

CBCS SCHEME



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BCV304

Third Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024 Water Supply and Waste Water 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.	Briefly explain : i) Factors affecting per capita demand of water. ii) Factors affecting design period. iii) Domestic water demand.	12	L2	CO1												
	b.	Explain the need and importance of protected water supply to the community.	8	L2	CO1												
OR																	
Q.2	a.	The population of 5 decades from 1980 to 2020 are given in below table. Find out the population after 3 decades beyond the last known decades by using arithmetic increase method.	12	L2	CO1												
	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Year</td> <td style="padding: 2px;">1980</td> <td style="padding: 2px;">1990</td> <td style="padding: 2px;">2000</td> <td style="padding: 2px;">2010</td> <td style="padding: 2px;">2020</td> </tr> <tr> <td style="padding: 2px;">Population</td> <td style="padding: 2px;">25,000</td> <td style="padding: 2px;">28,000</td> <td style="padding: 2px;">34,000</td> <td style="padding: 2px;">42,000</td> <td style="padding: 2px;">47,000</td> </tr> </table>		Year	1980	1990	2000	2010	2020	Population	25,000	28,000	34,000	42,000	47,000			
Year	1980	1990	2000	2010	2020												
Population	25,000	28,000	34,000	42,000	47,000												
	b.	List different methods of population forecasting. Explain briefly Arithmetical and Geometrical Increase method.	8	L2	CO1												
Module – 2																	
Q.3	a.	Explain the objectives of Water treatment or Water purification.	4	L2	CO2												
	b.	Describe briefly the construction and working of coagulation sedimentation tank with neat sketch.	10	L2	CO2												
	c.	Briefly explain the terms : i) Sedimentation ii) Coagulation iii) Flocculation.	6	L2	CO2												
OR																	
Q.4	a.	The maximum daily demand at a water purification plant has been estimated as 12 million litres per day. Design the dimensions of a suitable sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies , assuming a detention period of hours and velocity of flow as 20cm per minute.	8	L2	CO2												
	b.	List the coagulants used in water treatment.	4	L2	CO2												
	c.	Briefly explain the mechanism of Filtration.	8	L2	CO2												
Module – 3																	
Q.5	a.	What is Disinfection of water? What are the characteristics of good disinfectant?	6	L2	CO3												

	b.	Explain the different types of sewerage system with their merits and demerits of suitability.	12	L2	CO3
OR					
Q.6	a.	Calculate the velocity of flow and discharge of sewer of a circular section having a diameter of 1m laid at a gradient of 1 in 500. Use Manning's formula taking $N = 0.012$. Assume that the sewer is running half full.	8	L3	CO3
	b.	Explain the process and objective of sampling with different methods.	6	L2	CO3
	c.	Explain DWF and WWF.	6	L2	CO3
Module – 4					
Q.7	a.	Illustrate the layout of a conventional municipal treatment plant and infer upon importance of each unit in sanitation.	10	L2	CO4
	b.	Elucidate the working principle of sludge digester, with a neat labeled sketch.	6	L2	CO4
	c.	Explain different types of screens.	4	L2	CO4
OR					
Q.8	a.	Discuss briefly with a neat sketch Grit Chamber and Oil and Grease removal tank.	10	L2	CO4
	b.	Explain the working of Conventional Activated Sludge Process (ASP) with flow diagram.	10	L2	CO4
Module – 5					
Q.9	a.	Determine the size of a high rate trickling filter for the following data : i) Sewage flow = 4.5 m ³ /d ii) Recirculation Ratio = 1.5 iii) BOD of raw sewage = 250 mg/ℓ. iv) BOD Removal in primary settling tank = 30%. v) Final effluent BOD desired = 30 mg/ℓtr.	10	L3	CO5
	b.	Explain the concept of BoD and CoD. Enumerate their limitation.	6	L2	CO5
	c.	Briefly explain Self – Cleansing Velocity.	4	L2	CO5
OR					
Q.10	a.	Draw a neat sketch of Skimming tank. Enumerate importance of Skimming tank.	10	L2	CO5
	b.	Draw and explain Oxidation Pond and Oxidation ditch.	10	L2	CO5
