Sub Code:MTBT102

Paper Id: 254102 Roll No:

M. TECH
(SEM-I) THEORY EXAMINATION 2019-20
BIOPROCESS ENGINEERING & TECHNOLOGY

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a.	How production of metabolites can be controlled?
b.	Define yield factor.
c.	Differentiate between overall and instantaneous yields.
d.	What do you understand by the term scale up?
e.	Comment upon maintenance coefficient.
f.	What are operons?
g.	What is the basis of chromatographic process?

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a.	What do you understand by fermentation? Discuss the major historical developments in fermentation industry.
b.	What are the factors which affects oxygen transfer rate in bioreactors.
c.	What is crab tree effect? Explain, under what conditions of sugar concentration, yeast cell tends to produce ethyl alcohol.
d.	Discuss the concept of feedback inhibition of a metabolic process with suitable example.
e.	Discuss the process, parameters and materials for the industrial manufacture of insulin harmone.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain density gradient centrifugation.
(b)	What do you understand by chromatography? Discuss theory and mechanism of chromatography.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	What do you understand by secondary metabolites? Discuss the overproduction of secondary metabolites.
(b)	What do you understand by non conventional raw materials? Discuss the applications of cellulosic and hydrocarbon raw materials in detail.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Production of single cell protein from hexadecane is described by the following reaction equation: $C_{16}H_{34} + aO_2 + bNH_3 \longrightarrow cCH_{1.66}O_{0.27}N_{0.20} + dCO_2 + eH_2O$ Where, $CH_{1.66}O_{0.27}N_{0.20}$ represents the biomass. If RQ = 0.43, determine the stoichiometric coefficients.
(b)	Discuss the method of medium design for industrial fermentations using Plackett burman design.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Discuss the method of K_La determination by oxygen balance method.
(b)	Differentiate between axial and radial flow impellers.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Discuss carbon catabolite repression in detail with suitable example.
(b)	What is the strategy to develop strain improved microbes / genetically engineered microbes? How are they important?

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