

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI(OLD) – EXAMINATION – SUMMER 2019****Subject Code:160604****Date:18/05/2019****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) What are different water demands? Discuss factors affecting water demand **07**  
(b) Why is population forecasted for calculation of water demand? Differentiate arithmetic and geometric increase method of population forecast. **07**
- Q.2** (a) Discuss theory of sedimentation and prove that settling velocity dose not depends on depth of sedimentation tank. **07**  
(b) Design the septic tank with soak pit for 150 users. Assume suitable data. **07**
- OR**
- (b) Describe different aerobic and anaerobic processes used to treat wastewater **07**
- Q.3** (a) Differentiate dry well and wet well used for intake structure? Schematically describe reservoir and river intakes. **07**  
(b) What is discrete settling? Derive the equation for settling velocity for discrete particles in PST **07**
- OR**
- Q.3** (a) Design a clariflocculator for discharge of 240 m<sup>3</sup>/hr **07**  
(b) Describe the working procedure of Rapid sand filter and Slow sand filter. **07**
- Q.4** (a) Define velocity gradient and give the salient features and design criteria for flash mixer **07**  
(b) Draw the flow diagram of wastewater treatment plant and discuss the functioning of different units **07**
- OR**
- Q.4** (a) Explain the mass curve method of finding capacity of ESR **07**  
(b) Compare gravity and pumping system of supply and explain any one water distribution network system in details **07**
- Q.5** (a) What are sewer appurtenances? Describe purpose of manhole and drop manhole with sketches **07**  
(b) What is HRTF? Design HRTF for wastewater flow of 4.0 MLD with recirculation ratio=1.4, BOD of raw wastewater=250 mg/l and desired effluent BOD=40 mg/l **07**
- OR**
- Q.5** (a) Enlist different methods of chlorination and discuss method of Break point chlorination with chemical reactions **07**  
(b) Why is sludge digestion required? Discuss the different factors affecting the sludge digestion process **07**

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