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 **07**
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 = 1 in 1000
Manning's coefficient =0.015
Runoff Coefficient = 0.6

Q.3 **(a)** Explain the following terms **07**
(1) Detention time (2) Surface loading (3) Coagulation (4) Filtration (5)
Disinfection
(b) Define slow sand and rapid sand filters and give a point wise comparison **07**
between them.

OR

Q.3 **(a)** Explain the following terms in relation of disinfection **07**
(1) Pre-chlorination (2) Post-chlorination (3) Double chlorination (4)
Break-point chlorination (5) Super chlorination (6) De-chlorination
(b) (1) Enumerate various methods used for water softening **07**
(2) Explain the procedure of fixing storage capacity of an elevated storage
reservoir

Q.4 **(a)** Discuss requirement of a good distribution system. Describe layouts of **07**
various water distribution networks.
(b) State various types of sewers. Describe the procedure to estimate the **07**
waste water discharge for a city.

OR

Q.4 **(a)** Explain the following with figure. **07**
(1) Catch basin or catch pits (2) Drop manhole (3) Grease and oil traps
Q.4 **(b)** Define septic tank. Describe its construction details and design **07**
considerations.

1

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. **07**
(1) Trickling filter (2) Activated sludge process

OR

Q.5 **(a)** Explain sludge digestion and its stages in digestion process. Also explain factors affecting sludge digestion. **07**

(b) Explain the following **07**
(1) Grit Chamber (2) Sludge drying beds (3) Soak pit

****

2