

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2160604

Date:13/05/2016

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) Describe various factors affecting per capita demand of water. 07
- (b) Draw a complete flow diagram of Municipal Wastewater Treatment Plant and describe the function of its each unit. 07
- Q.2 (a) Differentiate between 07
1. Activated sludge unit and trickling filter
 2. Attached growth process and suspended growth process
- (b) Explain the factors affecting the site selection for an intake structure. 07
- OR**
- (b) Enumerate various methods of population forecasting. Explain geometric increase and arithmetic increase method in detail. 07
- Q.3 (a) Define slow sand and rapid sand filters and give a point wise comparison between them. 07
- (b) A city with 3.5 lakh population is to be supplied water at 140 lpcd from a river 2 km away. The difference in water level of sump and reservoir is 20 m. If the demand has to be supplied in 10 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**
- Q.3 (a) Enumerate various methods used for water softening. 07
- (b) Calculate the velocity of flow and corresponding discharge in a circular sewer having a diameter of 1.00 m laid at a gradient 1 in 400. The sewer is running at 0.60 m depth. Take $N = 0.012$ in Manning's formula. 07
- Q.4 (a) Discuss requirement of a good distribution system. Describe layouts of Various water distribution networks. 07
- (b) Design a primary settling tank of rectangular shape for a town having population of 50000 with wastewater supply 140 liters/capita/day. 07
- OR**
- Q.4 (a) Differentiate between plain sedimentation and sedimentation aided with coagulation. Explain different types of settling. 07
- (b) Design a rapid sand filter unit for treating 7×10^6 liters/day supply for a town. The filter are to work day and night .take rate for filtration as 5500lit/m²/hour 07
- Q.5 (a) Explain sludge digestion and its stages in digestion process. Also explain factors affecting sludge digestion. 07
- (b) Discuss the low cost sanitation system and design a septic tank for 170 users. Take loading of 150 liters/capita/day for septic tank. Assume suitable data if required 07
- OR**
- Q.5 (a) Explain trickling filter with sketch. Discuss design parameters. 07

(b) Describe the following in detail.

07

(1) Grit Chamber (2) Activated sludge process
