B.Sc. 2nd Semester (Latest) (Full and Re-appear)

Examination, May–2023

BIO-TECHNOLOGY

Paper–BT-205

Physical Chemistry

Time allowed : 3 hours] *[Maximum marks : 40*

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

Compulsory Question

1. (a) What do you mean by the law of mass action ? 1

   (b) What is the specific reaction rate ? 1

   (c) Write the unit of the rate constant for second-order reaction. 1

   (d) What is Boltzmann's fraction ? 1

   (e) Define equivalent conductivity. 1

   (f) What is transport number ? 1

   (g) State Ostwald dilution law. 1

   (h) Define pKa. 1

Section–A

2. (a) Differentiate between the order and molecularity of a reaction. 2

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

(c) Derive an expression for rate constant for zero order reaction. 3

3. (a) Derive integrated rate equation for first-order reaction. Describe its important characteristics. 4

(b) Explain the two important methods for determination of order of reaction. 4

Section–B

4. (a) Derive Arrhenius equation. 4

(b) Explain transition state theory of reaction rate. 4

5. Describe Collision theory for : 4,4

(i) Unimolecular reactions

(ii) Bimolecular reaction for similar molecules

Section–C

6. (a) What is specific and molar conductivity ? Explain their variation with dilution. 4

(b) Describe Debye-Huckel theory of strong electrolytes. 4

7. (a) Describe Hittorf's method for the calculation of transport numbers. 4

(b) Describe Arrhenius theory of electrolytic dissociation. 4

Section–D

8. (a) Describe buffer solutions and buffer actions. 4

(b) Describe Kohlrausch's law. Why it is called as law of independent migration of ions ? 4