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B. Sc. (Hons.) Chemistry 2nd Sem. Latest Examination – April, 2018

PHYSICAL CHEMISTRY

Paper : 202

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Section. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. Describe the following : $1 \times 8 = 8$

(a) What are zero order reactions ?

(b) What is the difference between order and molecularity of a reaction ?

(c) Why specific conductivity decreases with dilution ?

(d) What are sparingly soluble salts ?

(e) Why Li^+ ion has a smaller transport number than Na^+ ion ?

(f) What is conductivity water ?

(g) What do you mean by spontaneous process ?

(h) Define enthalpy of neutralization.

SECTION – A

2. (a) What are Pseudo-unimolecular reactions ? Give examples. 2

(b) How can you determine order of a reaction by method of integration ? 2

(c) A first order reaction is 40% complete in 50 minutes. Calculate the value of rate constant. In what time will the reaction be 80% complete ? 4

3. (a) Describe the effect of temperature on rate of reaction. 4

(b) Derive an expression for the rate constant for second order reactions. Mention the important characteristics of these reactions. 4

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SECTION – B

4. (a) Explain the term specific and equivalent conductivity. How are they inter-related ? 4

(b) State and explain Ostwald's dilution law. 4

5. (a) Describe : 6

(i) Kohlrausch's law

(ii) Arrhenius theory of ionization

(b) If specific conductivity of N/50 KCl solution at 298 K is 0.002765 $ohm^{-1}cm^{-1}$ and resistance of a cell containing this solution is 100 ohms. Calculate the cell constant. 2

SECTION – C

6. (a) What is buffer solutions ? Explain the different types of buffer solutions. 2

(b) Derive Henderson equation for acidic buffer mixture. 2

(c) Explain the method of calculation of transport number by Hittorf's method. 4

7. (a) Briefly explain the Debye Huckel theory of strong electrolytes. 4

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(b) Describe :

(i) Buffer capacity

(ii) Degree of dissociation

SECTION – D

8. (a) State First law of thermodynamics in different ways. Derive the mathematical expression for it. 4

(b) Describe : 4

(i) Extensive and intensive properties

(ii) Reversible and irreversible processes

9. (a) Derive thermodynamically Kirchoff's equation. 4

(b) Explain : 4

(i) Hess law

(ii) Entropy

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