Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2015

Subject Code: 151303 **Date: 11/05/2015**

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.**

Q-1 (a)Draw a neat sketch of conventional water treatment plant and explain the function of each unit. **07**

(b) Explain the coagulation theory for removal of colloids. **07**

Q-2 (a) Differentiate between: **07**

(I) Coagulation and flocculation

(ii) Physical treatment and chemical treatment.

(b) Give the classification of different types of filters and explain the multimedia filters. **07**

OR

(b) Draw a neat sketch of Rapid Sand Filter (RSF) and explain its construction and working. **07**

Q-3 (a)Write a short note on "Tube Settlers". **07**

(b) A Water Treatment Plant is Processed 30,000 m3/day of Water. The Rapid Mixing Tank will mixed 35 mg/l of alum with the flow & should have a detention time of 2 mins.The Tank is to have a Square Cross section & a flat blade in. Determine The Following:- **07**

(i) Quantity of alum added in kg/day.

(ii) Dimension of the tank.

(iii) Power input necessary for G value of 900s-1. Assume the water temp. is 20^0C

OR

Q-3 (a)A Jar test was done in a laboratory on water sample to determine the optimum chemical does for classification 2L samples were kept in a each jar after the test, the jar showing Optimum removal was closed with 10 ml alum solution. Containing 5 mg Al^{+3} per ml & 1 ml polyelectrolyte containing 1mg/ml. if the amount of water to be treated on that day is 45 MLD. Calculate kg/day of alum and polyelectrolyte that should be added to the water. **07**

(b) Explain the disinfectants used for water treatment. **07**

Q-4 (a) Enlist and explain the different types of settling phenomena. **07**

(b)Enlist and explain the sources and effects of following parameters in water and wastewater (Any four) : **07**

(i) Oil and grease (ii) Pesticides (iii) Alkalinity

(iv) Phenol (v) Fluorides

OR

Q-4 (a) With the help of a neat sketch explain the concept of "Break point Chlorination." **07**

(b) Explain the mechanisms involved in removal of solids in a filter. **07**

Q-5 (a) Determine the built up of head loss through a bar screen when 75% of the flow area is blocked off due to the accumulation of coarse solids. Assume the following conditions: **07**

(i) Approach velocity=0.6m/s

(ii) Velocity through clean bar screen=0.9 m/s

(iii) Open area for flow through clean bar screen=0.25m2

(iv) Head loss Coefficient for clean bar =0.7

(b) Explain any one type of Grit Chamber with sketch. **07**

OR

Q-5 (a) Describe the usual sources of sludge and the characteristics of sludge generated in a conventional wastewater treatment plant. **07**

(b) Describe the methods normally used to process the sludge before its final disposal. **07**

3. **Figures to the right indicate full marks.**

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