

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2160604**Date: 26/10/2016****Subject Name: Water & Waste Water Engineering****Time: 10:30 AM to 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)** Give the site selection criteria for the location of water treatment plant. Draw a complete treatment train for the conventional water treatment plant and describe the functions of any two units. **07**
- (b)** Define the following terms: **07**
- (1) Design Period
 - (2) Water demand
 - (3) Attached growth process
 - (4) Sludge recirculation
 - (5) Mixed Liquor suspended solids (MLSS)
 - (6) Softening process
 - (7) Flocculation

- Q.2 (a)** Draw a complete flow diagram of conventional Wastewater Treatment plant and describe the function of its each unit. **07**
- (b)** For water supply of a town water is to be pumped from a river 2.1 km away from reservoir. The R.L. of bottom of water level in river is 100 m while the R.L. of the reservoir is 120 m. The Per capita demand of the town is 170 litres per day with population of town 90,000. If the pumps are to operate for a total of 12 hours and the efficiency of pump is 75%, determine the size of the rising main and H.P. of the pumps. The value of the friction factor is 0.03 and the velocity of flow is 1.8 m/s. Assume maximum daily flow as 1.5 times average demand. **07**

OR

- (b)** Define Intake structure. Describe the site selection criteria for selecting the site of intake structure. Enlist all the types of intake structures. **07**
- Q.3 (a)** What are the different types of filters? Explain any one in detail with neat sketch. **07**
- (b)** What are the objectives of Aeration in water treatment? Enlist different types of Aerators and describe any one in detail with neat sketch. **07**

OR

- Q.3 (a)** Make a list of various forms of chlorination and explain break point chlorination with sketch. **07**
- (b)** Enlist different types of settling and sedimentation tanks. Find the dimensions of a continuous horizontal flow rectangular sedimentation tank for the following data: **07**
- (i) Volume of water to be treated = 5 million litres per day
 - (ii) Detention period = 4 hours
 - (iii) Velocity of flow = 15 cm/min.

- Q.4 (a)** Enlist different layouts of distribution network and explain any two types with neat sketches. **07**
- (b)** Define: Sewer. Enlist and explain different types of sewers. **07**

OR

PTO

- Q.4 (a)** Enlist different type of storage and distribution reservoirs. **07**
 Find out the storage capacity of equalizing storage for distribution reservoir for the data given in following table using analytical solution. Assume a 24 hour pumping at a uniform rate.

Time	Hourly demand (litres)	Time	Hourly demand (litres)
12 mid night	0	1 p.m.	96000
1 a.m.	47000	2	90000
2	54000	3	90000
3	63000	4	93000
4	65000	5	96000
5	72000	6	99000
6	90000	7	102000
7	102000	8	102000
8	122000	9	90000
9	130000	10	72000
10	129000	11	80000
11	120000	12	54000
12 noon	108000		

- (b) Describe the steps of Laying of sewers. **07**
- Q.5 (a)** Define attached growth process .Explain the working of a trickling filter with the help of a neat sketch. **07**
- (b) Write short note on (1) Sludge Drying bed (2) Grit Chamber. **07**
- OR**
- Q.5 (a)** Explain sludge digestion and its stages. Also describe factors affecting sludge digestion. **07**
- (b) What do you understand by low cost sanitation systems? Design a septic tank for a hostel housing of 125 persons provided with an assured flow at a rate of 120 litres per capita per day. Take Desludging period as 1 Year. Assume suitable data you may need. **07**
