

## **COURSE-IX BSCCH 301 INORGANIC CHEMISTRY- III**

### **Block 1**

#### **Unit -1 Hard and Soft Acid and Base (HSAB)**

- 1.1 Objectives
- 1.2 Introduction
- 1.3 Classification of acids and bases as hard and soft
- 1.4 Pearson's HSAB concept acid base strength and hardness and softness
- 1.5 Symbiosis
- 1.6 Theoretical basis of hardness and softness
- 1.7 Summary
- 1.8 Terminal Question
- 1.9 Answers

#### **Unit -2 Metal Ligand bonding in Transition metal Complexes**

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Limitations of valence bond theory
- 2.4 An elementary idea of crystal field theory
- 2.5 crystal field splitting in octahedral tetrahedral and square planer complexes
- 2.6 Factor effecting the crystal field parameter
- 2.7 Summary
- 2.8 Terminal Question
- 2.9 Answers

#### **Unit -3 Magnetic properties in Transition metal Complexes**

- 3.1 Objectives
- 3.2 Introduction
- 3.3 Types of magnetic behavior
- 3.4 Methods of determining magnetic susceptibility
- 3.5 Gued and Quinckes method
- 3.6 Spin only formula
- 3.7 Orbital contribution to magnetic moments
- 3.8 Application of magnetic moment data of 3d-metal complexes

3.9 Summary

3.10 Terminal Question

3.11 Answers

## **Block 2**

### **Unit -4 Electron spectra of Transition metal-Complexes**

4.1 Objectives

4.2 Introduction

4.3 Types of electronic transitions

4.4 Selection rule for d-d transition

4.5 Spectroscopic ground state spectrochemical series

4.6 Orgel-energy level diagram for  $d^1$  and  $d^9$  state

4.7 Discussion of the electronic spectrum of  $[\text{Ti}(\text{H}_2\text{O})_6]^{+3}$  complex ion\

3.12 Summary

3.13 Terminal Question

4.8 Answers

### **Unit -5 Thermodynamic and Kinetic Aspects of metal Complexes**

5.1 Objectives

5.2 Introduction

5.3 A brief outline of thermodynamic and kinetic stability of metal complexes

5.4 Factor effecting and stability

5.5 Substitution

5.6 Reactions of square planer complexes

5.7 Summary

5.8 Terminal Question

5.9 Answers

## **Block 3**

### **Unit -6 Organometalic Chemistry**

6.1 Objectives

6.2 Introduction

6.3 Mononuclear carbonyls and nature of bonding in metal carbonyls

6.4 Definition,

6.5 Nomenclature

6.6 Classification

6.7 General methods of preparation of organometallic compounds

6.8 Brief account of metal-ethylenic complexes

6.9 Alkyl and Aryl derivatives of alkali and alkaline earth metal

6.10 Summary

6.11 Terminal Question

6.12 Answers

### **Unit -7 Bioinorganic chemistry**

7.1 Objectives

7.2 Introduction

7.3 Essential and trace elements in biological processes

7.4 Metalloporphyrins with special references to haemoglobin and myoglobin

7.5 Biological role of alkali and alkaline earth metal ion with special references to  $\text{Ca}^{+2}$

7.6 Nitrogen fixation

7.7 Summary

7.8 Terminal Question

7.9 Answers

### **Unit -8 Silicones and Phosphazenes**

8.1 Objectives

8.2 Introduction

8.3 Silicones and Phosphazenes as examples of inorganic polymers

8.4 Nature of bonding in triphosphazenes

8.5 Summary

8.6 Terminal Question

8.7 Answers