

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII • EXAMINATION – WINTER • 2014**

**Subject Code: 170404**

**Date: 27-11-2014**

**Subject Name: Bioprocess Engineering-I**

**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) How dynamic methods help determine  $k_L a$ ? 07
- (b) Give the important aspects of active diffusion and passive diffusion processes in fermentation. 07

- Q.2 (a) Explain the behavior of Bingham, Dilatants and Psuedoplastic fluids through suitable equations. 07
- (b) Discuss the effect of rheological properties in mixing. 07

**OR**

- (b) Draw net sketches of two each - *Radial and Axial flow impellers* and discuss their mechanism of action. 07

- Q.3 (a) Explain the terms: Tyndallization, desiccation and lyophilization. 07
- (b) Suggest the controlling mechanism of temperature for fermentor. 07

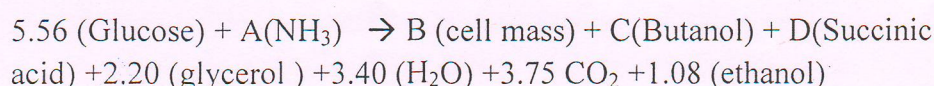
**OR**

- Q.3 (a) Explain various systems for fermentation processes. 07
- (b) Narrate the basic considerations for framing dynamic models for fermentation system. 07

- Q.4 (a) How artificial neural network and genetic algorithm helps in control of fermentation? 07
- (b) Answer the following: 07
1. What are the major categories of bioproducts those could be released through fermentation?
  2. Explain the terms: Yield Coefficient and RQ- Respiratory Quotient

**OR**

- Q.4 (a) What chemical methods are adopted to control microorganisms? 07
- (b) Anaerobic fermentations typically produce a variety of partially oxygenated compounds in addition to cell mass. If the cell molecular formula is given by  $C_6H_{10}O_3N$ , Calculate the unknown coefficients for the following typical equation where coefficients are given as mole quantities and not in mass. 07



- Q.5** (a) Give the classification of various pumps for biotech industries. **07**  
(b) Enlist the merits and demerits of Membrane Bio-reactor and Photo Bio reactor. **07**

**OR**

- Q.5** (a) Describe sterilization aspects of Diaphragm valve, Gate valve and Globe valve. **07**  
(b) What are the factors affecting incubation control? **07**

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