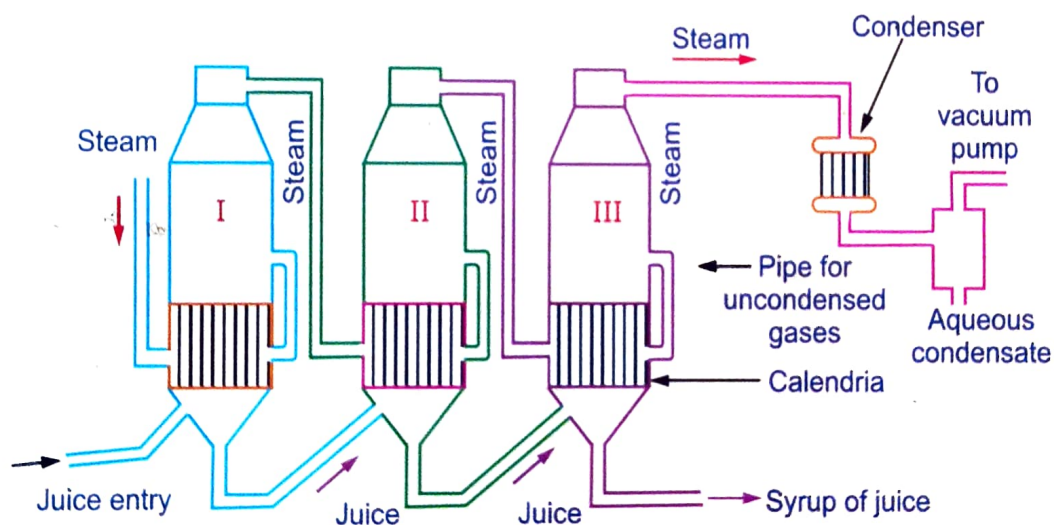


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CBCS Pattern
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B.Sc. Part-III : Semester-VI

INDUSTRIAL CHEMISTRY

(CHEMISTRY : DSE-F8 : PAPER-XVI)



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A Text Book Of
INDUSTRIAL CHEMISTRY

DSE – F8 : Paper - XVI

FOR
B.Sc. Part - III : Semester - VI

**As Per New Revised CBCS Pattern Syllabus of
Shivaji University, Kolhapur w.e.f. June 2020**

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Preface

This book is basically intended for B.Sc. III students for Semester VI Course of Shivaji University, Kolhapur. This book is written according to new revised CBCS pattern syllabus being implemented from June 2020 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.

Last but not the least we are very much indebted to Mr. Virbhaval 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

B.Sc. III : INDUSTRIAL CHEMISTRY

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Syllabus

B.Sc. Part III (CBCS) SEMESTER-VI
Paper No. DSE-F8 Chemistry Paper No. XVI
(Industrial Chemistry)
(Theory Credits : 02, 30 Hours, 38 Lectures)

Unit 1 Sugar Industry

[07]

- 1.1 Introduction.
- 1.2 Manufacture of cane sugar in India: Extraction of juice, Clarification, Concentration, Crystallization, Centrifugation and other details of industrial process.
- 1.3 Byproducts of sugar industry.
- 1.4 Manufacture of Ethyl Alcohol from Molasses: by Fermentation.

Unit 2 Manufacture of Industrial Heavy Chemicals [08]

- 2.1 Introduction
- 2.2 Manufacture of Ammonia (NH_3)
 - (i) Physico-chemical principles.
 - (ii) Manufacture by Haber's process.
- 2.3 Manufacture of Sulphuric acid (H_2SO_4)
 - (i) Physico-chemical principles.
 - (ii) Manufacture by Contact process.
- 2.4 Manufacture of Nitric acid (HNO_3)
 - (i) Physico-chemical principles.
 - (ii) Manufacture by Ostwald's process (Ammonia oxidation process).
- 2.5 Manufacture of Sodium carbonate (Na_2CO_3) (Washing soda).
 - (i) Physico-chemical principles.
 - (ii) Manufacture by Solvay process.

Unit 3 Synthetic Polymers

[08]

- 3.1 Introduction.
- 3.2 Classification.
 - (i) Based on origin.
 - (ii) Based on composition-organic, inorganic polymers.
 - (iii) Based on method of preparation.
 - (iv) Based on general physical properties.
 - (v) Based on structure.

- 3.3 Addition Polymerization : Free radical addition and ionic addition polymerization.
- 3.4 Ziegler-Natta polymerization.
- 3.5 Methods of preparation and applications of some organic polymers: Polyethylene, Polystyrene, Polyvinyl chloride, Phenol-formaldehyde resin.
- 3.6 Conducting organic polymers : Synthesis and properties of Polyaniline, Polypyrrole.
- 3.7 Applications of conducting organic polymers.

Unit 4 Petroleum Industry and Eco-Friendly Fuels [07]

[A] Petroleum industry

Introduction, occurrence, composition of petroleum, resources, processing of petroleum, calorific value of fuel, cracking, octane rating (octane number), cetane number, flash point, petroleum refineries, applications of petrochemicals, synthetic petroleum, lubricating oils and additives.

[B] Fuels

Fuels and eco-friendly fuels: liquid, gaseous fuel (LPG, CNG), fossil fuels, diesel, Biodiesel, gasoline, aviation fuels. Use of solar energy for power generation.

Unit 5 Nanotechnology [08]

- 5.1 Introduction of nanotechnology, history, classification of nanoparticles based on size.
- 5.2 Optical properties of nanomaterial's
 - (i) Semiconducting nanoparticles.
 - (ii) Metallic nanoparticles.
- 5.3 Synthetic routes of nanomaterials : Top-down and bottom-up approaches.
- 5.4 Synthesis methods : Sol-gel, precipitation, chemical reduction, chemical vapour deposition, hydrothermal, electrodeposition.
- 5.5 Characterization of nanomaterials : X-Ray diffractometer, Scanning Electron Microscope, Transmission Electron Microscope.
- 5.6 Applications of nanotechnology.

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