

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 between them. **07**

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 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. **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 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. **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
