

Roll No.

91551

**B. Sc. (Bio-Technology) 2nd Sem.
(New Scheme) Examination – May, 2016**

PHYSICAL CHEMISTRY

Paper : BT-205

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 two questions from each Section. All questions carry equal marks.

SECTION – I

1. (a) Why are reactions of high molecularity rare? 2
- (b) Derive an expression for the rate constant for third order reaction of type : 4



- ↙ (c) Why rate constant is independent of units of concentration? 2
2. (a) What is the difference between order and molecularity of reaction? 2
- (b) Derive Integrated rate expression for first order reaction. 4
- (c) What is the order of reaction if the value of rate constant is 693s^{-1} ? 2
- ↙ 3. (a) Describe "Transition state theory". What are the advantages of this theory over the collision theory? 4
- (b) Explain the following: 4
- (i) Photochemical reaction
- ✕ (ii) Half life Period
4. (a) Compare between Collision theory and Absolute reaction rate theory. 3
- (b) After 24 hours, only 0.125 g out of the initial quantity of 1 g of radio isotope remains behind. What is its half-life period? 3

(c) Write the characteristics of second order reaction.

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SECTION – II

5. (a) Explain the effect of dilution on : 6

(i) Conductance of weak electrolyte

(ii) Conductance of strong electrolyte

(iii) Equivalent conductance

(b) The resistance of a $\frac{N}{10}$ solution of a salt is found to 2.5×10^3 ohms. Calculate the equivalent conductance of the solution. 2

Cell constant = 1.15 cm^{-1} .

6. (a) Derive the expression for Arrhenius equation. 4

(b) For a bimolecular reaction involving like molecules, calculate the pre-exponential factor at 100°C and at 200°C . Given that molar mass of the molecules is 100 g mol^{-1} , collision diameter is 0.2 nm . Assume the steric factor ρ as equal to 1.0. 4

7. (a) How does Debye-Huckel theory explain the anomalous behaviour of strong electrolytes? 4
- (b) A solution containing 10.09 g of CuSO_4 in 189.9 g of water was electrolysed. After electrolysis 275.4 g of solution around the anode was found to contain 15.4 g of CuSO_4 and 3.096 g of silver was deposited in calorimeter. Calculate Hittroff's number of Cu^{+2} and SO_4^{2-} ions. 4
8. (a) Explain the buffer action of $\text{CH}_3\text{COOH} / \text{CH}_3\text{COONa}$ mixture. 2
- (b) Derive Ostwald Dilution Law. 3
- (c) Derive Handerson-Hazel equation for basic buffer. ~~3~~
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