

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013****Subject code: 711806N****Date: 17-06-2013****Subject Name: Water and Wastewater 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) Tabulate different main characteristics of water and wastewater indicating their desirable and permissible limits. 07
- (b) Describe requirements of water for domestic and industrial purposes and discuss the variations in flows of wastewater. 07
- Q.2** (a) Describe different types of settling phenomena and derive the equation for settling velocity in sedimentation tank. 07
- (b) Differentiate BOD and COD and find out the BOD_5 at 20°C if BOD_2 at 35°C is 150 mg/l. Assume $K_{D(20)} = 0.1$. 07

OR

- (b) Define (i) ThOD (ii) TOD (iii) MCRT (iv) Sludge age (v) Sludge bulking (vi) F/M ratio. 07
- Q.3** (a) Describe the dilution method of BOD determination in laboratory and state the limitations of BOD test. 07
- (b) What is clariflocculator ? Discuss the design criteria of it and draw its sketch with indicating all its parts. 07

OR

- Q.3** (a) What are stability and instability forces in coagulation process? Discuss the importance of energy barrier in process. 07
- (b) What are different types of coagulants used in water treatment? Give chemical reactions for at least one coagulant. 07
- Q.4** (a) Discuss the theory of filtration and describe the different methods of washing of different filters. 07
- (b) Differentiate absorption and adsorption? Describe briefly Freundlich isotherm and Langmuir isotherm equations. 07

OR

- Q.4** (a) Write short notes on (i) Anoxic and Aerobic & anaerobic Processes (ii) Particle size distribution 07
- Q.4** (b) Discuss the process of working of UASB reactor and discuss its merits and demerits. 07
- Q.5** (a) Differentiate the attached and suspended growth process and draw the complete flow diagram of ASP process. 07
- (b) Describe the zero, first and second order reactions and discuss the pseudo first order reaction with examples. 07

OR

- Q.5** (a) Write short notes on (i) Plug flow reactor (ii) Trickling filter 07
- (b) Differentiate the working of SSF and RSF and discuss different filter troubles in operation of RSF. 07
