 mg/lt viii) Quantity of waste sludge = 250 m ³ /d Determine the following : i) Aeration period (hours) ii) F/M ratio iii) Percentage efficiency of BOD removal iv) Sludge age (days).	10	L3	CO4

Module – 5

Q.9	a.	List out the operating troubles of trickling filters and explain in brief.	10	L2	CO5
	b.	With the help of neat sketch explain the construction and working of trickling filters.	10	L2	CO5
OR					
Q.10	a.	Write a note on the following : i) Oxidation Ditch ii) Stabilization Pond.	10	L2	CO5
	b.	Describe the Anaerobic sludge digester in treating the wastewater.	10	L2	CO5

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