Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: 151303 **Date: 03-12-2014**

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	**(a)**	Enlist the physical water-quality parameters also explain why these parameters are of concern to environmental engineers	**07**
	(b)	Draw a neat sketch of conventional water treatment plant.	**07**
Q.2	**(a)**	Write a short note: Grit removal	**07**
	(b)	Explain the purpose of screen and draw a neat sketch of manually cleaned bar rack.	**07**
		OR	
	(b)	Explain in details types of flocculation and flocculators	**07**
Q.3	**(a)**	Explain Jar tests for optimum coagulant dosage	**07**
	(b)	Explain the purpose of disinfection. Give advantages of chlorination over the other methods	**07**
		OR	
Q.3	**(a)**	Determine the head loss using Carmen-kozeny equation across a bed of uniform sand having the porosity of 0.4. The depth of bed is 0.67 m. The sand grains are 0.4 mm in diameter with a shape factor of 0.85 and a specific gravity of 2.65. Water at 20 °C is passed through this bed at a filtering velocity of 5 m/h.	**07**
	(b)	Write a short note: Dual media filters	**07**
Q.4	**(a)**	Derive the expression for Stokes equation	**07**
	(b)	Explain anaerobic sludge digestion in detail.	**07**
		OR	
Q.4	**(a)**	Calculate the terminal settling velocity of a spherical particle with diameter 0.5 mm and specific gravity of 2.65 settling through water at 20 °C. Assume density and viscosity of water at given temperature as 998.2 kg/cu.m and 1.002 * 10^{-3} N.s/sq.m	**07**
	(b)	Why sludge treatment is required? Explain sludge thickening	**07**
Q.5	**(a)**	Write a short note: (a) elutriation (b) chemical conditioning	**07**
	(b)	Explain the terms: Average daily flow, Maximum daily flow, Peak hourly flow, Minimum daily flow, Minimum hourly flow, Sustained flow	**07**
		OR	
Q.5	**(a)**	Explain the procedure for statistical analysis of wastewater flowrate data	**07**
	(b)	Give classification of filtration systems	**07**

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