

7E 4181

Roll No. _____

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7E 4181

B.Tech. VII Semester (Main/Back) Examination - 2014

Chemical Engineering

7CH 1 Chemical Reaction Engg. - II

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

Attempt any **five** questions, selecting **one** question from each **unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

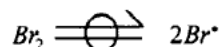
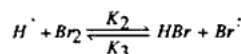
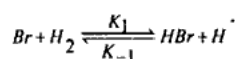
1. a) Discuss BET Theory of multilayer adsorption. (6)
- b) Differentiate between physical and Chemical adsorption with examples. (4)
- c) Describe desorption as rate controlling steps. (6)

OR

1. a) Describe about catalyst: Promoters, Inhibitors and poisons. (6)
- b) Discuss the Kinetics of
 - i) Unimolecular Surface reaction
 - ii) Bimolecular Surface reaction in detail (10)

Unit - II

2. The reaction of H_2 and Br_2 to form HBr Occurs through the following sequence of elementary steps involving free radicals.



Use the fact that bromine radical are in equilibrium with bromine Br_2 to determine a rate expression of the form:

$$r = \frac{\alpha_1 [Br_2]^{1/2} [H_2]}{1 + \alpha_2 \left(\frac{[HBr]}{Br_2} \right)} \quad (16)$$

OR

2. N_2O_5 decomposes as follows : $2N_2O_5 \rightleftharpoons 4NO_2 + O_2$ Experimentally, The rate of reaction was found to be : $r = \frac{d[O_2]}{dt} = k[N_2O_5]$ Show that the following sequence Can lead to a reaction rate expression that would be consistent with the experimental observations:



Unit - III

3. a) Find an expression for the overall effectiveness factor of a first order isothermal reaction in a flat plate catalyst pellet. (8)
b) Discuss the Thiele modulus. (8)

OR

3. a) What do you understand by non-isothermal effectiveness factors. (4)
b) Write short notes on prater number (4)
c) Discuss multiple steady states in heterogenous reaction. (8)

Unit - IV

4. Discuss in brief:
a) Shrinking Core Model
b) Progressive conversion Model. (8+8)

OR

4. a) Explain various controlling regimes with diagram. (8)
b) Discuss the design of gas solid reactors in brief. (8)

Unit - V

5. a) Write about heat transfer and mixing in fluidized bed reactor. (8)
b) Explain :
i) Parametric sensitivity
ii) Enhancement Factor. (8)

OR

5. a) Explain One-dimensional Model for the fixed - bed reactors. (8)
b) Discuss the effect of diffusion on rate of reaction (8)
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