

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 Pseudoplastic fluids through suitable equations. 07
(b) Discuss the effect of rheological properties in mixing. 07

OR

- (b) Draw neat 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

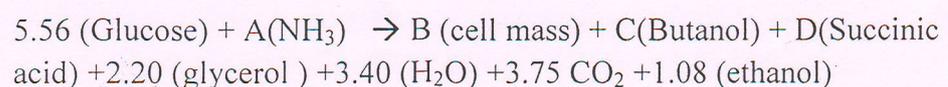
OR

- 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
