Total number of printed pages–4

53 (FPT 712) FRTC

2019

FERMENTATION TECHNOLOY

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 transfered 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

Contd.

7. Suppose a microbial species obeys Monod model

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

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

$K_s = 5g/L$

Cell yield = 0.65

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