Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI EXAMINATION – WINTER 2015

Subject Code:160604 **Date:14/12/ 2015**

Subject Name: Water and Wastewater Engineering

Time:2:30pm to 5:00pm **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)** Following data were obtained from the census. **07**

Year	Population
1980	56000
1990	72000
2000	84000
2010	93000

Find the population of 2030 and 2040 using any three methods

(b) Give the classification of intake. Explain river intake with neat sketch. **07**

Q.2 **(a)** Draw a layout of a complete water treatment plant and state the function of all the units of water treatment plant **07**

(b) A city with 1.0 lakh population is to be supplied water at 135 lpcd from a river 1 km away. The difference in water level of sump and reservoir is 25 m. If the demand has to be supplied in 8 hours, determine the size of the main and B.H.P of the pumps required. Assume maximum demand as 1.5 times the average demand. Take f = 0.0075, velocity in the pipe as 2.0 m/s and efficiency of pump as 75%. **07**

OR

(b) Design a plain sedimentation tank for treating 15 MLD of water. **07**

Q.3 **(a)** Differentiate between rapid sand filter and slow sand filter. **07**

(b) Explain different layout of distribution network with their relative merits and demerits. **07**

OR

Q.3 **(a)** Differentiate between plain sedimentation and sedimentation aided with coagulation. Explain different types of settling. **07**

(b) Explain how you will find the capacity of elevated service reservoir required for proper distribution of water. **07**

Q.4 **(a)** Design a rectangular grit chamber for treating 5 MLD of sewage. **07**

(b) Explain different types of man hole used in a sewerage system. **07**

OR

Q.4 **(a)** Classify sewers based upon (i) Their size and discharge carried by them (ii) Material used in their manufacture. **07**

(b) Define septic tank. Give the constructional details and design criteria for a septic tank. **07**

Q.5	**(a)**	Design a high rate trickling filter using the following data : (i) Sewage flow = 12 MLD (ii) Recirculation ratio = 1.5 (iii)BOD of raw sewage = 300 mg/l (iv)BOD removal in primary clarifier = 30 % and (v) Final effluent BOD desired = 20 mg/l	**07**
	(b)	Differentiate between 1. Activated sludge unit and trickling filter 2. Attached growth process and suspended growth process	**07**

OR

Q.5	**(a)**	Draw a typical flow sheet of a wastewater treatment plant having activated sludge plant in it and explain activated sludge process .	**07**
	(b)	Why preliminary treatment is required before primary and secondary treatment of wastewater. Explain function of each units used for preliminary treatment of wastewater.	**07**

****