Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 161304 **Date: 03-06-2013**

Subject Name: Biological Process for Wastewater Treatment

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) Derive the relationship to find the amount of methane per gram of COD. **07**

(b)Enlist and explain the advantages and disadvantages of anaerobic treatment processes. **07**

Q-2 (a) Differentiate between; **07**

1. Suspended Growth Process
2. Attached Growth Process.

(b) Describe the procedure to estimate the Biokinetic constants in the laboratory. **07**

OR

(b) Explain the Thomas method for determination of reaction rate constant and ultimate BOD. **07**

Q-3 (a) A sample of wastewater was incubated for 7 days at 20 ºC and BOD result is 208 mg/l, BOD rate constant K = 0.15 day-1. Calculate (i) 5 ï day BOD (ii) 10 ï Day BOD **07**

(b) Explain the mechanism by which substrate removal takes place in an attached growth process. **07**

OR

(a) Find the volume of ASP Aerosol tank to Treatment of a waste of flow is 0.15 m3/s & influent BOD of 84 mg/l. The effluent standards is 30mg/l of BOD5 & 30 MG/L OF S.S Assume that BOD5 of S.S is 63% of S.S Concentration. Take Ks=100,K=5,kd=0.05,Y=0.5,& X=2000mg/l. **07**

(b) Give the classification of trickling filter and application of each type. **07**

Q-4 (a) Enlist the different types of natural treatment systems and describe any two. **07**

(b) Define **07**

(1). Yield Coefficient (2). Sludge Retention Time (SRT) (3).Specific Growth Rate (4). Endogenous decay of co-efficient (5). F/M Ratio (6). Half Velocity Constant

OR

(a) Write down the mass balance for CFSTR without recycle and hence Derive the equation for finding biokinetic constant. **07**

(b) A series of BOD determination was made on a sample to calculate Ultimate BOD and rate constant. Incubation was carried out on a 5% Dilution of the sample at 20 ºC when initial DO for the samples and blank was 9.17 mg/l. ,determine L & K by Fujimotto method. **07**

days	Final DO in Sample (mg/l)	Final DO in blank bottle (mg/l)
1	7.1	9.0
2	6.1	9.0
3	5.1	8.9
4	4.2	8.9
5	3.9	8.8
6	3.5	8.7
7	3.0	8.6

Q-5 (a) Explain anaerobic treatment process as a three stage process. **07**

(b) Highlight the importance of BOD for environmental engineers & explain the factors affecting the BOD test **07**

OR

(a) Write short notes on **07**

1. Step Feed Process
2. Contact Stabilization

(b) Draw the BOD progression curve and explain the different phases of the Same. **07**

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