

Total number of printed pages-4

53 (FPT 712) FRTC

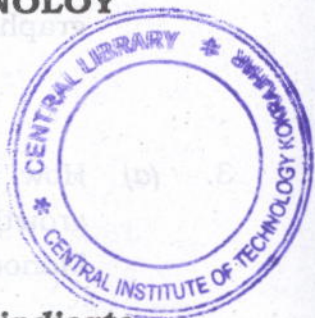
2019

FERMENTATION TECHNOLOGY

Paper : FPT 712

Full Marks : 100

Time : Three hours



The figures in the margin indicate full marks for the questions.

Answer any five questions.

1. (a) Define stoichiometry, respiratory quotient, theoretical oxygen demand. 10
(b) Briefly discuss about up-stream process of yeast fermentation (strain isolation, calibration of probes, sterilization, inoculation etc). 10

Contd.

2. (a) Why sterilization of nutrient medium is required? 6
- (b) What is del factor? 6
- (c) Write cell growth equation and show graphically specific cell growth rate. 8
3. (a) How limiting substrate influence cell growth during log phase? Explain with Monod model. 5
- (b) What is batch, continuous and fed batch mode of fermentation? 15
4. (a) Why agitation is required in suspension culture? 5
- (b) How oxygen is transferred from air bubble to microbial cell in fermentation broth? 5
- (c) How plug flow reactor is effective for enzymatic conversion reaction? 10



5. Briefly discuss about the following:

4×5=20

- (i) Filtration
- (ii) Absorption
- (iii) Adsorption
- (iv) Extraction.

6. Briefly discuss about fermentative production of the following mentioning their uses in Food industry: (**any two**)

- (i) Production of citric acid
- (ii) Production of vitamin C
- (iii) Production of any enzyme important in Food industry. 10+10=20



7. Suppose a microbial species obeys Monod model

$$dx/dt = \frac{M_{max}[S][x]}{K_s + [S]}$$

where $M_{max} = 0.7 \text{ hr}^{-1}$

$$K_s = 5 \text{ g/L}$$

$$\text{Cell yield} = 0.65$$

The micro-organism is cultured in a CSTR. The feeding rate and substrate concentration of inlet are 500 L/hr and 85 g/L respectively. The substrate concentration of outlet stream is 5 g/L . Calculate size of Fermenter and cell concentration of outlet stream at steady state. 20

