

# CBCS SCHEME - Make-Up Exam

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BCV304

## Third Semester B.E/B.Tech. Degree Examination, June/July 2025 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										
<b>1</b>	a.	Explain the need of planned water supply scheme in present day community life.	7	L2	CO1										
	b.	The population of a city in three consecutive years i.e. 2001, 2011 and 2021 is 80,000, 2,50,000 and 4,80,000 respectively. Determine (i) The saturation population (ii) The equation of logistic curve (iii) The expected population in 2031.	9	L3	CO1										
	c.	Enumerate the fire demand in water supply.	4	L2	CO1										
<b>OR</b>															
<b>2</b>	a.	What is meant by design period? Discuss the factors affecting design period.	6	L2	CO1										
	b.	The population statistics of a Town are given below : <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">Years</td> <td style="text-align: center;">1991</td> <td style="text-align: center;">2001</td> <td style="text-align: center;">2011</td> <td style="text-align: center;">2021</td> </tr> <tr> <td style="text-align: center;">Population</td> <td style="text-align: center;">80,000</td> <td style="text-align: center;">1,20,000</td> <td style="text-align: center;">1,68,000</td> <td style="text-align: center;">2,28,000</td> </tr> </table> Estimate probable population in the year 2051 by geometrical and incremental increase method.	Years	1991	2001	2011	2021	Population	80,000	1,20,000	1,68,000	2,28,000	8	L3	CO1
Years	1991	2001	2011	2021											
Population	80,000	1,20,000	1,68,000	2,28,000											
	c.	Enumerate the various physical and chemical characteristics of water and highlight the importance of each parameter.	6	L2	CO1										
<b>Module – 2</b>															
<b>3</b>	a.	Briefly explain the complete treatment process of a water supply scheme with flow chart.	9	L2	CO2										
	b.	What is Aeration? Explain the types of aerators.	5	L2	CO2										
	c.	What is optimum dosage of coagulant? Explain how it is determined in the laboratory.	6	L2	CO2										
<b>OR</b>															
<b>4</b>	a.	Explain :(i) Detention period (ii) Surface loading (iii) Basin dimensions related to design of sedimentation tank	6	L2	CO2										
	b.	Explain the theory of filtration.	6	L2	CO2										
	c.	Design of 12 slow sand filter beds for a population of 2,50,000. Rate of filtration – 500 Lt/hr/m <sup>2</sup> . Assume the data as follows per capita demand – 135 LPCD. Length of each bed = 2.5 times the breadth, Peak demand = 1.5 Avg demand.	8	L3	CO2										

<b>Module – 3</b>					
<b>5</b>	a.	Explain the zeolite processes of water softening with sketch. Write down the relevant chemical equation.	<b>10</b>	<b>L2</b>	<b>CO3</b>
	b.	What is meant by disinfection of water? Discuss the theory of disinfection by Chlorine.	<b>6</b>	<b>L2</b>	<b>CO3</b>
	c.	Explain break point chlorination graphically.	<b>4</b>	<b>L3</b>	<b>CO3</b>
<b>OR</b>					
<b>6</b>	a.	Explain briefly the different types of water carriage system.	<b>10</b>	<b>L2</b>	<b>CO3</b>
	b.	Calculate 3 day BOD and ultimate BOD of a sample of sewage for the following data : (i) DO of Raw sewage 0.6 mg/L (ii) DO of dilution water 6 mg/L (iii) DO of mix dilution water and sewage after 3 days of incubation 1.1 mg/L (iv) Dilution ratio is 3% (v) Assume $K = 0.12/\text{day}$ at test temperature.	<b>10</b>	<b>L3</b>	<b>CO3</b>
<b>Module – 4</b>					
<b>7</b>	a.	Write the flow diagram of Treat Municipal waste water and indicate the importance of each Photon unit.	<b>10</b>	<b>L2</b>	<b>CO4</b>
	b.	Design a primary sedimentation tank of circular cross section, for a sewage of 10 MLD, detention period of 2 hours and assume surface loading rate to be $30 \text{ m}^3/\text{m}^2/\text{day}$ .	<b>10</b>	<b>L3</b>	<b>CO4</b>
<b>OR</b>					
<b>8</b>	a.	Explain the working of Grit chamber and skimming tank with figures.	<b>10</b>	<b>L2</b>	<b>CO4</b>
	b.	Mention the modification of activated sludge processes. Explain any two of them.	<b>10</b>	<b>L2</b>	<b>CO4</b>
<b>Module – 5</b>					
<b>9</b>	a.	With the help of a neat sketch, explain the working of Trickling filters.	<b>10</b>	<b>L2</b>	<b>CO5</b>
	b.	Write note on : (i) Bio Towers (ii) Rotating Biological contactor.	<b>10</b>	<b>L2</b>	<b>CO5</b>
<b>OR</b>					
<b>10</b>	a.	With flow diagram, explain the sludge treatment unit operation and processes.	<b>10</b>	<b>L2</b>	<b>CO5</b>
	b.	With neat sketch, explain the stages in Anaerobic Digestion of sludge.	<b>10</b>	<b>L2</b>	<b>CO5</b>

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