

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- VIth SEMESTER-EXAMINATION – MAY- 2012****Subject code: 160604****Date: 17/05/2012****Subject Name: Water and wastewater 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) What is per capita demand? Discuss factors affecting per capita demand. **07**
 (b) Describe different types of intakes and design a intake well for a flow of $0.1 \text{ m}^3/\text{sec}$. **07**

- Q.2** (a) What is the necessity of water supply scheme? Draw a complete flow diagram of water treatment plant. **07**
 (b) What is the economic diameter of pumping mains? Give step wise procedure for finding BHP of pumps. **07**

OR

- (b) Enumerate different population forecasting methods and calculate the population after two decades for following data by any two methods. **07**

Year	Population	Year	Population
1980	25000	1990	28000
2000	34000	2010	42000

- Q.3** (a) What is rate of filtration? Design a rapid sand filter with under drainage network for getting flow of $0.1 \text{ m}^3/\text{sec}$. Take rate of filtration as 5000 liters/sqm/hr. **07**
 (b) What is clariflocculator? Design a clariflocculator for flow of $0.1 \text{ m}^3/\text{sec}$. Assume suitable data as per manual. **07**

OR

- Q.3** (a) Derive the equation for settling velocity in sedimentation tank and prove that settling velocity does not depend upon depth of sedimentation tank. **07**
 (b) Write short notes on: **07**
 (i) Methods of disinfection (vi) Distribution networks

- Q.4** (a) Why biological treatment is necessary? Differentiate suspended growth process and attached growth process. **07**
 (b) Draw a complete flow diagram of wastewater treatment plant and describe the function of its each unit. **07**

OR

- Q.4** (a) Describe the working of Trickling filters with sketch and discuss the formation of slime layer in it. **07**
 (b) 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**

- Q.5** (a) Why sludge recirculation is done in activated sludge process? Discuss the mass balance with sketch for completely mixed reactor of wastewater treatment using ASP. **07**
 (b) Enumerate different sewer appurtenances and describe man hole with sketch. **07**

OR

- Q.5** (a) Write short notes on: **07**
(i) COD test (vi) Factors affecting sludge digestion
- (b) Discuss the low cost sanitation system and design a septic tank with soak pit for 100 users. Take loading of 120 liters/capita/day for septic tank and percolation rate of 1250 liters/cum/day for soak pit. Assume suitable data if required **07**
