

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER 2013****Subject Code: 151303****Date: 21-05-2013****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** Tests on a Type II settling suspension in a settling column of 240 cm depth with sampling ports spaced at 60cm intervals, gave the following results. Based on the test removals, plot the iso removal lines for 80%, 70% and 60% and find probable % removal for a detention time of 80 minutes. **14**

Time (min)	% solids removed		
	60 cm	120 cm	180 cm
5	17	10	8
10	28	19	15
20	41	30	26
30	54	41	33
40	62	46	42
50	66	54	46
60	73	59	52
75	75	67	58

- Q.2 (a)** Differentiate between **07**
- (i) Primary, secondary and tertiary treatment
 - (ii) Physical, chemical and biological treatment

- (b)** Give the classification of Screens and describe any one. **07**

OR

- (b)** Write a note on αGrit Chamberä **07**

- Q.3 (a)** Draw a neat flow diagram of Conventional Water Treatment Plant and explain its different units stating their functions **08**

- (b)** Explain the terms: (i) SOR (ii) WOR (iii) Scour velocity (iv) Coagulation (v) Flocculation (vi) Disinfection **06**

OR

- Q.3 (a)** Explain the four types of settling phenomena in water and wastewater treatment. Explain clearly the difference between them. **08**

- (b)** Write a note on tube settlers highlighting its benefits and limitations. **06**

- Q.4 (a)** Determine the daily requirement of alum, lime and polyelectrolyte to coagulate a flow of 36400 m³/d, if results of jar test indicated optimum coagulation when 1 L of water was dosed with 5 mL of a 10 mg/L alum solution, 2.0 mL of a 10g/L suspension of lime and 0.3mg/L of commercial polyelectrolyte. Also compute the amount of chemical sludge due to use of alum and lime. **07**

(b) Enlist the mechanisms of coagulation and describe any two. 07

OR

Q.4 (a) Enlist the different types of mixing equipments and explain any one with sketch. 07

(b) Write a note on Colloidal Stability and how it can be destabilized? 07

Q.5 (a) Draw a neat sketch of Rapid Sand Filter and explain its features and working. 07

(b) Give the classification of filters based on direction of flow and explain each type with the help of a neat sketch. 07

OR

Q.5 (a) Explain the process of disinfection using Chlorine and its compounds. 07

(b) Highlight the sources and effects of following parameters in water and wastewater: 07

(i) Organic matter (ii) Hardness (iii) Nitrates (iv) Chlorides
