



CBCS SCHEME

USN

Library									
---------	--	--	--	--	--	--	--	--	--

BCV304

Third Semester B.E/B.Tech. Degree Examination, Dec.2024/Jan.2025 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		
1	a.	Briefly explain the need and importance of protected water supply system.				6	L2	CO1		
	b.	Explain the various types of water demand.				8	L2	CO1		
	c.	Describe the incremental method of estimating the population of a locality.				6	L2	CO1		
OR										
2	a.	What is meant by per capita demand? Mention the factors that affect per capita demand.				6	L1	CO1		
	b.	Give the drinking water standards for the following parameters. Discuss their effect when theory exceed their limits : i) Turbidity ii) Hardness iii) Fluoride iv) Nitrate.				8	L2	CO2		
	c.	The population data of a town are given below :				6	L3	CO1		
		Year	1990	2000	2010				2020	2030
		Population	90,000	1,20,000	1,60,000				2,50,000	2,60,000
Estimate the expected population in the year 2050 by geometric increase method.										
Module – 2										
3	a.	Briefly explain the unit treatment processes of a water treatment plant with flow chart.				10	L2	CO3		
	b.	The maximum daily demand at a water purification plant has been estimated as 12 million liter per day. Design a rectangular sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies, assuming a detention period of 6 hours and the velocity of flow as 20 cm per minute.				5	L3	CO3		
	c.	Explain theory of filtration.				5	L3	CO3		
OR										
4	a.	What is meant by aeration? Explain the different types of aerators.				6	L1	CO3		
	b.	What is coagulation? List the different types of coagulants used in water treatment plant.				4	L1	CO3		
	c.	Explain the construction and working of a rapid gravity sand filter with a neat sketch.				10	L2	CO3		
Module – 3										
5	a.	List the minor methods of disinfection and explain any two methods in detail.				8	L1	CO3		
	b.	Explain the need for sanitation. Define the following terms : i) Sullage ii) Sewage.				6	L2	CO4		
	c.	Define sampling of water or wastewater. Explain the different methods of sampling.				6	L2	CO4		
1 of 2										

OR

6	a.	What is softening of water? List the methods used to remove hardness of water. Explain any one method in detail.	6	L2	CO3
	b.	Define disinfection. Explain break point chlorination.	4	L2	CO3
	c.	List the different types of sewerage systems with their advantages and disadvantages.	10	L2	CO4

Module – 4

7	a.	Explain with a neat flow diagram the various treatment unit operations and process used in municipal wastewater treatment.	10	L2	CO4
	b.	What is meant by activated sludge process? Describe with sketch, the treatment of sewage by activated sludge process.	10	L2	CO4

OR

8	a.	Discuss briefly with a neat sketch grit chamber and oil and grease removal tank.	10	L2	CO4
	b.	An average operating data for conventional activated sludge treatment plant is as follows : i) Wastewater flow = 35000 m ³ /d ii) Volume of aeration tank = 10900 m ³ iii) Influent BOD = 250 mg/L iv) Effluent BOD = 20 mg/L v) Mixed liquor suspended solids (MLSS) = 2500 mg/L vi) Effluent suspended solids = 30 mg/L vii) Waste sludge suspended solids = 9700 mg/L viii) Quality of waste sludge = 220 m ³ /d Based on the given information, Determine : i) Aeration period (hrs) ii) F/M ratio iii) Percentage efficiency of BOD removal iv) Sludge age (days).	10	L3	CO4

Module – 5

9	a.	Explain with a neat sketch the construction and operation of a trickling filter.	10	L2	CO4
	b.	Explain the following : i) Rotating biological contactors ii) Aerobic and anaerobic process.	10	L2	CO5

OR

10	a.	Determine the volume depth and efficiency of a building filter unit for influent sewage of 4.5 MLD, BOD ₅ of the influent is 160 mg/L. The organic loading is to be 160 gm/m ³ /day and surface loading is 2000 l/m ² /day.	10	L3	CO4
	b.	Explain the following : i) Oxidation pond ii) Stages in sludge digestion process.	10	L2	CO5
