GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– VI EXAMINATION – SUMMER 2020

Subject Code: 2160604   **Date:29/10/2020**
Subject Name: WATER & WASTE WATER ENGINEERING
Time: 10:30 AM TO 01:00 PM   **Total Marks: 70**

Instructions:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

			MARKS
Q.1	(a)	How will you estimate Waste water discharge of your city?	03
	(b)	How will you select treatment train for a waste water treatment plant giving you desired BOD and SS removal?	04
	(c)	Design flash mixer for flow of 270m3/hr	07
Q.2	(a)	List out sewer appurtenances. Draw neat sketch of storm water relief works.	03
	(b)	What are the objectives of aeration ? List out aerators.	04
	(c)	Derive equation of settling velocity	07
		OR	
	(c)	Derive shield's formula for self cleansing velocity.	07
Q.3	(a)	Write design criteria for flocculator	03
	(b)	How will you determine optimum coagulant dose ?	04
	(c)	Explain procedure of determining storage capacity of reservoir.	07
		OR	
Q.3	(a)	Give brief note on flexible joint	03
	(b)	Forecast population by means of geometrical increase method for following data for year 2000 and 2010.	04

Year	1960	1970	1980	1990
Population	7000	11000	16000	22500

			MARKS
	(c)	A city with 1.5 lakh population is to be supplied water at 100lpcd from a river 1 km away. The difference in water level of sump and reservoir is 30 m. If the demand has to be supplied in 8 hours. Determine the size of main and B.H.P. of pumps. Assume suitable data	07
Q.4	(a)	What is F/M ratio ?	03
	(b)	Define septic tank. Give the design criteria for a septic tank.	04
	(c)	What is HRTF? Determine the size of HRTF for flow of 4.50 MLD. If recirculation ratio = 1.5, BOD of wastewater =250 mg/l and final effluent desired = 30 mg/l. Assume suitable data if required.	07
		OR	
Q.4	(a)	Discuss about sludge drying beds	03
	(b)	Describe steps of designing trickling filter	04
	(c)	Design a septic tank for a hostel building of 100 students Also design the soil absorption system for the disposal of the septic tank effluent, assuming the percolation rate as 20 minutes per cm. Also assume peak discharge is 240 lpm	07

Q.5 **(a)** Why sludge recirculation is done in activated sludge process? **03**

(b) How phosphorus removed by chemical precipitation ? **04**

(c) Design a rectangular grit chamber for treating 5 MLD of sewage. **07**

OR

Q.5 **(a)** Write note on pressure filter. **03**

(b) List out different types of pipe with suitability of each. **04**

(c) Design bell mouth canal intake for 11 MLD discharge. **07**

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