

**Model Question Paper-1/2 with effect from 2022-23 (CBCS 2022 Scheme)**

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**Third Semester B.E. Degree Examination****WATER SUPPLY AND WASTEWATER ENGINEERING****TIME: 03 Hours****Max. Marks: 100****Note** : Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	COs	Marks												
Q.01	a	Explain needs of planned water supply scheme in the present day community life.	L2	CO1	5												
	b	Briefly explain various types of water Demand.	L2	CO1	7												
	c	Define percapita demand and explain factors affecting percapita demand.	L2	CO1	8												
OR																	
Q.02	a	Discuss the importance of physical, chemical and Biological characteristics of water.	L2	CO1	8												
	b	Discuss the factor affecting Design period.	L2	CO1	4												
	c	The population of 5 decades from 1930 to 1970 is given below. Find out the population after one, two & three decades beyond the last known decade, by using i) Arithmetic increase method ii) Geometric increase method iii) incremental increase method	L3	CO1	8												
		<table border="1"> <tr> <td>Year</td> <td>1930</td> <td>1940</td> <td>1950</td> <td>1960</td> <td>1970</td> </tr> <tr> <td>population</td> <td>25000</td> <td>28000</td> <td>34000</td> <td>42000</td> <td>47000</td> </tr> </table>	Year	1930	1940	1950	1960	1970	population	25000	28000	34000	42000	47000			
Year	1930	1940	1950	1960	1970												
population	25000	28000	34000	42000	47000												
<b>Module-2</b>																	
Q. 03	a	What are the objectives of water treatment? Draw a flow chart of conventional water treatment plant and explain significance of each unit.	L2	CO3	8												
	b	Define Aeration. Explain the types of Aerators.	L2	CO3	6												
	c	Design a Rectangular Sedimentation tank to treat 2.4 MLD of water. The detention period may be assumed to be 3 hours and velocity of flow as 1.5 cm/min.	L4	CO3	6												
OR																	
Q.04	a	Briefly explain Theory of Filtration.	L2	CO3	5												
	b	With Neat sketch explain the construction and working process of slow sand filter bed.	L2	CO3	7												
	c	Determine Dimensions of a set of rapid gravity filters for treating water required for population 50000 with average rate of demand as 180 Lpcd. Assume peak factors 1.8 by ignoring wash water requirements. Assume rate of filtration 5000 l/hr/sq.mt.	L3	CO3	8												
<b>Module-3</b>																	
Q. 05	a	With the help of chemical formula explain Zeolite process of removing Hardness.	L2	CO3	8												

	b	Explain the following i) Breakpoint Chlorination ii) Super chlorination	L2	CO3	4
	c	Briefly explain types of sewerage system.	L2	CO3	8
<b>OR</b>					
Q. 06	a	Briefly explain the needs for sanitation	L2	CO3	5
	b	Define sampling. Explain different methods of sampling.	L2	CO3	7
	c	The 5 day BOD at 30° C of a sewage sample is 120mg/L. Calculate 5 days BOD at 20° C. Assume deoxygenation constant at 20° C, K = 0.1/day.	L3	CO3	8
<b>Module-4</b>					
Q. 07	a	With neat sketch neat flow diagram, Explain unit operation and process of Municipal wastewater treatment.	L2	CO4	8
	b	Explain the importance of screens and types of screens in the sewage treatment process.	L2	CO4	6
	c	Explain with neat sketch Grit chamber and oil & grease removal tank	L2	CO4	6
<b>OR</b>					
Q. 08	a	Explain the working of conventional activated sludge process (ASP) with flow diagram	L2	CO4	10
	b	Design a primary sedimentation tank of circular cross-section, for sewage of 10 MLD, detention period of 2 hours and assume the surface loading rate to be 30 m <sup>3</sup> /m <sup>2</sup> /d.	L3	CO4	10
<b>Module-5</b>					
Q. 09	a	With a neat sketch Explain construction and operation of trickling filter	L2	CO5	7
	b	Determine the size of the High rate trickling filters for the following data: i) sewage flow = 4.5 MLD ii) Recirculation ratio = 1.5 iii) BOD of Raw sewage = 250 mg/L iv) BOD removal in primary tank = 30% v) Final effluent BOD desired = 30 mg/L	L4	CO5	8
	c	Briefly explain factor affecting sludge digestion and their control.	L2	CO5	5
<b>OR</b>					
Q. 10	a	With a neat Sketch explain oxidation pond.	L2	CO5	6
	b	Explain briefly the different stages of sludge digestion process in a "Digester". With a neat sketch, explain the constructional details of sludge digestion tank.	L2	CO5	8
	c	Write a short Note on. i)Rotating Biological Contractor ii)Sludge drying Beds iii)Sludge thickener	L2	CO5	6

\*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.