

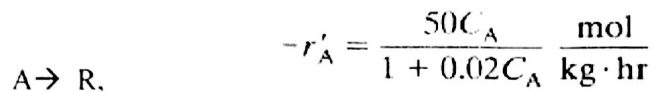
Department of Chemical Engineering

Minor I – CLL222 & CHL 221 CRE –II

Time: 11 AM - 12 Noon

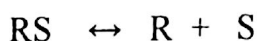
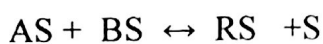
Date 30 August., 2015

- 1) A reaction takes place in the presence of 1% Pt /Alumina catalyst. The catalyst has a dispersion value of 80% as obtained from the hydrogen chemisorption method. Calculate the mass of the catalyst required in CSTR and in packed bed reactor for 80% conversion of A if the feed rate is 1000 m<sup>3</sup>/hr of pure gaseous A ( $C_{A0} = 100 \text{ mol/m}^3$ ). The stoichiometry and reaction rate are given by (7)



- 2) (a) How the BET isotherm is used for the determination of catalyst surface area. (3)
- (b) A solid catalyzed first-order gas phase reaction ( $A \rightarrow R$ ), takes place with 50% conversion in a basket type mixed reactor. With proper explanation calculate the conversion if the reactor size is trebled and all else-temperature, amount of catalyst, feed composition, and flow rate-remains unchanged? (4)

- 3) For a solid catalyzed reaction,  $A + B \leftrightarrow R$ . The following mechanism is given,



Where, S is an active site and mechanism is dual site. Develop a rate model of Hougen-Watson type based on the above mechanism if adsorption of A is rate controlling. (6)