Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 160604 **Date: 03-06-2013**

Subject Name: Water and Waste Water Engineering

Time: 10.30 am - 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.**

Q.1	**(a)**	Describe the factors affecting per capita demand of water for a city.	**07**
	(b)	Draw a schematic diagram of a sewage treatment plant explaining the function of each unit	**07**
Q.2	**(a)**	Enumerate various methods of population forecasting. Explain geometric increase and arithmetic increase method in detail.	**07**
	(b)	Describe various means of conveying water from intake to treatment plant.	**07**
		OR	
	(b)	Design a circular sewer to cater a residential colony in town for the following data Area of colony = 36 hectares Population = 10,000 Per capita consumption = 180 lphd Critical design rainfall intensity = 4 cm/hr General available slope of ground = 1in 1000 Manningôs coefficient =0.015 Runoff Coefficient = 0.6	**07**
Q.3	**(a)**	Explain the following terms (1) Detention time (2) Surface loading (3) Coagulation (4) Filtration (5) Disinfection	**07**
	(b)	Define slow sand and rapid sand filters and give a point wise comparison between them.	**07**
		OR	
Q.3	**(a)**	Explain the following terms in relation of disinfection (1) Pre-chlorination (2) Post-chlorination (3) Double chlorination (4) Break-point chlorination (5) Super chlorination (6) De-chlorination	**07**
	(b)	(1) Enumerate various methods used for water softening (2) Explain the procedure of fixing storage capacity of an elevated storage reservoir	**07**
Q.4	**(a)**	Discuss requirement of a good distribution system. Describe layouts of various water distribution networks.	**07**
	(b)	State various types of sewers. Describe the procedure to estimate the waste water discharge for a city.	**07**
		OR	
Q.4	**(a)**	Explain the following with figure. (1) Catch basin or catch pits (2) Drop manhole (3) Grease and oil traps	**07**
Q.4	**(b)**	Define septic tank. Describe its construction details and design considerations.	**07**

Q.5	**(a)**	Design a suitable rectangular sedimentation tank for treating sewage of a city. The city has maximum daily demand of 12 million litre per day. Assume suitable value of detention period and velocity of flow in the tank.	**07**
	(b)	Describe the following in detail. (1) Trickling filter (2) Activated sludge process	**07**

OR

Q.5	**(a)**	Explain sludge digestion and its stages in digestion process. Also explain factors affecting sludge digestion.	**07**
	(b)	Explain the following (1) Grit Chamber (2) Sludge drying beds (3) Soak pit	**07**

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