

From-2013-14

## B.Sc. - THIRD YEAR CHEMISTRY

There shall be three written papers and a practical examination as follows:

		Max. Marks
Paper – I	Inorganic Chemistry	75
Paper – II	Organic Chemistry	75
Paper – III	Physical Chemistry	75
<b>TOTAL</b>		<b>225</b>
PRACTICAL		75
<b>GRAND TOTAL</b>		<b>300</b>

Candidate will be required to pass in Theory and Practical Separately.

## B.Sc. – III Chemistry (Paper-I)

### Inorganic Chemistry :

#### Unit – I

##### I. **Metal-ligand bonding in Transition Metal Complexes**

Limitations 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.

##### II. **Thermodynamic and Kinetic Aspects of Metal Complexes**

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

#### Unit – II

##### III. **Magnetic Properties of Transition Metal Complexes**

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

##### IV. **Electronic spectra of Transition Metal Complexes**

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series, Orgel-energy level diagram for  $d^1$  and  $d^9$  states, discussion of the electronic spectrum of  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  complex ion.

#### Unit – III

##### V. **Organometallic Chemistry**

Definition, nomenclature and classification of organometallic compounds,

Preparation, properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn.

Metal carbonyls: 18 electron rule, preparation, structure and nature of bonding in the mononuclear carbonyls.

##### VI. **Silicones and Phosphazenes**

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

#### Unit – IV

##### VII. **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, electro negativity and hardness and softness.

##### VIII. **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  $\text{Ca}^{2+}$ .

