

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – WINTER • 2014****Subject Code: 151303****Date: 03-12-2014****Subject Name: Physico-chemical Treatment Technologies****Time: 10.30 am - 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) Enlist the physical water-quality parameters also explain why these parameters are of concern to environmental engineers **07**
(b) Draw a neat sketch of conventional water treatment plant. **07**
- Q.2** (a) Write a short note: Grit removal **07**
(b) Explain the purpose of screen and draw a neat sketch of manually cleaned bar rack. **07**
- OR**
- (b) Explain in details types of flocculation and flocculators **07**
- Q.3** (a) Explain Jar tests for optimum coagulant dosage **07**
(b) Explain the purpose of disinfection. Give advantages of chlorination over the other methods **07**
- OR**
- Q.3** (a) Determine the head loss using Carmen-kozeny equation across a bed of uniform sand having the porosity of 0.4. The depth of bed is 0.67 m. The sand grains are 0.4 mm in diameter with a shape factor of 0.85 and a specific gravity of 2.65. Water at 20 °C is passed through this bed at a filtering velocity of 5 m/h. **07**
(b) Write a short note: Dual media filters **07**
- Q.4** (a) Derive the expression for Stokes equation **07**
(b) Explain anaerobic sludge digestion in detail. **07**
- OR**
- Q.4** (a) Calculate the terminal settling velocity of a spherical particle with diameter 0.5 mm and specific gravity of 2.65 settling through water at 20 °C. Assume density and viscosity of water at given temperature as 998.2 kg/cu.m and 1.002×10^{-3} N.s/sq.m **07**
(b) Why sludge treatment is required? Explain sludge thickening **07**
- Q.5** (a) Write a short note: (a) elutriation (b) chemical conditioning **07**
(b) Explain the terms: Average daily flow, Maximum daily flow, Peak hourly flow, Minimum daily flow, Minimum hourly flow, Sustained flow **07**
- OR**
- Q.5** (a) Explain the procedure for statistical analysis of wastewater flowrate data **07**
(b) Give classification of filtration systems **07**
