

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VI • EXAMINATION – SUMMER 2014

Subject Code: 161304**Date: 28-05-2014****Subject Name: Biological Process 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) Explain the mechanism of anaerobic fermentation with a neat sketch **07**
(b) Explain the objectives of biological treatment **07**
- Q.2** (a) With the help of a neat sketch explain working of rotating biological contactor **07**
(b) Explain in detail the procedure to calculate biokinetic constants **07**
- OR**
- (b) An influent from a primary settling tank containing 225 mg/L of BOD₅ is to be treated aerobically in a complete mixed reactor without recycle. Compute the minimum mean cell residence time of biomass in the reactor if the essential biokinetic coefficients are as follows: $K_s = 60 \text{ mg/L}$, $K = 5 \text{ d}^{-1}$, $K_d = 0.05 \text{ d}^{-1}$, $Y = 0.5$. Assuming suitable ratio, determine design MCRT. **07**
- Q.3** (a) If BOD₅ of a sample measured at 20 °C is 250 mg/L, determine the 3-day BOD at 27 °C. Assume a reaction constant $K' = 0.23 \text{ d}^{-1}$ at 20 °C. **07**
(b) Explain the factors affecting oxygen transfer **07**
- OR**
- Q.3** (a) Define the terms: SVI, F/M, specific growth rate, yield coefficient, maximum substrate utilization rate constant, endogenous decay coefficient, organic loading **07**
(b) Explain the types of aerators **07**
- Q.4** (a) Write a short note: Package plants **07**
(b) Explain in detail Reed Beds **07**
- OR**
- Q.4** (a) Explain chemistry of carbohydrates **07**
(b) Discuss the fundamental considerations in the application of natural treatment systems **07**
- Q.5** (a) Write a short note: Bio-towers **07**
(b) Explain the major problems faced by small communities to treat the domestic wastewater **07**
- OR**
- Q.5** (a) Explain the parameters affecting anaerobic digestion **07**
(b) Explain the procedure to calculate the value of ultimate BOD and rate constant using Thomas method. **07**
