

S.No. 364

17POC03

(For the candidates admitted from 2017-2018 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2018.

First Semester

Organic Chemistry

PHYSICAL CHEMISTRY — I

Time : Three hours

Maximum : 75 marks

PART A — (5 × 5 = 25 marks)

Answer ALL questions. (Either or Choice)

1. (a) List the symmetry operations in water molecule. Explain.

Or

- (b) Explain the vibrational modes representation in non-linear molecule such as ammonia.

2. (a) State and explain the second law of thermodynamics.

Or

- (b) Derive Gibbs - Helmholtz equation.

3. (a) Explain the thermodynamic relationship between probability and entropy.

Or

(b) Derive Fermi - Dirac statistics.

4. (a) Describe any one of the thermodynamic criteria for non-equilibrium states.

Or

(b) Write a note on microscopic reversibility.

5. (a) State and explain the Debye — Huckel limiting law.

Or

(b) Define battery. Discuss the types of batteries with suitable example.

PART B — (5 × 10 = 50 marks)

Answer ALL questions. (Either or choice)

6. (a) Define symmetry elements. Discuss the types of symmetry elements with a suitable example.

Or

(b) State and explain the Orthogonality theorem and its consequences.

7. (a) Explain the followings : (5 + 5)

(i) Chemical potential

(ii) Partial molar volume.

Or

(b) Define fugacity. How fugacity of real gases is determined?

8. (a) Discuss the comparisons of Boltzmann - Distribution law, Bose - Einstein statistics and Fermi - Dirac statistics?

Or

(b) Describe the Einstein theory of specific heat capacity of solids.

9. (a) Explain the entropy balance equations for different irreversible processes.

Or

(b) State and explain the Onsager reciprocal theory.

10. (a) Explain the Debye — Huckel treatment of electrolyte in dilute solutions.

Or

(b) What are electrochemical cells? Explain with suitable examples.