

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VI (NEW) EXAMINATION – WINTER 2020****Subject Code:2160604****Date:29/01/2021****Subject Name:Water & Waste Water Engineering****Time:02:00 PM TO 04:00 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Draw a layout of a conventional water treatment plant. **03**
(b) Differentiate between trickling filter and activated sludge unit used for biological treatment of wastewater. **04**
(c) Design a plain sedimentation tank for treating water required for a town with population of 15,000 with the rate of water supply of 180 lpcd. Take peak factor as 1.8. Show necessary checks. **07**
- Q.2** (a) Define Intake. Give the classification of intake. **03**
(b) Differentiate between **04**
1. Plain sedimentation and sedimentation aided with coagulation.
2. Unit processes and unit operations used for wastewater treatment.
(c) Design a flash mixer for treating 8 MLD of water **07**
- Q.3** (a) Find the most economical diameter of the rising main and the BHP of the pump required for pumping 10 MLD of raw water. The total head against which the pump has to work is 35 m. Distance of conveyance of water is 2 km. Take coefficient of friction=0.0075. Neglect minor losses. Assume efficiency of pump as 80%. **03**
(b) Explain the different treatment trains adopted commonly for treatment of water. **04**
(c) Explain different types of aerators used for water treatment with neat sketch. **07**
- Q.4** (a) Find out the diameter of a clarifier needed for treating 200 m³/hour of flow. Assume surface loading rate as 30 m³/m²/day. **03**
(b) Define: 1. Pre-chlorination 2. Super chlorination 3. Break point chlorination 4. Plain chlorination **04**
(c) Enlist different layout of water distribution network. State the advantages and disadvantages of any two of them. **07**
- Q.5** (a) Explain how you will find the balancing storage requirement of a distribution reservoir. **03**
(b) Enlist different sewer appurtenances used in sewerage system. Explain different components of a manhole with a neat sketch. **04**
(c) Calculate the diameter and discharge of a circular sewer laid at a slope of 1 in 400 when it is running half full, and with a velocity of 1.1 m/s. Take Manning's N= 0.012. **07**
- Q.6** (a) Draw a neat sketch of an elevated service reservoir showing all its components. **03**
(b) Explain different types of storm regulators used in a sewerage system. **04**

- (c) A single stage trickling filter is required to treat wastewater flow of 5 MLD with BOD of 230 mg/l. It is to be designed for a loading rate of 10500 Kg of BOD/ha.m/day. What will be the BOD of the effluent? Take recirculation ratio as 1.0. **07**
- Q.7** (a) Why are coarse screen and grit chambers provided in the wastewater treatment plant? **03**
- (b) Write a short note on soak pit. **04**
- (c) Why sludge digestion is required? Explain the stages of sludge digestion. Enlist the factors affecting sludge digestion. . **07**
- Q.8** (a) Explain the symbiotic relation between algae and bacteria in an oxidation pond. **03**
- (b) Differentiate between suspended growth process and attached growth process used for biological treatment of wastewater. **04**
- (c) Design a septic tank for a colony of 170 persons. Assume rate of water supply as 120 lpcd. **07**

www.FirstRanker.com