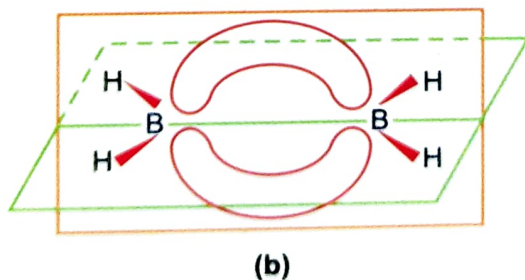
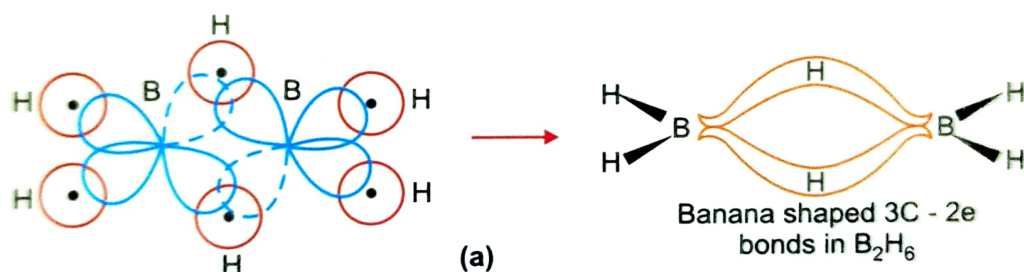


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# INORGANIC CHEMISTRY

CHEMISTRY (DSC-D3) : PAPER-VII



Structure of Diborane Having Banana Shaped Bond

Dr. DNYANDEV N. ZAMBARE  
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Dr. AVINASH M. NALAWADE  
Dr. PRAVINA B. PISTE

**TEXT BOOK OF**

# **INORGANIC CHEMISTRY**

**(Paper VII : DSC - D3)**

**B.Sc. Part II : Semester IV**

**As per New Revised Choice Based Credit System (CBCS)  
Syllabus of Shivaji University, Kolhapur, w.e.f. June 2019**

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## PREFACE

This book is basically intended for B.Sc.-II students for Semester - IV Course of Shivaji University, Kolhapur. This book is written according to New Revised Choice Based Credit System (CBCS) syllabus being implemented from June 2019 prescribed by Shivaji University, Kolhapur.

It is our great pleasure to present this book to the students and respected teachers in proper time. The subject matter is presented in simple and lucid language. This book covers all the chapters mentioned in the syllabus. The material is presented in a comprehensive way and the sequence of articles in each chapter helps the students to understand the subject with ease.

Different diagrams and illustrative description is provided to enhance the learning and understanding of the matter by students as well as to enable the teachers to explain the difficult concepts properly. The solved numerical examples, long answer type questions, short answer type questions including multiple type questions are given at the end of each chapter.

We are thankful to Nirali Prakashan, Pune for making us a part of their team of Authors. We thank Mr. **Dineshbhai Furia** and Mr. **Jignesh Furia** for publishing this book.

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We hope that this book will be found useful by students and teachers. We will appreciate any suggestions for the improvement of the book.

– Authors

# SYLLABUS

## Unit 1 : Co-ordination Chemistry

(10)

- 1.1 Introduction-Definition and Formation of Co-ordinate Covalent Bond in  $\text{BF}_3 - \text{NH}_3$ ,  $[\text{NH}_4]^+$  and  $\text{H}_2\text{O}$
- 1.2 Distinguish between Double Salt and Complex Salt
- 1.3 Werner's Theory
  - 1.3.1 Postulates
  - 1.3.2 The Theory as applied to Cobalt Amines viz.  $\text{CoCl}_3 \cdot 6\text{NH}_3$ ,  $\text{CoCl}_3 \cdot 5\text{NH}_3$ ,  $\text{CoCl}_3 \cdot 4\text{NH}_3$ ,  $\text{CoCl}_3 \cdot 3\text{NH}_3$
- 1.4 Description of the Terms - Ligand, Co-ordination Number, Co-ordination Sphere, Effective Atomic Number
- 1.5 IUPAC Nomenclature of Coordination Compounds
- 1.6 Isomerism in Complexes with C.N. 4 and 6
  - 1.6.1 Geometrical Isomerism
  - 1.6.2 Optical Isomerism
  - 1.6.3 Structural Isomerism-Ionisation Isomerism, Hydrate Isomerism, Coordination Isomerism, Linkage Isomerism and Co-ordination Position Isomerism
- 1.7 Valence Bond Theory of Transition Metal Complex with respect to C.N. 4, Complexes of Cu and Ni and C.N. 6, Complexes of Fe and Co.

## Unit 2 : Chelation

(05)

- 2.1 A Brief Introduction with respect to Ligands, Chelating Agent, Chelation and Metal Chelates.
- 2.2 Structural Requirements of Chelate Formation
- 2.3 Difference between Metal Chelate and Metal Complex
- 2.4 Classification of Chelating Agents (with specific illustration of Bidentate Chelating Agents)
- 2.5 Applications of Chelation with respect to Chelating Agents - EDTA and DMG

## Unit 3 : p-Block Elements (Group 13, 14 and 15)

(09)

- 3.1 Position of Elements in the Periodic Table
- 3.2 Characteristics of p-block elements with special reference to Electronic Configuration and Periodic Properties

### 3.3 Compounds of Group 13, 14 and 15

3.3.1 Boron-Diborane Method of Preparation and Nature of Bonding (Structure)

3.3.2 Borazine Method of Preparation and Nature of Bonding (Structure)

3.3.3 Allotropes of Carbon and Phosphorus

3.3.4 Oxyacids of Nitrogen –  $\text{HNO}_2$ ,  $\text{HNO}_3$ .

3.3.5 Hydrides of Nitrogen –  $\text{NH}_3$  and  $\text{N}_2\text{H}_4$

## Unit 4 : Chemistry of Elements of 3d Series Elements (08)

4.1 Position of Elements in the Periodic Table

4.2 Characteristics of d-block elements with special reference to

(i) Electronic structure

(ii) Oxidation states, stability of oxidation states of Fe with respect to Latimer diagram

(iii) Magnetic character

(iv) Coloured ions

(v) Complex formation.

## Unit 5 : Inorganic Semi-micro Qualitative Analysis (08)

5.1 Theoretical Principles involved in Qualitative Analysis

5.2 Applications of Solubility Product and Common Ion Effect in Separation of Cations into Groups.

5.3 Applications of Complex Formation in

(a) Separation of II Group into IIA and IIB Sub-groups.

(b) Separation of Copper from Cadmium.

(c) Separation of Cobalt from Nickel.

(d) Separation of  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ .

(e) Detection of  $\text{NO}_2^-$ ,  $\text{NO}_3^-$  (Brown Ring Test).

5.4 Application of Oxidation and Reduction in

(a) Separation of  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$  in the mixture

(b) Separation of  $\text{NO}_2^-$  and  $\text{NO}_3^-$  in the mixture

5.5 Spot Test Analysis.

\*\*\*

# CONTENTS

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- 1. Co-ordination Chemistry** **1.1 - 1.64**
  
- 2. Chelation** **2.1 - 2.10**
  
- 3. p-Block Elements (Group 13, 14 and 15)** **3.1 - 3.38**
  
- 4. Chemistry of Elements of 3d Series Elements** **4.1 - 4.36**
  
- 5. Inorganic Semi-micro Qualitative Analysis** **5.1 - 5.20**

**\*\*\***

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