

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE SEM-V Examination-Nov/Dec.-2011**

**Subject code: 151303****Date: 26/11/2011****Subject Name: Physico-chemical Treatment Technologies****Time: 2.30 pm -5.00 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)** Draw a neat sketch of conventional water treatment plant and explain the function of each unit. **07**
- (b)** Explain the construction and working of a Slow Sand Filter along with a neat sketch. **07**

- Q.2 (a)** Derive the Stokes law for finding settling velocity of discrete particles. **07**
- (b)** Write a short note on "Tube Settlers". **07**

**OR**

- (b)** Enlist and explain the different types of settling phenomena .Give example of each type. **07**

- Q.3 (a)** Settling Column tests on a discrete suspension gave the following results from a depth of 2.0 m **08**

Sampling	5	10	20	40	60	80
Time(min.)						
% of S.S.	56	48	37	19	05	02
in Sample						

Determine the theoretical removal of solids from this suspension in a horizontal flow tank with Surface Overflow Rate of 250 m<sup>3</sup>/day.

- (b)** Differentiate clearly between : **06**
- (i) SOR and WOR.
  - (ii) Primary treatment and secondary treatment.

**OR**

- Q.3 (a)** Highlight the sources and effects of following parameters in water and wastewater : **07**

(i) Colour (ii) Temperature (iii) Chlorides (iv) Organic matter

- (b)** Enlist the assumptions for ideal sedimentation tank. Explain the different zones of sedimentation tank and their characteristics. **07**

- Q.4 (a)** Give the classification of filters based on direction of flow. With the help of neat sketches explain each in detail. **07**

- (b) What are the functions of under drainage systems? Explain manifold and pipe lateral system of under drainage. **07**
- OR**
- Q.4 (a)** With the help a graph, explain breakpoint chlorination. Define the terms Free chlorine residuals and Combined chlorine residuals. **07**
- Q.4 (b)** Enlist the factors which affect chlorination. **07**
- Q.5 (a)** Write a short note on “Colloidal Stability”. What are the mechanisms of destabilization of colloids? **07**
- (b)** Write down the chemical reactions involved in coagulation with alum and hence calculate the alkalinity required for 10g of alum. **07**
- OR**
- Q.5 (a)** Explain clearly the difference between coagulation and flocculation. Prepare a list of different types of mixers and explain any one. **08**
- (b)** Explain the terms; **06**
- (i) Effective size of sand.
  - (ii) Uniformity coefficient.
  - (iii) Scour velocity.
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