

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. - SEMESTER – VI • EXAMINATION – WINTER 2012

Subject code: 160604**Date: 05/01/2013****Subject Name: Water and Wastewater Engineering****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Enlist different types of water demand. explain the different factors affecting the water demand. **07**

(b) Enlist different methods of population forecast. explain any three methods in detail. **07**

Q.2 (a) The following data have been noted from the census department. **07**

Year	1981	1991	2001	2011
Population	16000	24000	34000	47000

Calculate the probable population for the year 2031 and 2041 by arithmetical increase method, geometrical increase method and decrease rate of growth method.

(a) Enlist different types of pipes used for water supply. explain any two in detail. **07**

OR

(b) Explain the factors affecting the site selection for an intake structure. **07**

Q.3 (a) Draw the layout of a water treatment plant. Explain function of each unit. **07**

(b) Discuss various types of Rapid mixing devices in detail. **07**

OR

Q.3 (a) Design a clarifloculator to treat 1.5 MLD of raw water. **07**

(b) Design a rapid sand filter to treat 2.5MLD of raw water. **07**

Q.4 (a) Explain different layouts of distribution network with their relative merits and demerits. **07**

(b) State different methods used for disinfection. Explain any two in detail. **07**

OR

Q.4 (a) Enlist various sewer appurtenances and write short note on any one. **07**

(b) What do you understand by unit operations and processes? what is its importance in water and wastewater treatment? Elaborate various types of unit operations used for wastewater treatment. **07**

Q.5 (a) Design screen and grit chamber to cater 1.2MLD sewage. **07**

(b) What do you understand by a trickling filter? explain with the help of a neat sketch, the biological process involved in working of a trickling filter. **07**

OR

Q.5 (a) What is meant by activated sludge? Describe with sketches the treatment of sewage by activated sludge process. Mention the advantages and disadvantages of this system. **07**

(b) Design an activated sludge process to yield an effluent BOD₅ of 30mg/l and suspended solids of 25 mg/l. The influent BOD₅ following primary settling tank is 175mg/l. The waste flow is 15m³/min. Take Y= 0.65, k_d=0.05 and c=10 days. **07**
