

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2023**

**Subject Code:3151303**

**Date:07-12-2023**

**Subject Name: Physico-chemical Treatment Technology**

**Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

**Q.1** (a) Explain the procedure for statistical analysis of wastewater flow rate data. **03**

(b) What is unit process? List down different unit processes used for waste water treatment. **04**

(c) Explain with neat sketch: dissolved air flotation for surface water treatment. **07**

**Q.2** (a) Give the classification of screen with opening size. **03**

(b) Write a note on “Operational difficulties of RSF”. **04**

(c) Explain the construction and working of a Slow Sand Filter along with a neat sketch. **07**

**OR**

(c) Explain the construction and working of a Rapid Sand Filter along with a neat sketch. **07**

**Q.3** (a) Write a short note on vortex type Grit Chamber. **03**

(b) Derive the Newton’s law for settling velocity of discrete particle. **04**

(c) Explain the jar test procedure for determining the optimum dose of chemical Coagulant. What is the relationship between pH, Alkalinity and the alum dose? **07**

**OR**

**Q.3** (a) Write a note on tube settlers highlighting its benefits and limitations. **03**

(b) Write a short note on grit removal mechanism. **04**

(c) Write a short note on “Colloidal Stability”. What are the mechanisms of destabilization of colloids? **07**

**Q.4** (a) Explain the concept of “Break point Chlorination”. **03**

(b) Enlist the assumptions for ideal sedimentation tank. **04**

(c) Enlist the different types of mixing equipments & explain any one with sketch. **07**

**OR**

**Q.4** (a) Write a short note on ‘Filter backwashing’. **03**

(b) Enlist and explain different types of settling phenomena observed in sedimentation tank. **04**

(c) Differentiate between: (1) rapid mixture & flocculator (2) coagulation & flocculation. **07**

- Q.5** (a) Explain Sludge Drying bed and its design criteria. **03**  
(b) What are the advantages of dual media filters as compared to single media filters? **04**  
(c) Describe the usual sources of sludge and the characteristics of sludge generated in a conventional wastewater treatment plant. **07**

**OR**

- Q.5** (a) Why sludge treatment is required? Explain sludge thickening. **03**  
(b) Explain anaerobic sludge digestion in detail. **04**  
(c) Describe the methods normally used to process the sludge before its final disposal. **07**

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