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**SIDDHARTH GROUP OF INSTITUTIONS:: PUTTUR
(AUTONOMOUS)**

Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Environmental Engineering
(18CE0123)

Course & Branch: B.Tech - CE

Year & Sem: III-B.Tech& II-Sem

Regulation: R18

UNIT – I

INTRODUCTION TO WATER SUPPLY, WATER DEMAND AND QUANTITY STUDIES

1	a	What is meant by per capita demand?	[L1][CO1]	[2M]												
	b	List out various types of demand.	[L1][CO1]	[2M]												
	c	List any two objectives of a water supply system.	[L1][CO1]	[2M]												
	d	List out various surface and subsurface sources of water	[L1][CO1]	[2M]												
	e	Define design period	[L1][CO1]	[2M]												
2	a)	What are the necessities and importance of water supply scheme?	[L1][CO1]	[5M]												
	b)	Draw the flow chart of public water supply system.	[L2][CO1]	[5M]												
3		Explain the various types of water demand in detail.	[L2][CO1]	[10M]												
4		List out the various methods of population forecasting and explain any two methods in detail.	[L2][CO1]	[10M]												
5		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	[L3][CO1]	[10M]												
		<table border="1"> <thead> <tr> <th>Year</th> <th>1960</th> <th>1970</th> <th>1980</th> <th>1990</th> <th>2000</th> </tr> </thead> <tbody> <tr> <td>Population</td> <td>25000</td> <td>28000</td> <td>34000</td> <td>42000</td> <td>47000</td> </tr> </tbody> </table>	Year	1960	1970	1980	1990	2000	Population	25000	28000	34000	42000	47000		
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Population	25000	28000	34000	42000	47000											
6		Population of a town as obtained from the census reports is as below: Estimate the population after 3 and 5 decades by (a) Arithmetic increase method (b) Geometrical method (c) Incremental Increase Method	[L3][CO1]	[10M]												
		<table border="1"> <thead> <tr> <th>Year</th> <th>1951</th> <th>1961</th> <th>1971</th> <th>1981</th> </tr> </thead> <tbody> <tr> <td>Population</td> <td>100000</td> <td>109000</td> <td>116600</td> <td>128200</td> </tr> </tbody> </table>	Year	1951	1961	1971	1981	Population	100000	109000	116600	128200				
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7		Population of a town as obtained from the census reports is as below: Estimate the population of the town by 2020 & 2030 by Incremental Increase Method & Decreasing Rate Method	[L3][CO1]	[10M]												
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Population	55500	63700	71300	79500												
8		What is per capita demand? Explain the factors affecting per capita demand?	[L2][CO1]	[10M]												
9	a)	What is design period? Write the factors affecting the design period	[L1][CO1]	[5M]												
	b)	Explain the variations in water demand	[L2][CO1]	[5M]												
10		Explain the surface and subsources of water.	[L2][CO1]	[10M]												
11	a)	Explain the construction of infiltration gallery with a sketch	[L1][CO1]	[6M]												
	b)	What are factors governing the selection of source of water	[L1][CO1]	[4M]												

UNIT –II
QUALITY AND ANALYSIS OF WATER, WATER TREATMENT

1	a	Define pH value	[L1][CO2]	[2M]
	b	Define detention period	[L1][CO2]	[2M]
	c	Write down any four drinking water quality standards	[L1][CO2]	[2M]
	d	Define filtration? What are the two types of filter?	[L1][CO3]	[2M]
	e	Define coagulation	[L1][CO3]	[2M]
2		List the physical characteristics of water and explain method of measuring each parameters	[L2][CO2]	[10M]
3		Explain procedure of bacteriological testing of water	[L2][CO2]	[10M]
4		What are water borne diseases? Discuss its causes and preventive measures	[L2][CO2]	[10M]
5	a)	Draw the layout and general outline of surface and subsurface water treatment plant.	[L2][CO3]	[6M]
	b)	Write short notes on types of screens.	[L1][CO3]	[4M]
6	a)	Explain the principle of sedimentation giving equation of settling velocity of particles in water	[L2][CO3]	[5M]
	b)	What are the different methods of feeding coagulant in water treatment plant	[L1][CO3]	[5M]
7	a)	Write short notes on mechanical flocculator.	[L1][CO3]	[4M]
	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.	[L3][CO3]	[6M]
8		Discuss different methods of disinfection of water in water treatment plant.	[L2][CO3]	[10M]
9	a)	Compare slow sand filter with rapid sand filter.	[L2][CO3]	[6M]
	b)	Explain any one process of removal of permanent hardness of water	[L2][CO3]	[4M]
10	a)	List the types of chlorination and explain break point chlorination in detail.	[L2][CO3]	[5M]
	b)	Determine the dimensions of a set of rapid sand filters for treating water required for a population of 10000 with an average rate of demand 200 lpcd	[L3][CO3]	[5M]
11		With a sketch, Explain the principle of working of rapid sand filter.	[L2][CO3]	[10M]

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

1	a	What is distribution system?	[L1][CO3]	[2M]
	b	List out the methods of distribution system	[L1][CO3]	[2M]
	c	Define the terms (i) Sewage (ii) Sewer	[L1][CO4]	[2M]
	d	What are the two types of sewage system?	[L1][CO4]	[2M]
	e	List four factors that affect DWF	[L1][CO4]	[2M]
2	a)	What are the requirements of a distribution system?	[L1][CO3]	[4M]
	b)	Write short notes on methods of distribution system.	[L1][CO3]	[6M]
3		With neat sketch, explain the different types of layouts of water distribution system	[L2][CO3]	[10M]
4	a)	With neat sketch, explain the house service connection from a street main to building	[L2][CO3]	[5M]
	b)	How do you detect leakages and what are the preventive measures	[L1][CO3]	[5M]
5	a)	List different types of sewerage system? Give the advantages and disadvantages of any one system	[L1][CO4]	[5M]
	b)	What are sewer appurtenances? Sketch and explain the use of drop man hole	[L2][CO4]	[5M]
6		What are the systems of collection and disposal of waste and explain the methods of the system?	[L2][CO4]	[10M]
7	a)	What is DWF? Explain the factors affecting DWF	[L2][CO4]	[5M]
	b)	Explain the method of estimation of storm water flow.	[L2][CO4]	[5M]
8		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]	[10M]
9	a)	Explain about cleaning and ventilation of sewers	[L2][CO4]	[5M]
	b)	Explain the use of different materials of sewer and their suitability	[L2][CO4]	[5M]
10		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]	[10M]
11		Compare the three systems of sewerage	[L2][CO4]	[10M]

UNIT –IV**WASTEWATER CHARACTERISTICS & WASTEWATER TREATMENT**

1	a	Define BOD and COD	[L1][CO5]	[2M]
	b	What is the significance of pH value in sewage treatment?	[L1][CO5]	[2M]
	c	What are grit chambers where are they provided?	[L1][CO6]	[2M]
	d	State the purpose of using the skimming tanks	[L1][CO6]	[2M]
	e	What is the principle of working of trickling filters?	[L1][CO6]	[2M]
2	a)	Explain the physical characteristics of wastewater.	[L2][CO5]	[5M]
	b)	Explain the Chemical characteristics of wastewater	[L2][CO5]	[5M]
3	a)	Explain the term BOD and describe briefly how it is determined.	[L2][CO5]	[5M]
	b)	What is COD of sewage? List the advantages of COD in sewage analysis	[L1][CO5]	[5M]
4	a)	Draw the schematic diagram of typical sewage treatment plant	[L2][CO6]	[5M]
	b)	Explain the decomposition of sewage	[L2][CO5]	[5M]
5		Design a grit chamber for a maximum wastewater flow of 10000 m ³ /day to remove particles up to of 0.25 mm dia, having specific gravity of 2.65. The settling velocities of these particles is found to range from 0.02 to 0.025 m/sec. Maintain a constant flow through velocity of 0.28 m/sec through the provision of a proportional flow weir	[L4][CO6]	[10M]
6	a)	List the types of screens used in sewage treatment	[L1][CO6]	[4M]
	b)	With a sketch, explain the working of a skimming tank	[L2][CO6]	[6M]
7		Define activated sludge process? and explain their operation including advantages and disadvantages.	[L2][CO6]	[10M]
8		Explain with the help of neat sketch, the construction and working of trickling filter.	[L2][CO6]	[10M]
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][CO6]	[10M]
10		Compare between the standard rate filter and high rate filter.	[L2][CO6]	[10M]
11	a)	With a sketch, explain the working of a grit chamber	[L2][CO6]	[6M]
	b)	Design a primary sedimentation for treating 1 MLD of wastewater. Make suitable assumptions	[L4][CO6]	[4M]

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

1	a	What are the types of self-purification?	[L1][CO6]	[2M]
	b	What is mean by oxygen sag curve?	[L1][CO6]	[2M]
	c	What do you mean by sludge digestion?	[L1][CO6]	[2M]
	d	List the methods of sludge disposal	[L1][CO6]	[2M]
	e	Write down any two purposes of sludge dewatering	[L1][CO6]	[2M]
2		Explain with the help of a flow chart, various processes involved in sludge treatment and disposal.	[L2][CO6]	[10M]
3	a)	Explain the factors affecting the sludge digestion.	[L2][CO6]	[5M]
	b)	Explain the process involved in self-purification.	[L2][CO6]	[5M]
4	a)	What do you understand by sludge thickening?	[L1][CO6]	[5M]
	b)	With the help of sketch, explain the gravity-sludge thickener	[L2][CO6]	[5M]
5		Explain with a sketch, the method of sludge digestion in a digestion tank	[L2][CO6]	[10M]
6		Explain the various methods of sludge disposal	[L2][CO6]	[10M]
7		With a neat sketch, explain the working of a sludge drying bed	[L2][CO6]	[10M]
8		With a neat sketch, explain the construction and operation of septic tank	[L2][CO6]	[10M]
9		With a neat sketch, explain the construction and operation of Imhoff tank	[L2][CO6]	[10M]
10		Design a septic tank for 200 persons assuming water supply as 120 lpcd	[L4][CO6]	[10M]
11	a)	What is soak pit and why it is necessary?	[L1][CO6]	[5M]
	b)	With neat sketch, explain the process of dispersion trench.	[L2][CO6]	[5M]

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