Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 711806N **Date: 06-01-2014**

Subject Name: Water and Wastewater 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 different chemical characteristics of water and wastewater and explain any two in details.	**07**
	(b)	Differentiate (a) SOR and WOR (b) RSF and SSF	**07**
Q.2	**(a)**	Draw the complete flow diagram of conventional WWTP and explain the purpose of each unit.	**07**
	(b)	Why BOD is determined for five days at 20^0C. Determine BOD at 15^0C for 8 days if BOD at 20^0C for 5 days is 150 mg/L. Take k value as 0.23 per day.	**07**
		OR	
	(b)	What is the importance of BOD/COD ratio? Describe the step wise process of determination of COD in laboratory.	**07**
Q.3	**(a)**	Discuss different types of settling phenomena's and give at least one example of each types of settling phenomena's.	**07**
	(b)	Explain the mechanism of coagulation and with chemical reactions discuss the processing of alum coagulant.	**07**
		OR	
Q.3	**(a)**	Differentiate (a) Stability and instability forces in mechanism of coagulation (b) Total and zeta potential	**07**
	(b)	Discuss the Stock's law of sedimentation and prove that settling velocity does not depend upon depth of sedimentation tank.	**07**
Q.4	**(a)**	Draw the neat sketch of RSF and describe the backwashing of RSF	**07**
	(b)	Explain the environmental significance of (a) Nitrates and Nitrite (b) TDS and TSS (c) MPN	**07**
		OR	
Q.4	**(a)**	Why velocity control device is to be provided in grit chamber? Explain the working of aerated grit chamber.	**07**
	(b)	What do you mean by kinetic coefficient? Describe first order and second order kinetic equations.	**07**
Q.5	**(a)**	Why recirculation of sludge is necessary in ASP? Write the mass balance equation for completely mixed reactor with sludge return.	**07**
	(b)	Differentiate between attached growth and suspended growth and with neat sketch explain the working of trickling filter.	**07**
		OR	
Q.5	**(a)**	What is extended aeration? Derive the equation for finding the volume of ASP.	**07**
	(b)	How does sludge from PST and SST differs? Discuss the factors affecting sludge digestion process.	**07**

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