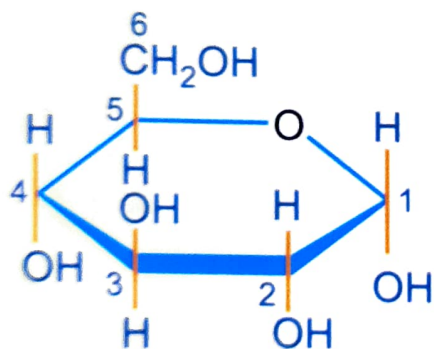


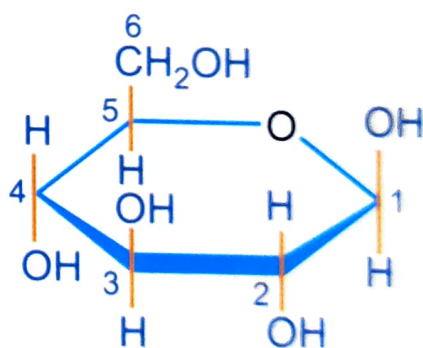
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(CHEMISTRY : DSC-D4 : PAPER-VIII)



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(α -D-Glucose)



β -D-Glucopyranose
(β -D-Glucose)

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(Paper VIII : DSC - D4)

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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.

We also thank Mr. Girish Redkar (Head Marketing Dept.) for his co-operation in publishing this book.

Last but not the least we are very much indebted to Mr. Virdhaval Shinde (Marketing Executive, Kolhapur District) and Mr. Ashok Nanavare (Marketing Executive, Sangli District) for their nice co-operation. We are very much thankful to Mr. Kiran Velankar (Proof Reading), Mrs. Anjali Muley (Graphic Design) and Mr. Malik Shaikh for a neat and error free D.T.P. of this book.

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 : Carboxylic Acids and their Derivatives (8 L)

- 1.1 Monocarboxylic acid: Introduction, Methods of Formation from Alcohols, Aldehydes, Ketones, Nitriles and Alkyl benzenes. Chemical Reaction: Hell-Volhard-Zelinsky (HVZ) reaction.
- 1.2 Formation of Halo Acids: Mono, Di, Tri- chloro acetic acid. Substitution reactions of Monochloro acetic acid by Nucleophile OH^- , I^- , CN^- and NH_3
- 1.3 Hydroxy acids: Malic and Citric acid. Methods of formation of Malic acid from maleic acid, from Alpha bromo succinic acid and moist Ag_2O . Chemical Reactions: Reactions of Malic acid-Action of heat, oxidation by KMnO_4 and reduction reaction with HI . Uses of Malic acid. Method of formation of Citric acid from glycerol. Chemical Reactions: Reaction of citric acid: Acetylation by acetic anhydride, reduction by HI , action of heat. Uses of citric acid.
- 1.4 Unsaturated acid: Cinnamic acid: Methods of formation from benzaldehyde using diethyl malonate and by using acetic anhydride and sodium acetate. Chemical Reactions- Bromination, Oxidation. Uses of cinnamic acid. Acrylic acid: Method of formation from acrolein and by dehydration of beta hydroxy propionic acid. Chemical Reactions: Addition of water, Reduction by $\text{Na/C}_2\text{H}_5\text{OH}$. Uses of acrylic acid.
- 1.5 Dicarboxylic acid: Succinic and phthalic acid. Method of formation of succinic acid from ethylene dibromide, maleic acid. Chemical Reactions: Action of heat, Action of NaHCO_3 , $\text{C}_2\text{H}_5\text{OH}$ in the presence of acid. Uses of succinic acid. Phthalic acid: Method of formation from o-xylene and Naphthalene. Chemical Reactions: Action of heat, reaction with sodalime, ammonia. Uses of phthalic acid.
- 1.6 Carboxylic acid derivatives: Introduction Acid halide derivative: Acetyl chloride: formation from acid, by action with PCl_3 and SOCl_2 , reaction with water, alcohol (Mechanism of esterification is expected) and ammonia. Uses of acetyl chloride. Acid anhydride derivative: Method of formation of acetic anhydride by dehydration of acetic acid, reactions with water, alcohol and ammonia. Uses of acetic anhydride.

Unit 2 : Amines and Diazonium Salts (8 L)

- 2.1 Introduction, Classification, Nomenclature, Structure.
- 2.2 Methods of preparation: (a) From alkyl halide by ammonolysis, (b) By reduction of nitriles or cyanides, (c) From unsubstituted amides (Hoffmann degradation), (d) By Gabriel synthesis (from phthalimide).

- 2.3 Reactions: Carbylamine reaction, Schotten-Baumann reaction, Electrophilic substitution (Aniline), Nitration, Bromination, Sulphonation.
- 2.4 Diazonium salt: Introduction, Preparation of Benzene diazonium chloride.
- 2.5 Reactions: Replacement by Halogen (Sandmeyer), Replacement by Iodine, Replacement by $-OH$, C and N . Coupling reactions, Synthesis of Methyl Orange and Congo Red. Reduction of BDC.

Unit 3 : Carbohydrates

(8 L)

Classification of carbohydrates, Reducing and non-reducing sugars, General properties of glucose and fructose, their open chain structure, Epimers, mutarotation and anomers.

Determination of configuration of Glucose (Fischer proof). Ring structure of glucose. Determination of size of the ring of Glucose by methylation method. Haworth projections. Cyclic structure of fructose. Linkage between monosaccharides, structure of disaccharides (sucrose, maltose, lactose) and polysaccharides (starch and cellulose), excluding their structure elucidation.

Unit 4 : Carbonyl Compounds - Aldehydes and Ketone

(6 L)

- 4.1 Introduction, Nomenclature, Structure.
- 4.2 Reactivity of Carbonyl group, Mechanism of nucleophilic addition to carbonyl group.
- 4.3 Reactions: Mechanism and application of Aldol condensation, Perkin reaction, Cannizzaro's reaction, Knoevenagel condensation, Reformatsky reaction.

Unit 5 : Stereochemistry

(8 L)

- 5.1 Conformational isomerism – Introduction.
- 5.2 Representation of conformations of ethane by using Saw-Horse, Fischer (dotted line wedge) and Newman's projection formulae.
- 5.3 Conformations and conformational analysis of ethane and n-butane by Newman's projection formula with the help of energy profile diagrams.
- 5.4 Cycloalkanes relative stability - Baeyer's strain theory, Theory of strainless rings.
- 5.5 Conformations and stability of cyclohexane and monosubstituted cyclohexanes: Cyclohexanol, bromocyclohexane and methyl cyclohexane.
- 5.6 Locking of conformation in t-butyl cyclohexane.

CONTENTS

- | | |
|--|-------------------|
| 1. Carboxylic Acids and their Derivatives | 1.1 - 1.24 |
| 2. Amines and Diazonium Salts | 2.1 - 2.12 |
| 3. Carbohydrates | 3.1 - 3.38 |
| 4. Carbonyl Compounds -
Aldehydes and Ketones | 4.1 - 4.18 |
| 5. Stereochemistry | 5.1 - 5.28 |

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