CM-305

B.E. III Semester

Examination, December 2014

Advanced Engineering Chemistry

Time: Three Hours ***Maximum Marks: 70***

Note: i) Answer five questions. In each question part A. B. C is compulsory and D part has internal choice

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals. Derivation, Design and Drawing etc.

1. a) What is steric hindrance and hyper conjugation?

B) Explain the difference between stability and reactivity. What is meant by the connectivity of a molecule?

C) What additional infonnation might be needed in order to specify its structure?

D) Explain the Kinetics. Mechanism. Stereochemistry, Substrate Effect of The SN_2 Reaction.

OR

Write the methods used to generate carbocations and define the following carbocation reactions:

i) Reaction with nucleophiles

ii) Elimination of a proton

iii) Rearrangements

iv) Addition to unsaturated systems.

2. a) Write effects of exposure to styrene.

b) Polyvinyl alcohols uses in plastics industry and pharmaceutical industries.

c) Write features of ACH Process for MMA production.

d) Describe the direct chlorination method of VCM from ethylene and the hazard associated with VCM.

OR

Discuss about the acrylic acid Processing, Storage and Handling Safety and Applications.

3. a) Advantages and product benefits of interesterification in oils and fats.

b) Give important application of hydrogenation.

c) Write a few of the benefits of using natural laundry detergent.

d) Explain Refined. Bleached. Deodorized and Winterized vegetable oils within the description / extraction method.

OR

Describe the factors influencing the choice of extraction processes.

4. a) What is the half-life of a zero order reaction?

b) Define Collision Theory and draw Collision Theory Energy Diagram.

c) How do catalysts affect chemical equilibrium?

d) Explain how concentration, temperature and surface area affects the rate of a reaction.

OR

For the reaction A+B C, the rate constant at 215°C is $5.0X10\text{-}^{3}$ and the rate constant at 452°C is $1.2x10^{-1}$.

i) What is the activation energy in kJ/mol?

ii) What is the rate constant at 100°C?

5. a) Define ionic atmosphere and Debye Length.

b) Define Gibbs Free Energy.

c) Discuss the Effect of Solvent Properties on Equivalent Conductivity of Electrolytes.

d) Relate the standard Gibbs energy change in a reaction to the standard cell potential and Nemst Equation to calculate standard cell potential for an electrochemical cell.

OR

Describe the Binary Eutectic Alloy System and Binary Peritectic Alloy System.