Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**
PBT4I104

4th Semester Regular / Back Examination 2018-19
BIOCHEMICAL REACTION ENGINEERING
BRANCH : BIOTECH
Max Marks : 100
Time : 3 Hours
Q.CODE : F480

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) What is Ideal batch reactor?
b) Define enthalpy of reaction?
c) Write the half life period of a 2nd order reaction?
d) State adiabatic flame temperature?
e) What is activation energy?
f) Differentiate between order and molecularity of reaction.
g) What is Psychometric charts? Write its application?
h) What is mixed flow fermenter?
i) Explain the term chemical kinetics.
j) What do you understand bymicrobial fermentation?

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Discuss methods of producing immobilised enzyme systems and how its operation affects the kinetics.
b) Write the equation for varying volume batch reactor following zero order kinetics.
c) Explain CSTR and plug flow reactors and their use for kinetic interpretation.
d) Discuss with examples classification of reactions?
e) Derive performance equation for a plug flow reactor?
f) A tank contains weak sulphuric acid containing 15% H_2SO_4 and 85% H_2O(by weight). If 500 kg of 50% H_2SO_4 (by weight) are added to the tank andthe final acid solution contains 20% H_2SO_4 (by weight), calculate theweight of weak acid which has been made up?
g) Discuss about reaction in series.
h) Write a note on use of log-log and semi-log graph paper.
i) A liquid phase reaction A+B→C+D takes place in a CSTR of volume 25m^3.The feed stream consists of 5kmol/m^3 of A and 100 kmol/m^3. What volumetric flow rate and space time is required to obtain 60% conversion of limiting reactant? The reaction rate constant is 0.00/m^3kmol/sec at reaction temperature.
j) Discuss the working of recycle reactor.
k) Briefly explain graphical differentiation and graphical integration.
l) Explain the temperature dependency of reaction from collision theory.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3	Discuss in details the construction and working principle of packed bed reactorand fluidized bed catalytic reactors?	**(16)**
Q4	Suggest a method for searching the mechanism of non-elementary reaction? Explain kinetic models for nonelementary reactions	**(16)**
Q5	What are autocatalytic reactions? Give examples. Derive integrated rate expression for an auto catalytic reaction.	**(16)**
Q6	Write the equation of porous spherical surface solid catalyst following first order kinetics.	**(16)**