



IV Semester M.Sc. Degree Examination, June 2017
(2010-2011 Scheme) (NS) (Repeaters)

CHEMISTRY

C – 403 PC : Kinetics and Reaction Mechanisms

Time : 3 Hours

Max. Marks : 80

Instruction : Answer Question No. 1 and **any five** of the **remaining**.

Answer **any ten** of the following :

(10×2=20)

1. a) Explain cage effect with an example.
b) Write the Swain-Scott LFER equation and explain the terms involved in it.
c) Explain the mechanism of H₂ and I₂ reaction.
d) Point out the significance of volume of activation.
e) In the explosion reaction between H₂ and O₂ there are high and low explosion limits. Justify the statement.
f) Explain the adsorption theory of heterogeneous catalysis.
g) What are N-haloamines ?
h) Enumerate the factors affecting bioavailability of a drug from its dosage form.
i) Explain the term transmission coefficient.
j) What is elimination constant ? Give its significance.
k) What information one can get from molecular beam reactions ?
l) Calculate the energy of activation of a reaction whose rate constant is doubled by a rise of 10°C in temperature, in the vicinity of 30°C.
2. a) Deduce the rate expression for the effect of dielectric constant on the rate of ionic reaction in the light of double sphere model.
b) Explain diffusion and activation controlled reactions.
c) State the Taft equation and point out its significance. **(5+4+3=12)**
3. a) Discuss the kinetics and mechanism of dehydrogenation of ethane.
b) Explain the mechanism of nucleophilic substitution reactions.
c) State and explain microscopic reversibility. **(5+4+3=12)**



4. a) Describe the metallic mirror technique for the production and identification of methyl radical.
- b) Discuss the kinetics and mechanism of condensation polymerization with a suitable example.
- c) What are catalytic promoters ? Specify their action. **(4+5+3=12)**
5. a) What are acidity functions ? Obtain the rate expression which relates the acidity function and rate constant.
- b) Propose the reaction mechanism and derive the rate law for the oxidation of an amino acid with chloramine-T in presence of NaOH and RuCl_3 catalyst, which exhibits first order kinetics each on (CAT) and (RuCl_3) fractional order on (NaOH) and zero order on (amino acid). **(6+6=12)**
6. a) Explain the pharmacokinetic and pharmacodynamic parameters by depicting plasma drug concentration time profile.
- b) Discuss the one compartment open model.
- c) Mention the factors influencing protein binding of drugs. **(5+4+3=12)**
7. a) Discuss briefly the theoretical calculation of energy of activation.
- b) Write notes on :
- i) Quantum mechanical tunneling.
- ii) Reaction rates and cross sections. **(4+4+4=12)**
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