

**Core Course VII : Inorganic Chemistry I**

**UNIT 1: COORDINATION CHEMISTRY I :**

Types of ligands - IUPAC nomenclature - Isomerism - theories of coordination compounds - Werner, Sidgwick, valence bond, crystal field and molecular orbital theories.

**UNIT 2: COORDINATION CHEMISTRY II :**

\Stability of complexes - factors affecting the stability of complexes - unimolecular and bimolecular nucleophilic substitution reactions in octahedral and square planar complexes - trans effect - magnetic properties of transition metal complexes - elementary idea of electronic spectra of transition metal complexes.

**UNIT 3: APPLICATION OF COORDINATION COMPOUNDS :**

Application of coordination compounds - estimation of nickel using DMG and aluminium using oxine - estimation of hardness of water using EDTA - biologically important coordination compounds - chlorophyll, haemoglobin, vitamin B<sub>12</sub> - Their structure and application - metal carbonyls - mono and poly nuclear carbonyles of Ni, Fe, Cr, Co and Mn - synthesis and structure - nitrosyl compounds - classification, preparation and properties - structure of nitrosyl chloride and sodium nitroprusside.

**UNIT 4: METALLIC BONDING :**

Metallic state - packing of atoms in metal (BCC, FCC, HCP and Simple cube) - theories of metallic bonding - electron gas, Pauling and band theories - semi conductors - n-type and p-type, transistors - uses - structure of alloys - substitutional and interstitial solid solutions - Hume Rothery ratio.

**UNIT 5: SOME SPECIAL TYPE OF COMPOUNDS :**

Organo metallic compounds of alkenes, alkynes and cyclopenta diene - binary compounds - hydrides, borides, carbides and nitrides - classification, preparation, properties and uses.

some special classes of compounds - clathrates - examples and structures - Interstitial and non - stoichiometric compounds - silicones - composition, manufacture, structure properties and uses - silanes and their polymers - applications of phosphozenes and phosphazenes - silicates and their polymers - classification into discrete anions - one, two and three dimensional structures with examples - composition, properties and uses of beryl, asbestos, tale, mica, zeolites and ultramarines.

**Books for Reference :**

1. Soni P.L., Text Book of Inorganic Chemistry, S, Chand & Co, New Delhi (2006).
2. Puri B.R., Sharma L.R. and Kalkithar, Principles of Inorganic Chemistry, New Delhi (2002).
3. Madan R.D., Juli G.D and Malik S.M., Selected Topics in Inorganic Chemistry, S. Chand & Co, New Delhi (2006)
4. Lee J.D., Concise Inorganic Chemistry , ELBS Edition.