MCH23 — PHYSICAL CHEMISTRY – II
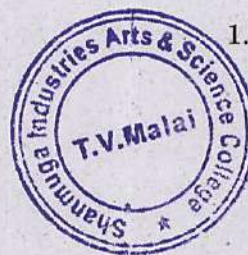
Time : Three hours   Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) What are consecutive reaction? Explain the kinetics of consecutive reaction.

   Or

   (b) Using the Rice Herzfeld mechanism. Explain the kinetics of $u_2 + cl_2 \rightarrow 2Hcl$.

2. (a) Explain the mean ionic activity and mean ionic activity coefficient.

   Or

   (b) Explain Debye–Huckel limiting law and its limitations.

3. (a) Discuss the effect of ionic association on conductance.

   Or

   (b) Explain the electro kinetic phenomena.

4. (a) Explain

   (i) Abelian group

   (ii) Cyclic group

   Or

   (b) Explain symmetry elements and operations with example.

5. (a) Write orthogonality theorem and explain.

   Or

   (b) Write and explain selection rules for vibrational spectroscopy.

   SECTION B — $(3 \times 15 = 45$ marks)

   Answer any THREE questions.

6. Discuss the principle and applications of flash protolysis method for studying the kinetics of fast reaction.

7. (a) Explain the determination of activity coefficient by electrochemical method.

   (b) Discuss Debye Hucksel Bronsted equation.

8. Write elaborately on Helmholtz–Perrin model of electrical double layer.

9. Describe the following with example.

   (a) Sub group

   (b) Point group

   (c) Reducible and irreducible representation.

10. (a) Construct the character table for C_{2v} point group.

    (b) Obtain a hybrid orbitals in CH_4.

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