

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2019**

**Subject Code: 2151303**
**Date: 06/06/2019**
**Subject Name: Physico - Chemical Treatment Technologies**
**Time: 02:30 PM TO 05:00 PM**
**Total Marks: 70**
**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
<b>Q.1</b>	(a) Explain the procedure for statistical analysis of wastewater flowrate data.	<b>03</b>
	(b) Why are screens necessary before the treatment of wastewater? How are they classified?	<b>04</b>
	(c) Draw a neat sketch of conventional water treatment plant and explain the function of each unit.	<b>07</b>
<b>Q.2</b>	(a) Explain the concept of “Break point Chlorination”.	<b>03</b>
	(b) Enlist the different types of mixing equipments and explain any one with sketch.	<b>04</b>
	(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.	<b>07</b>
	<b>OR</b>	
	(c) Define physical characteristics of water and wastewater. Enlist and explain all the physical parameters along with their sources and effects.	<b>07</b>
<b>Q.3</b>	(a) Enlist and explain the factors affecting the process of chlorination.	<b>03</b>
	(b) Write a short note on Aerated Grit Chamber.	<b>04</b>
	(c) Derive the Stokes law for finding the terminal settling velocity of discrete particles. Which relationship will be used if the type of flow is turbulent flow?	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Write a short note on ‘Filter backwashing’.	<b>03</b>
	(b) Enlist and explain the mechanisms by which the colloids are stabilized.	<b>04</b>
	(c) Explain the four types of settling phenomena in water and wastewater treatment. Explain clearly the difference between them.	<b>07</b>
<b>Q.4</b>	(a) What are the advantages of dual media filters as compared to single media filters?	<b>03</b>
	(b) Explain the coagulation theory for removal of colloids.	<b>04</b>
	(c) Prepare a list of different types of chemical coagulants and explain any two along with chemical reactions.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Write a note on “Operational difficulties of RSF”.	<b>03</b>
	(b) Enlist and explain the mechanisms of filtration in a Rapid Sand filter.	<b>04</b>
	(c) Draw a neat sketch of Rapid Sand Filter and explain its construction and working.	<b>07</b>
<b>Q.5</b>	(a) What are the functions of under drainage systems?	<b>03</b>
	(b) Describe the methods normally used to process the sludge before its final disposal.	<b>04</b>

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

**OR**

- Q.5**
- (a) Discuss the objectives of treatment of sludge. **03**
  - (b) Explain sludge thickening. **04**
  - (c) Specify the significance of the Volume-Weight relationship of the sludge in design of sludge handling facility. **07**

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