

**GUJARAT TECHNOLOGICAL UNIVERSITY****M. E. I<sup>ST</sup> Semester–Remedial Examination – July- 2011****Subject code: 711806N****Subject Name: Water and Wastewater Treatment Technologies****Date: 12/07/2011****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) Explain different physical characteristics of water with their environmental significance. **07**  
 (b) Differentiate (i) Flocculent and zone settling (ii) BOD and COD **07**  
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- Q.2** (a) Describe different types of solids present in water and draw the spectrum of particle size distribution. **07**  
 (b) What is discrete settling? Derive the equation for finding the settling velocity in PST. **07**

**OR**

- (b) How quantity of wastewater generated is calculated? Discuss the variations in wastewater flow. **07**

- Q.3** (a) What is short circuiting? Prove that settling velocity does not depend on the depth of the sedimentation tank. **07**  
 (b) Describe different mechanisms of coagulation theory and discuss the effect of alkalinity on coagulation. **07**

**OR**

- Q.3** (a) Explain the mechanism of filtration and differentiate slow sand filter and rapid sand filter. **07**  
 (b) Define (i) Mean cell residence time (ii) Hydraulic retention time (iii) Specific growth rate **07**

- Q.4** (a) Differentiate (i) Surface and Back washing (ii) Anaerobic and Anoxic process (iii) First and Second order reaction. **07**  
 (b) Enumerate different types of reactors and explain the kinetics of plug flow reactor. **07**

**OR**

- Q.4** (a) What is pseudo first order reaction? Explain schematically all curves of zero, first and second order reactions. **07**  
 (b) What is first stage BOD? Calculate the BOD for 2 days at 30°C if BOD<sub>5</sub> at 20°C is 200 mg/l. Take k=0.15 per day **07**

- Q.5** (a) What is UASB system? Draw the complete flow diagram of wastewater treatment plant using UASB. **07**  
 (b) Define (i) Kinetic constant (ii) Zeta potential (iii) Stability and instability forces in coagulation **07**

**OR**

- Q.5** (a) Explain the adsorption process and discuss schematically the Langmuir isotherm. **07**  
 (b) Explain the procedure to find COD in lab and discuss the limitations of COD test. **07**

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