Reg. No. : | | | | | | | | | | | |

V 4527

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fifth Semester

Biotechnology

BT 1303 — BIOPROCESS PRINCIPLES

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you mean by upstream and downstream bioprocessing?

2. What are the advantages of fed batch cultivation?

3. What are the types of probes used in fermentors for measuring pH?

4. Define Degree of reduction.

5. 10 gms of E.Coli is produced from 35 gms of glucose. No other product is formed calculate the yield coefficient.

6. Give two examples of antifoam used in industries?

7. What is Del factor?

8. What is endogenous respiration?

9. What is leudeking – piret kinetics?

10. What is substrate inhibition?

PART B — (5 × 16 = 80 marks)

11. (a) What neat diagram, explain the construction details of industrial fermentors and its ancillary equipments. (16)

Or

(b) (i) What are the main parameters to be monitored and controlled in a Fermentation process and explain their significance? (8)

(ii) Write an overview of fermentation industry. (8)

12. (a) Write notes on medium optimization methods. (16)

Or

(b) Write the criteria for good medium and write about the different sources of carbon and Nitrogen and factors influencing their choices. (16)

13. (a) (i) Explain the continuous heat sterilization process. (8)

(ii) Explain the air sterilization process. (8)

Or

(b) Explain the thermal death kinetics of microorganism and how will you design batch sterilization process. (16)

14. (a) *Aspergillus Niger sp.* is used for the production of citric acid through glucose fermentation. The pH is maintained around 2. The biomass composition is $CH_{1.5}O_{0.3}N_{0.2}$. The Nitrogen source is NH_4NO_3 and no CO_2 is formed. 60 g critic acid is produced per100g glucose. Write the stoichiometric equation and calculate the stoichiometric coefficients for the cell mass and oxygen. (16)

Or

(b) (i) Explain heat generation and yield factor estimates used in metabolic energy stoichiometry. (8)

(ii) How strochiometrically product formation may be classified. (8)

15. (a) (i) Describe the monod growth kinetics model. (8)

(ii) Derive the expression for substrate and biomass concentration in steady state chemostat. (8)

Or

(b) (i) Write notes on leudking-piret model. (8)

(ii) Explain the growth of filamentous organism. (8)