53 (FPT 712) FRTC

2017

FERMENTATION TECHNOLOGY

Paper : FPT 712 (Back)

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions from **seven**.*

1. Discuss briefly about the following : 5×4=20

   (i) Stoichiometry in microbial growth

   (ii) Respiratory Quotient

   (iii) Growth yield ($Y\ x/s\ \ g/g$) and Product yield ($Y\ p/s\ \ g/g$)

   (iv) Theoretical oxygen demand

   (v) Del Factor in nutrient medium sterilization.

2. *(i)* Briefly write about Upstream process for microbial fermentation.

(ii) What are the environmental parameters for microbial culture ?

(iii) Why sterilization of nutrient medium is required ?

12+4+4=20

3. *(i)* What is batch fermentation ?

(ii) Write microbial cell growth kinetic equation.

(iii) What is doubling time ?

(iv) Write significant role of substrate to influence cell growth during exponential phase. Explain with Monod Model.

8+3+3+6=20

4. *(i)* What is Maintenance Coefficient ?

(ii) What is CSTR ?

(iii) What Dilution rate signify in CSTR ?

(iv) What is Fed batch culture and why it's required ?

(v) How Plug Flow reactor is effective in immobilized enzymatic conversion ?

4+4+4+4+4=20

5. (i) Why agitation is required in suspension microbial culture ?

(ii) How O_2 is transferred from gas bubble to microbial cell ?

(iii) What is volumetric oxygen transfer coefficient ? How this can be improved in a fermenter ?

(iv) Write unit of Diffusion Coefficient, mass transfer coefficient and volumetric oxygen transfer coefficient.

6+6+5+3=20

6. (i) Briefly discuss about enzyme kinetics equation and what K_m and V_{max} signify?

(ii) Discuss briefly : ***(any three)***

Filtration

Centrifugation

Adsorption

Absorption

Chromatographic separation.

8+12=20

7. (i) Discuss about fermentative production of the following products :

Citric Acid

α Amylase

β galactosidase

(ii) Find out the ratio of substrate concentration, when the velocity of enzymatic reaction is 90% of V_{max} and 10% of V_{max}.

12+8=20