

# **MJD Govt. College Taranagar (Churu)**

**Department of Chemistry**

**B.Sc.-III (Syllabus)**

**INORGANIC CHEMISTRY**

**PAPER-I**

## **Unit-I**

### **(a) Metal-ligand Bonding in Transition Metal Complexes**

Limitation of valence bond theory, an elementary idea of crystal-field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal field parameters

### **(b) Thermodynamic and Kinetic Aspect of Metal Complexes**

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes.

## **Unit-II**

### **(a) Magnetic Properties of Transition Metal Complexes**

Types of magnetic behavior, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of  $m_{\text{spin}}$  and  $m_{\text{eff}}$  values, orbital contribution to magnetic moments, application of magnetic moment data for 3d-metal complexes.

### **(b) Electron Spectra of Transition Metal Complexes**

MGSU BIKANER [152]

Types of electronic transition, selection rules of d-d transitions, spectroscopic ground state, spectrochemical series. Orgel-energy level diagram for d1 and d9 states, discussion of the electronic spectrum of  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  complex ion.

## **Unit-III**

### **Organometallic Chemistry**

Definition, nomenclature and classification of organometallic compounds. Preparation, properties, bonding and applications of alkyls and Aryls of Li, Mg, Al, Zn, Hg, Sn and Ti a brief account of metallocene complexes and homogeneous hydrogenation, mononuclear carbonyls and the nature of bonding in metal carbonyls.

### **Nuclear Chemistry**

Stability of nucleus n/p ratio, Einstein mass-energy relation. Types of Radioactivity, Group displacement law, Disintegration series, Q-values, nuclear cross-section, spallation, Applications of radio activity.

## Unit-IV

### **Bioinorganic Chemistry**

Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to  $\text{Ca}^{2+}$ , nitrogen fixation.

## Unit-V

### **(a) Hard and Soft Acids and Bases (HSAB)**

Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid base strength and hardness and softness. Symbiosis, theoretical basis of hardness and softness, electronegativity and hardness and Softness.

### **(b) Silicones and Phosphazenes**

Silicones and phosphazenes as examples of organic polymers, nature of bonding in triphosphazenes.