Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –Ist SEMESTER–EXAMINATION – JULY- 2012

Subject code: 711806N **Date: 11/07/2012**

Subject Name: Water and Wastewater Treatment Technologies

Time: 2:30 pm – 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.**

Q.1 **(a)** With the help of a neat sketch explain the conventional domestic wastewater treatment plant along with important design parameters. **07**

(b) Give the difference between : **07**

(i) Zone settling and compression settling

(ii) Scour velocity and settling velocity

Q.2 **(a)** Draw a neat sketch of a Rapid Sand Filter and explain in detail its component parts. **07**

(b) Prepare a list of chemical coagulant used in water and wastewater treatment. With the help of chemical reactions explain the coagulation with alum. **07**

OR

(b) Explain the concept of biological treatment along with the objectives and classification of biological treatment processes. **07**

Q.3 **(a)** Explain in brief the importance of following parameters, along with their sources, in water and wastewater : **08**

(i) Total Dissolved solids.

(ii) Nitrates

(iii) Alkalinity

(iv) Sulphates

(b) Write the mass balance for CFSTR with recycle and hence derive the equation for the volume of Activated Sludge Process. **06**

OR

Q.3 **(a)** Define and explain the following terms: **04**

(i) Specific growth rate

(ii) Food to microbe ratio.

(iii) Maximum specific growth rate.

(iv) Substrate utilization rate

(b) The kinetic parameters are determined using a bench scale activated sludge reactor with out recycle. The results are shown below. Determine the parameters **10**

Run	So mg/L BOD_5	Se mg/L BOD_5	Θ days	X mg VSS/L
1	300	7	3.1	127
2	300	12	2.1	126
3	300	19	1.7	135
4	300	31	1.2	130

Q.4 **(a)** Write a short note on "Tube Settler" **07**

	(b)	Assuming the diameter of the clarifier to be 20 m and an average wastewater flow rate of 40 MLD, calculate the detention time and surface overflow rate of a clarifier having a wastewater depth of 2.5 m in the clarifier.	**07**
		OR	
Q.4	**(a)**	Explain the functional zones of sedimentation tank	**07**
	(b)	A treatment unit is 1.5m wide, 20 m long and has a wastewater depth of 2.0 m. If the wastewater flow through the tank is 30 m^3 / min, calculate the detention time.	**07**
Q.5	**(a)**	Write the applications of screens in wastewater treatment plant.	**07**
	(b)	Explain BOD progression curve in detail.	**07**
		OR	
Q.5	**(a)**	Give the classification of grit chamber and explain any one in detail.	**07**
	(b)	Explain the phenomenon of sloughing in Trickling Filter	**07**

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