Course Code: 20CE0125 **R20**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
PUTTUR
(AUTONOMOUS)
Siddharth Nagar, Narayanavanam Road – 517583
QUESTION BANK (DESCRIPTIVE)

Subject with Code: Environmental Engineering (20CE0125) **Course & Branch**: B.Tech & CE

Year & Sem: III-Year & II-Sem **Regulation:** R20

UNIT –I
INTRODUCTION TO WATER SUPPLY, WATER DEMAND AND QUANTITY STUDIES

1	**a)**	What are the necessity and importance of water supply system?	[L1][CO1]	**[6M]**
	b)	Mention the various objectives of protected water supply system.	[L2][CO1]	**[6M]**
2	**a)**	Explain the factor affecting the per capita demand.	[L2][CO1]	**[6M]**
	b)	Draw the flow chart of public water supply system.	[L2][CO1]	**[6M]**
3	**a)**	Write short notes on the estimation of water demand for a town or city.	[L2][CO1]	**[6M]**
	b)	Explain in detail about the variations in rate of demand.	[L2][CO1]	**[6M]**
4	Explain the various types of water demand in detail.		[L2][CO1]	**[12M]**
5	**a)**	Write short notes on design period considering the various factors.	[L1][CO1]	**[6M]**
	b)	Briefly explain about the domestic demand and fire demand.	[L2][CO1]	**[6M]**
6	List out the various methods of population forecasting and explain any two methods in detail.		[L2][CO1]	**[12M]**
7	The populations of 5 decades from 1960 to 2000 are given below in table. Find out the population 2010, 2020 & 2030 beyond the last known decade. by a) Arithmetic increase method b) Geometrical method		[L4][CO1]	**[12M]**

Year	1960	1970	1980	1990	2000
Population	25000	28000	34000	42000	47000

8	The population of five decades from 1940 to 1980 are given below. Find out the population in decades 1990, 2000 and 2010 by using decrease rate of growth method.				[L4][CO1] **[12M]**

Year	1940	1950	1960	1970	1980
Population	25000	28000	32500	40000	45000

9	Briefly explain the various sources of water.		[L2][CO1]	**[12M]**
10	**a)**	What are the factors to be taken in consideration for the selection of source of water? Brief it.	[L1][CO1]	**[6M]**
	b)	With neat sketch, explain the infiltration gallery in detail.	[L2][CO1]	**[6M]**

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UNIT –II
QUALITY AND ANALYSIS OF WATER & WATER TREATMENT

1	**a)**	What are the physical characteristics of water?	[L1][CO2]	**[3M]**
	b)	Explain any three physical characteristics of water.	[L2][CO2]	**[9M]**
2	**a)**	Briefly explain any three chemical characteristics of water.	[L2][CO2]	**[6M]**
	b)	Write short notes on different water borne diseases.	[L1][CO2]	**[6M]**
3	**a)**	Explain briefly about the bacteriological testing of water.	[L2][CO2]	**[6M]**
	b)	List out any six drinking water standards with their effects.	[L1][CO3]	**[6M]**
4	Draw the layout and general outline of a water treatment plant.		[L2][CO2]	**[12M]**
5	**a)**	Write short notes on types of screens.	[L1][CO2]	**[5M]**
	b)	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 for the raw supplies, assuming a detention period of 6 hours and the velocity of flow as 20cm per minute.	[L4][CO2]	**[7M]**
6	**a)**	Write short notes on methods of coagulant feeding.	[L1][CO2]	**[6M]**
	b)	Briefly explain about flocculation with neat sketch.	[L2][CO2]	**[6M]**
7	Explain the working principle of slow sand filter with the help of neat sketch.		[L2][CO2]	**[12M]**
8	**a)**	Design a rapid sand filter to treat a city of population 100000 with an average per capita demand of 160 lpcd.	[L4][CO2]	**[5M]**
	b)	Compare slow sand filter with rapid sand filter.	[L2][CO2]	**[7M]**
9	**a)**	List out the requirements of good disinfectant.	[L1][CO2]	**[5M]**
	b)	List the types of chlorination and explain break point chlorination in detail.	[L2][CO2]	**[7M]**
10	**a)**	Define hardness of water and brief about their types.	[L1][CO2]	**[6M]**
	b)	Briefly explain the Zeolite process of water softening.	[L2][CO2]	**[6M]**

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UNIT –III
WATER DISTRIBUTION, INTRODUCTION TO SANITATION & ESTIMATION OF SEWAGE FLOW

1	**a)**	What are the requirements of a distribution system?	[L1][CO3]	**[6M]**
	b)	Write short notes on methods of distribution system.	[L1][CO3]	**[6M]**
2	With neat sketch, explain the different types of layouts of water distribution system.		[L2][CO3]	**[12M]**
3	**a)**	Briefly explain about grid iron and radial system of water distribution system with neat sketch.	[L2][CO3]	**[6M]**
	b)	Briefly explain the various methods of waste water detection?	[L2][CO3]	**[6M]**
4	With neat sketch, explain the house service connection from a street main to a house.		[L2][CO3]	**[12M]**
5	Compare between conservancy system and water carriage system.		[L2][CO4]	**[12M]**
6	Briefly explain about the sewerage systems with their merits & demerits.		[L2][CO4]	**[12M]**
7	A certain district of a city has a projected population of 80000 residing over an area of 70 hectares. Find the design discharge for the sewer line for the following data: (i) Rate of water supply = 200 LPCD (ii) Average impermeability coefficient for the entire area =0.3 (iii) Time of concentration = 50 minutes.		[L4][CO4]	**[12M]**
8	A main combined sewer is to be designed to serve an area of 12 sq.km with a population density of 250 persons/hectare. The average rate of sewage flow is 250 LPCD. The maximum flow of 100% in excess of average together with the rainfall equivalent of 15 mm in 24 hours, all of which are runoff. Determine the capacity of the sewer. Taking the maximum velocity of flow as 3 m/sec, determine the size of the circular sewer		[L4][CO4]	**[12M]**
9	**a)**	Mention the various sewer appurtenances in sewerage system.	[L1][CO4]	**[5M]**
	b)	Explain briefly catch basin with neat sketch.	[L2][CO4]	**[7M]**
10	**a)**	Explain the use of different materials of sewer and their suitability	[L2][CO4]	**[6M]**
	b)	Explain about the various methods of ventilation of sewers.	[L2][CO4]	**[6M]**

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UNIT –IV
WASTE WATER CHARACTERISTICS & WASTE WATER TREATMENT

1		Briefly explain about the various characteristics of sewage.	[L2][CO5]	**[12M]**
2	**a)**	Make a note on decomposition of sewage.	[L1][CO5]	**[5M]**
	b)	Define BOD and mention the importance of BOD.	[L2][CO5]	**[7M]**
3		Draw the schematic diagram of typical sewage treatment plant and explain it.	[L2][CO5]	**[12M]**
4	**a)**	With a sketch, explain the working of a grit chamber.	[L2][CO5]	**[6M]**
	b)	Write short notes on skimming tanks.	[L1][CO5]	**[6M]**
5	**a)**	Write short notes on COD.	[L1][CO5]	**[4M]**
	b)	Design an aerated grit chamber for treating the municipal sewage with an average rate of flow of $0.6m^3$/sec. Assume the maximum rate of flow as 2.4 times the average flow.	[L4][CO5]	**[8M]**
6	**a)**	Define screen and list the types of screens used in sewage treatment.	[L1][CO5]	**[5M]**
	b)	Design a primary sedimentation for treating 1 MLD of wastewater. Make suitable assumptions.	[L4][CO5]	**[7M]**
7		Define activated sludge process with their operation including advantages and disadvantages.	[L1][CO5]	**[12M]**
8		Explain with the help of neat sketch the construction and working process of a conventional trickling filter.	[L2][CO5]	**[12M]**
9		The sewage flows from a primary settling tank to a standard trickling filter at a rate of 5 MLD having a 5-day BOD of 150 mg/L. Determine the depth and the volume of the filter, adopting a surface loading of 2500 l/m^2/day and an organic loading of 165 g/m^3/day. Also, determine the efficiency of the filter unit, using NRC formula.	[L4][CO5]	**[12M]**
10		Compare between the conventional rate trickling filter and high rate trickling filter.	[L2][CO5]	**[12M]**

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UNIT –V
DISPOSAL OF SEWAGE AND SLUDGE TREATMENT & DISPOSAL OF SLUDGE

1		Explain, with the help of a flow chart, various processes involved in sludge treatment and disposal.	[L2][CO6]	**[12M]**
2	**a)**	Write short notes on sludge digestion.	[L1][CO6]	**[6M]**
	b)	Briefly explain the process involved in self-purification.	[L2][CO6]	**[6M]**
3		Explain the factors affecting the sludge digestion.	[L2][CO6]	**[12M]**
4	**a)**	What do you understand by sludge thickening?	[L1][CO6]	**[3M]**
	b)	Describe with the help of sketch the gravity-sludge thickener.	[L2][CO6]	**[9M]**
5	**a)**	Why dewatering of sludge is necessary?	[L1][CO6]	**[4M]**
	b)	Explain the methods of dewatering the sludge on sludge drying beds.	[L2][CO6]	**[8M]**
6		Mention the various methods of sludge disposal and explain any two methods of sludge disposal.	[L2][CO6]	**[12M]**
7		Discuss the criterion for design of a septic tank.	[L2][CO6]	**[12M]**
8	**a)**	What is a septic tank?	[L1][CO6]	**[2M]**
	b)	Design a septic tank for 200 persons assuming water supply as 120 LPCD.	[L4][CO6]	**[10M]**
9		Write a detailed note on design of Imhoff tank with sketch.	[L1][CO6]	**[12M]**
10	**a)**	What is soak pit and why it is necessary?	[L1][CO6]	**[6M]**
	b)	With neat sketch, explain the process of dispersion trench.	[L2][CO6]	**[6M]**

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