B.SC. PART-I (SEMESTER -I) QUESTION BANK SUBJECT- CHEMISTRY (CHM-51T-101)

Unit-I

- Q.1 What is radius ratio and how it is related to coordination number of ions and geometry of molecules? Derive the radius ratio for coordination number 4 and 6.
- Q.2 Explain Born Haber cycle and its importance. How can it be used for calculating the lattice energy of an ionic compound.
- Q.3 What are stoichiometric compounds. Explain lattice defects in stoichiometric solids.

Unit- II

- Q.1 Discuss valence bond theory taking the example of hydrogen molecule.
- Q.2 Define hybridisation and explain the types of hybridisations with suitable examples.
- Q.3 On the basis of molecular orbital energy diagram, explain the stability of NO⁻, NO and NO⁺. Explain how molecular orbital theory is superior than valence bond theory.

Unit- III

Q.1 Explain the terms combinations and permutations. Determine the number of words obtained by arranging the letter of the word ATOM in different orders.

Q.2 Write short note on -

- 1. Smectic liquid crystals
- 2. Seven segment cells
- 3. Theories for structure of liquids
- 4. Nematic liquid crystal

Q.3 (a) Derive Braggs equation. Describe a method for the determination of crystal structure.

(b) Explain

- 1. Elements of symmetry
- 2. Isotropy and Anisotropy
- 3. Space lattice and unit cell

Unit-IV

Q.1 What are the main postulates of kinetic theory of gases? Derive kinetic gas equation.

Q.2 Calculate critical constants in terms of Vander Waals constant.

Q.3 Explain:

- 1. Brownian movement and Electrophoresis
- 2. Emulsion and Gold number
- 3. Lyophilic and Lyophobic colloids