Roll No. .....

(07/22-II)

5189

B. Sc. EXAMINATION

(For Batch 2014 & Onwards)

(Second Semester)

CHEMISTRY

Paper–V (CH-105)

Physical Chemistry

Time : Three Hours *Maximum Marks :* 26

Note : Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. **1** is compulsory.

1. (a) Describe zero order reaction with example. 1

(b) What is integrated rate expression for first order reaction ? 1

(c) What are pseudo unimolecular reaction ? Give example. 1

(d) Define specific conductance. 1

(e) What is the relation between pH and pOH of a solution ? 1

(f) Write the limitations of Ostwald' dilution law. 1

Section A

2. (a) What is Transition State theory ? Give the advantages of transition state theory over the collision theory. 3

(b) What is the order of a reaction when half life of a reaction is inversely proportional to the square of the initial concentration ? Explain it. 2

3. (a) Briefly explain different methods used for the order of the reaction. 3

(b) Explain Arrhenius equation giving the effect of temperature on the rate constant of a reaction. 2

4. (a) Discuss collision theory for Unimolecular reaction as given by Lindemann. 3

(b) Derive expression for 2nd order reaction involving one reactant only. 2

Section B

5. (a) How can the Debye-Huckel-Onsager equation be utilized for determining the equivalent conductance of strong electrolyte at infinite dilution ? 3

(b) At 293 K, the equivalent conductance at infinite dilution of HCl, CH_3COONa, NaCl solution are 383.5, 78.4 and 102.0 ohm^{-1} cm^2 $equiv.^{-1}$ respectively. If the equivalent conductance of CH_3COOH at some other dilution is 100 ohm^{-1} cm^2 $equiv.^{-1}$ at 293 K, calculate the degree of dissociation of acetic acid at that dilution. 2

6. (a) Explain briefly the conductometric titration of strong acid with strong base. What are the advantages of conductometric titration ? 3

(b) Calculate the degree of dissociation of acetic acid of conc. 0.1 M using Ostwald's dilution law. Given the dissociation constant of acetic acid $K_d = 1.8 \times 10^{-5}$ at 298 K. 2

7. (a) What do you mean by a buffer solution ? How a buffer solution resists change in its pH ? Explain with suitable example. 3

(b) What are the limitations of Arrhenius theory ? 2