

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)

B.Tech.Sem - VII CHEMICAL : : SUMMER - 2022

SUBJECT : MULTIPHASE REACTION ENGINEERING

Day : Thursday
Date : 2/6/2022

S-13596-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N.B.:

- 1) All the questions are **COMPULSORY**.
 - 2) Figures on the right indicate **FULL** marks.
 - 3) Draw neat labeled **DIAGRAM** wherever necessary
 - 4) Assume suitable **DATA** if necessary
 - 5) Use of non-programmable **CALCULATOR** is allowed
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Q.1 Write note on prediction of the rate – controlling step in industrial multiphase reactors. **(10)**

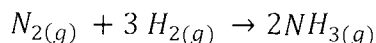
OR

Explain the laboratory methods for discerning intrinsic kinetics of multiphase reactors. **(10)**

Q.2 Explain three methods for evaluation of equilibrium constants. **(10)**

OR

The standard heat of formation and standard free energy of formation of ammonia at 298 K are - 46100 J/mol and - 16500 J/mol, respectively, calculate the equilibrium constant for the reaction. **(10)**



At 500 K assuming that the standard heat of reaction is constant in the temperature range 298 to 500 K.

Q.3 Explain with the help of neat schematic multistage mechanically agitated contactors **(10)**

OR

Write note on gas inducing type of agitated contactors. **(10)**

Q.4 (a) Why multiple impeller bioreactors are now becoming important? Elaborate your answer. **(05)**

(b) What are different types of mixers, depending upon various applications? **(05)**

OR

Give comparison between single and multiple impeller systems **(10)**

(P.T.O.)

Q.5 Explain with neat schematic the rates of mass transfer between a fluid and immersed sphere in packed and fluidized beds of spherical inert particles (10)

OR

Explain the effect of geometric parameters on mechanically agitated vessels. (10)

Q.6 Derive the equation for pressure drop in fluidized bed for spherical particles in laminar regime. (10)

OR

Explain the alternative procedure for the estimation of pressure drop in expanded and fixed beds. (10)
