10. (a) (i) Explain with suitable examples of reducible and irreducible representation. (5)

(ii) Write a notes on direct products representation. (5)

Or

(b) Construct the character table for C_2V point group and discuss the uses of character table.

S.No. 352

17PCH03

(For the candidates admitted from 2017–2018 onwards)

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

First Semester

Chemistry

PHYSICAL CHEMISTRY — I

Time : Three hours   Maximum : 75 marks

PART A — (5 × 5 = 25 marks)

Answer ALL questions.

1. (a) Explain C_p–C_v interms of coefficient of expansion.

Or

(b) Define the term partial molar volume.

2. (a) Discuss the thermodynamics of ideal and real gases.

Or

(b) Describe and explain mean activity coefficient.

3. (a) Discuss the hard sphere collision theory.

Or

(b) Explain the influence of solvent on reaction in solutions.

4. (a) State and explain photo electric effect.

Or

(b) Derive Schrodinger equation and its solution to particle present in 3-D box.

5. (a) Explain with suitable examples of
   (i) Proper rotation (C_p) (3)

   (ii) Inversion centre (i). (2)

Or

(b) State and explain the great orthogonality theorem and its consequences.

PART B — ($5 \times 10 = 50$ marks)

Answer ALL questions.

6. (a) Discuss the applications in the evaluation of $C_p - C_v$ for solids and for Vanderwaals gases.

Or

(b) (i) Derive Gibbs-Duhem equation. (5)

   (ii) How will you determine chemical potential by direct method? (5)

7. (a) What is Fugacity? Give the method of determination Fugacity and its variation of with temperature and pressure.

Or

(b) How will you determine the activity coefficient from freezing point, EMF and solubility measurements?

8. (a) Explain with suitable mechanism of Lindemann theory of unimolecular reaction.

Or

(b) (i) Explain with suitable examples of primary salt effect. (6)

   (ii) Write a notes on kinetic isotopic effect. (4)

9. (a) (i) Give the postulates of quantum mechanics. (7)

   (ii) Write a notes on compton effect. (3)

Or

(b) Derive Schrodinger wave equation to harmonic oscillator. Calculate the energy of harmonic oscillator.