

Govind Guru University

B.Sc. Semester - IV

Chemistry-204 [Inorganic Chemistry]

Unit:-I

Wave –Mechanics:

Marks-14 (Lec.-12)

Basic postulates of quantum mechanics (Postulates 1,2,3 and 4); Operators: their addition, subtraction and multiplication; Commutators; Particle in a box (One dimensional); Zeropotential energy; Characteristics of the wave functions; Electron in a ring.

Unit:-II

Coordination Compounds:

Marks-14 (Lec.-12)

Application of valence bond theory to some complexes; Shortcoming of valance bond theory; Crystal Field Theory; Orientation of d-orbitals and Crystal Field Splitting of Energy levels; Crystal Field Splitting in Octahedral complexes; Crystal Field Stabilization Energy (CFSE); Crystal Field Splitting in Tetrahedral Complexes; Crystal Field Splitting in Tetragonal and square Planar Complexes; Magnetic Properties of Metal Complexes and Crystal Field Theory; Factors influences the magnitude of Crystal Field Splitting; Color of Transition Metal Complexes; Crystal Field Effects on Ionic Radii; Crystal Field Effects on Lattice Energies; Jahn- Teller Effect.

Unit:- III

Chemical Bonding:

Marks-14 (Lec.-12)

Molecular orbital Theory; Energy Level Diagram for Molecular Orbitals; Mixing of Orbitals; Filling up of Molecular Orbitals; Electronic Configuration of Heteronuclear Diatomic molecules (CO, NO, HF, HCl); Molecular orbitals of Polyatomic Species (BeH_2 , BH_3 , NH_3) (Excluding Walsh diagram); M.O. Theory of $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoF}_6]^{3-}$; Molecular orbital or Band Theory for metals.

Unit:- IV

[A] Non Aqueous Solvents

Marks-7 (Lec.-6)

Introduction; Classification of Solvents; General Properties of Ionising Solvents

- (a) Liquid Ammonia (NH_3): Physical Properties, Auto-ionization, Acid-Base reactions, Reduction –Oxidation (Redox) reactions; Advantages and disadvantages of using liquid Ammonia as a solvent.
- (b) Liquid SO_2 : Physical Properties, solubility of Inorganic materials and Organic Compounds, Electrolytic conductance behavior of solutions, Acid-Base reactions, Solvolysis, Reduction –Oxidation (Redox) reactions
- (c) Liquid HF : Physical Properties, Solvent effect, Amphoteric behavior, Precipitation reactions, Reduction –Oxidation (Redox) reactions, Solutions of Compounds of Biological Interest.

[B] Physico chemical principles

Marks-7 (Lec.-6)

Physico chemical principles of Sodium carbonate (Na_2CO_3);
Sodium bicarbonate (NaHCO_3); Sodium hydroxide (NaOH)

REFERENCES

1. Gurdeep Raj, “*Advanced Inorganic Chemistry*”, Goel Publishing House, Meerut, Volume –I, 24th Revised Edition, 1998.
2. R.D. Madan, “*Modern Inorganic Chemistry*”, S. Chand & Co. Ltd., New Delhi, 2nd Edition, 2006.
3. J.D. Lee, “*Concise Inorganic Chemistry*”, Wiley India Publication, 5th Edition, 1996, Reprint 2011.
4. W.V. Malik, G.D. Tuli, R.D. Madan, “*Selected Topics in Inorganic Chemistry*”, S.Chand & Co. Ltd., New Delhi, 7th Edition, 2007.
5. A.K. Chandra, “*Introductory Quantum Chemistry*”, Tata- McGraw Hill Pub. Co. Ltd., New Delhi, 4th Edition.
6. Puri, Sharma, Kalia, “*Principles of Inorganic Chemistry*”, Milestone Publishers & Distributors, New Delhi, 3rd Edition, 2006.
7. R.K.Prasad, “*Quantum chemistry*”, New Age International (P) Ltd., Publishers, 4th Edition, 2010.
8. Peter Atkins, Tina Overton, Jonathan Rourke, Mark Weller, Fraser Armstrong, “*Shriver & Atkins’ Inorganic Chemistry*”, Oxford University Press, 2011.