Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2161304 Date: 24/10/2016

Subject Name: Biological Processes for Wastewater Treatment

Time: 10:30 AM to 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)** Differentiate between BOD,COD and TOC. **07**

(b) What are the factors affecting anaerobic treatment. **07**

Q.2 **(a)** Define the terms: **07**

(i) Food to microbe ratio
(ii) Mean cell residence time
(iii) Specific growth rate
(iv) Half velocity constant
(v) Substrate utilization rate
(vi) Decay coefficient
(vii) Yield

(b) Explain the procedure of preparing the Dilution water for carrying out BOD test. **07**

OR

(b) Differentiate between: **07**

(i) Suspended growth and Attached growth process
(ii) Aerobic and anaerobic treatment processes

Q.3 **(a)** Describe the procedure to determine the Biokinetic constants in the laboratory. **07**

(b) The value of BOD_5^{20} is 200 mg/l . What will be the ultimate BOD? What will be is 7 day demand? If the bottle would have been incubated at 35^0 C what would be the 5 day BOD? K(at 20^0 C) =0.23 day^{-1} **07**

OR

Q.3 **(a)** Explain any one method for determination of reaction rate constant and ultimate BOD. **07**

(b) Compute the carbonaceous and nitrogenous oxygen demand of waste represented by formula $C_9N_2H_6O_2$. **07**

Q.4 **(a)** Draw the biomass growth curve and explain the different phases of the same. **07**

(b) Prepare the mass balance for substrate and biomass for CFSTR with recycle. **07**

OR

Q.4 **(a)** Derive the relationship to find the methane gas generation per gram of COD. **08**

(b) Explain the experimental procedure to find the reaeration constant in the laboratory. **06**

Q.5 **(a)** With the help of a neat sketch explain any two modifications of ASP. **07**

(b) Write a short note on Trickling Filters. **07**

OR

Q.5 **(a)** Explain the different types of anaerobic digesters. **07**

(b) Explain the factors affecting oxygen transfer. **07**