

Total No. of Questions : 10]

SEAT No. :

**P4000**

**[4959]-1188**

[Total No. of Pages :2

**B.E.(Chemical)**

**CATALYSIS**

**(2012 Course) (Semester-II) (Elective-IV)(End Sem)(409352)**

*Time :2½Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

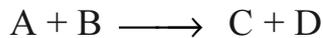
- 1) *Answer Q1 or Q2,Q3or Q4, Q5 or Q6 , Q 7 orQ 8, Q 9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

**Q1)** Explain the types of catalysis **[10]**

OR

**Q2)** Explain the qualitative nature and concept of catalysis and catalyst. **[10]**

**Q3)** For the dual functional catalyst, following gas phase reaction: **[10]**



Derive the rate expression considering. Eley Radiel mechanism in terms of partial pressure of the respective components.

OR

**Q4)** For the reaction,  $A \longrightarrow 3R$ , (gaseous reaction) run at 3.5 atm and 110°C. The rate at this temperature is measure as a  $-r_A^1 = 93.25C_A$ , mol/kgcat.hr. Determine the amount of catalyst needed in a packed bed reactor with a very large recycle rate(assume mixed flow) for 31% conversion of A to R for a feed rate of 2100 mol/h of pure A. **[10]**

**Q5)** 8.01 gm of glucosil is studied with  $N_2$  adsorption at -195.8 °C is 1 atm. The following data are obtained

Pressure,(mmHg)      6      25   140   230   285   320   430   505

Volume adsorbed(cm<sup>3</sup>)   61   127   170   197   215   230   277   335

The volume is measured at 0°C and 1 atm. Estimate the surface area of the catalyst. Data: Density of liquid  $N_2$  at -195.8 °C is 0.808 gm/cm<sup>3</sup> **[16]**

OR

**P.T.O.**

**Q6)** a) Explain the helium-mercury method for determining the void volume and so did density of the catalyst. [8]

b) Explain the BET method for determination of surface area of the catalyst. [8]

**Q7)** a) Highlight important characteristics of Zeolites. Discuss the shape selectivity of zeolites and their industrial application [12]

b) What are zeolites? Explain? [4]

OR

**Q8)** Write a short note on: [16]

a) Applications of zeolite

b) Modifications of zeolite

**Q9)** a) Write a note on M-M Kinetics [9]

b) Explain the role of enzymes, lipase and microbes as catalyst [9]

OR

**Q10)**a) Give the kinetics of uncompetitive inhibition [9]

b) Give the kinetics of non competitive inhibition [9]

