Total No. of Questions : 10] **SEAT No. :**

P3571 **[Total No. of Pages : 2**

[4959] - 1172
B.E. (Chemical)
Chemical Reaction Engineering - II
(2012Pattern) (End-Sem.)

Time : 2 1/2 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) Explain kinetic regimes for mass transfer and reaction for fluid-fluid reaction in detail. **[10]**

OR

Q2) a) Explain unreacted core model for spherical particles of unchanging in size in detail. **[5]**

b) Explain 'Film Conversion Parameter'. **[5]**

Q3) a) Give the characteristics of the catalysis. **[5]**

b) Explain pore volume and solid density. **[5]**

OR

Q4) Explain the 'pore volume distribution' in the catalyst in detail. **[10]**

Q5) Explain the following term: **[18]**

a) Surface diffusion.

b) Gaseous diffusion.

c) Mass transfer with reaction in porous catalyst.

OR

P.T.O.

Q6) Derive the effectiveness factor of cylindrical pore catalyst. Also explain the testing method of pore resistance in the porous catalyst. **[18]**

Q7) a) Explain the experimental methods for finding the rates of solid-catalysed reaction. **[8]**

b) Explain the mechanism of fluid-solid catalytic reaction. **[8]**

OR

Q8) Determine the amount of catalyst needed in a packed bed reactor for 35% conversion of A to R for a feed rate of 2000 mol/hr of pure A at 3.2 atm and 117ºC temperature for the reaction.

$A \rightarrow 4R$ and $-r_A = 96 c_A$ mol/hr.kg.cat .

The amount of catalyst needed can be calculated for the following conditions:

a) Reactor with very large recycle rate, and

b) Reactor with no recycle rate.

[16]

Q9) a) Derive the M-M kinetic equation. **[8]**

b) Explain the fluidized bed reactor in detail. **[8]**

OR

Q10) a) Explain the procedure for determining the M-M kinetic constants in a batch or plug flow reactor. **[8]**

b) Explain slurry reactor in detail. **[8]**