

Roll No.

~~14101442070~~

(04/17-I)

5173

B. Sc. EXAMINATION

(For Batch 2011 to 2013 Only)

(Second Semester)

CHEMISTRY

Fifth Paper (CH-105)

Physical Chemistry

Time : Three Hours

Maximum Marks : 26

Note : Q. No. 1 is compulsory. Attempt *two* questions each from Section A and B. Attempt *Five* questions in all.

1. (a) Predict the order of reaction if $t_{1/2}$ is independent of initial molar concentration of the reactants.
(b) What is degree of dissociation ? How it is calculated from equivalent conductance ?

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P.T.O.

- (c) Give two points of failure of Arrhenius theory.
- (d) Why does molar conductance of acetic acid show sharp increase on dilution ?
- (e) State Kohlraush Law.
- (f) Give equation for buffer index. $1 \times 6 = 6$

Section A

2. (a) Derive rate law expression for the reaction : $3A \rightarrow \text{Products}$.
- (b) Derive Half-life period for above reaction.
- (c) The Half-life period of a chemical reaction is 50 min. When conc. is doubled the half-life period becomes 100 min ? What will the order of reaction ? 2,1,2

3. (a) Derive Arrhenius equation to show the effect of change of temperature on rate constant.
- (b) Calculate the activation energy of a reaction which has rate constant $2.46 \times 10^{-5} \text{ s}^{-1}$ at 273 K and $1.63 \times 10^{-5} \text{ s}^{-1}$ at 303 K. 2.5,2.5

4. (a) Give Lindemann Hypothesis for uni-molecular reactions.
- (b) Explain under which condition the above reaction will be first order or second order.
- (c) Explain with example pseudo-molecular reactions. 2,1,2

Section B

5. (a) What is meant by transport number of an ion ? Which will have higher transport number ?
- (i) H^+ ion in 0.1 N HCl or K^+ ion in 0.1 N KCL
- (ii) Cl^- ion in HCl or in NaCl.
- (b) Explain the principle of Hittorf's method for determination of transport number of cation. 3,2
6. (a) Write basic principle of conductometric titrations and give their advantage over volumetric titrations.

(b) Discuss the titration curve obtained in the titration of aqueous solutions of acetic acid with sodium hydroxide.

(c) Calculate pK_a for acetic acid if K_a is 1.8×10^{-5} . 2,2,1

7. (a) What are buffer solution and buffer action? (1)

(b) Derive Handerson equation for calculation of pH of an acidic buffer solution.

(c) What is meant by common ion effect? How it affects pH of a solution containing weak acid and a soluble salt of weak acid? 1,2,2