Central Tribal University of Andhra Pradesh
Semester End Examination – Jan/Feb-2024

Name of the Program: B.Sc. Chemistry
Name of the Subject : Inorganic Chemistry -I (Minor)
Subject Code : CHE101 **Semester: I**
Max Time: 3 Hours **Max. Marks: 70**

Part-A
Answer all ten questions. Each question carries 1 mark each.
10q x 1m =10

1. What is the primary cause of the spectral lines in the hydrogen atomic spectrum?
2. The square of the wave function represents the .....
3. On which quantum numbers does the radial wave function rely?
4. Slater's rules are used for calculating.....
5. Define covalent radius.
6. What is the hybridization of C in CO_2
7. What is the difference in bonding between Na and NaCl?
8. Define lattice energy.
9. Write the structure of PCl_5
10. Give example for dipole-dipole interactions

Part-B
Answer any four questions. All questions carry 5 marks each.
4q x 5m = 20

11. How does the de Broglie equation illustrate the wave-particle duality of particles, and what role does it play in quantum mechanics?
12. Describe various quantum numbers and explain their significance.
13. Describe radius ratio rule in ionic solids.
14. Explain the arrangement of atoms in crystals in both Cubic Close-Packed (CCP) and Hexagonal Close-Packed (HCP) structures.
15. Describe the reason why water predominantly exists in a liquid state at room temperature.
16. Explain the characteristics of Frenkel and Schottky defects in crystals.

Part-C

Answer either A or B from each question. All questions carry 10 marks each. **4q x 10m = 40**

17. a) Write Bohr's atomic theory, its key postulates, and contributions. Highlight limitations and explore how later theories addressed these issues.

OR

b) Explain the following
   i) Heisenberg's Uncertainty Principle
   ii) Schrödinger's wave equation,

18. a)i) What is Shielding or screening effect? How does it effectZ_{eff} ?
   ii) Calculate Z_{eff} for 2S electron in nitorgen

OR

b) Discuss the following
   - Van der Waal's radii
   - Ionic radii

19. a) Describe the concept of hybridization in Valence Bond Theory and provide examples of molecules exhibiting hybridized orbitals.

OR

b) Describe the Valence shell electron pair repulsion theory. Explain the structure of ClF3 using this theory.

20. a) Describe basic principles of Molecular Orbital Theory (MOT). Draw the molecular orbital diagrams of N_2 molecule.

OR

b) Explain band theory of solids. How does band theory contribute to explaining the difference between conductors, semiconductors, and insulators?