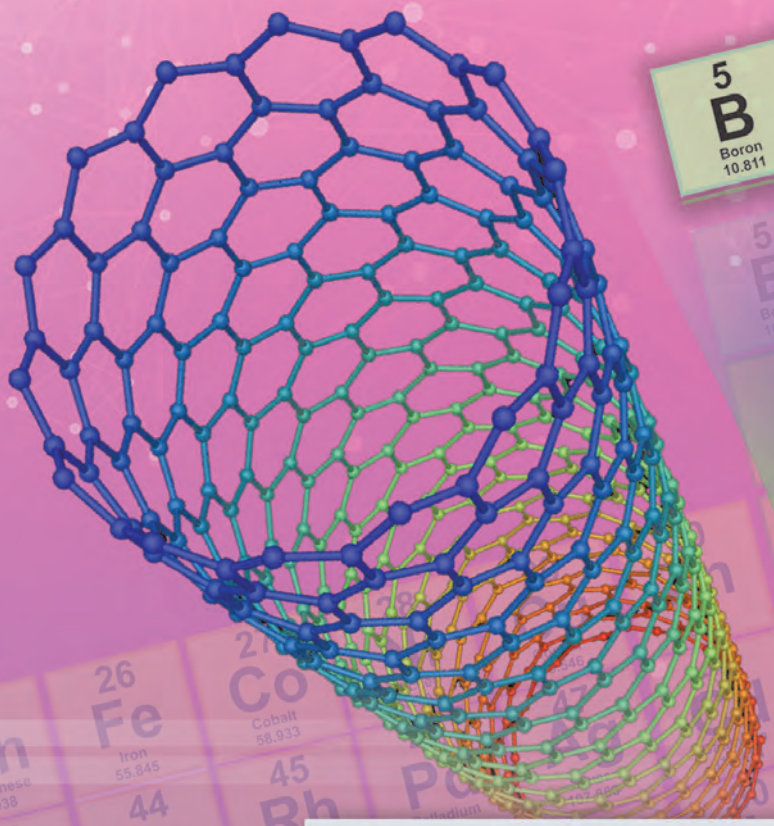
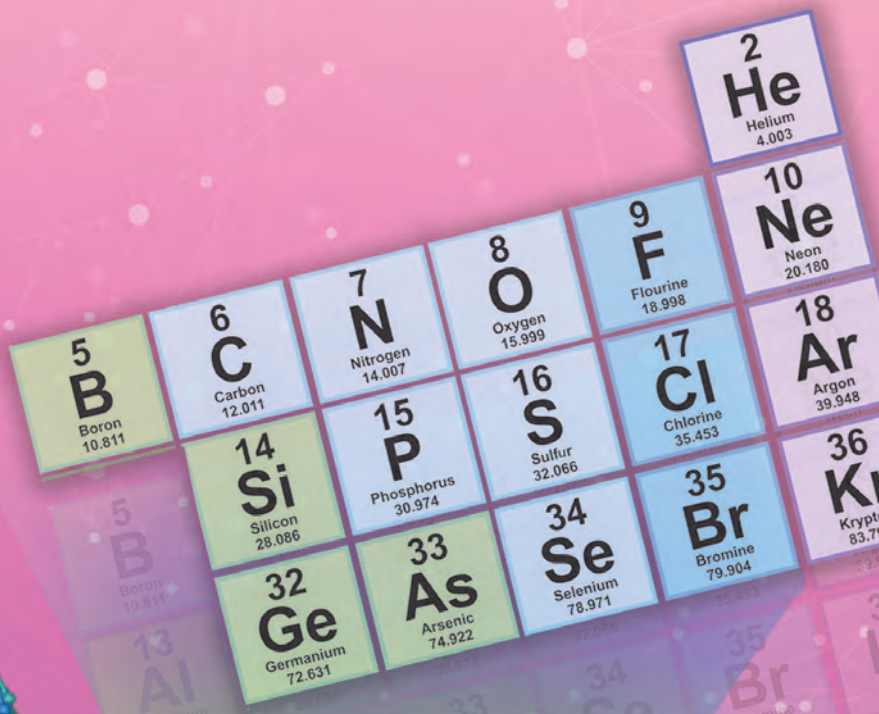
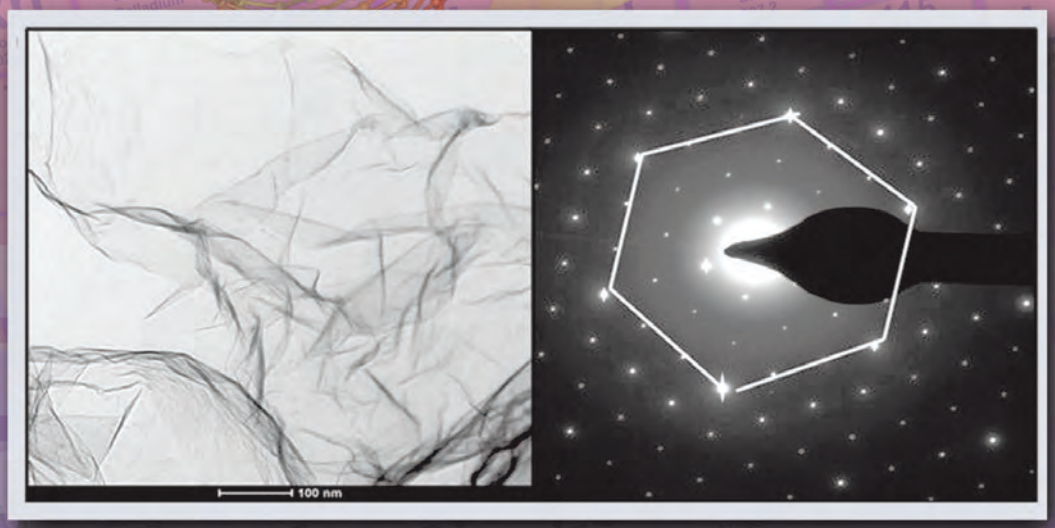
CHEMISTRY

Standard XI







The Constitution of India

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties- It shall be the duty of every citizen of India–

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

(k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

The Coordination Committee formed by GR No. Abhyas - 2116/(Pra.Kra.43/16) SD - 4 Dated 25.4.2016 has given approval to prescribe this textbook in its meeting held on 20.6.2019 and it has been decided to implement it from academic year 2019-20.

CHEMISTRY

Standard XI

E9A7Q9

Download DIKSHA App on your smartphone. If you scan the Q.R. Code on this page of your textbook, you will be able to access full text. If you scan the Q.R. Code provided, you will be able to access audio-visual study material relevant to each lesson, provided as teaching and learning aids.

2019

Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune.

First Edition : 2019
Reprint : 2021

Subject Committee

Dr. Chandrashekhar V. Murumkar, **Chairman**
Dr. Sushama Dilip Joag, Member
Dr. Shridhar Pandurang Gejji, Member
Dr. Satyawati Sudhir Joshi, Member
Dr. Rajashree Vikas Kashalkar, Member
Dr. Laxman Shamrao Patil, Member
Shri. Rajesh Vamanrao Roman, Member
Shri. Rajiv Arun Patole, **Member Secretary**

Study group

Dr. Anjali Deepak Ruikar
Shri. Sachin Ashok Bartakke
Smt. Archana Sanjeev Kale
Smt. Pushpalata Babanrao Gangarde
Smt. Archana Dipak Harimkar
Shri. Vishnu Rustumrao Deshmukh
Shri. Sharad Ajabrao Mankar
Shri. Ritesh Vijay Bijewar
Shri. Rupesh Dinkar Thakur
Shri. Milind Chandrakant Gaikwad
Shri. Gajanan Shivajirao Suryawanshi

Illustration
Shri. Pradeep Ghodke
Shri. Shubham Chavan

Cover
Shri. Vivekanand S. Patil

Typesetting
DTP Section, Textbook Bureau, Pune

Co-ordination
Shri. Rajiv Arun Patole
Special Officer for Chemistry

Paper
70 GSM Creamwove

Print Order

Printer

Production
Shri Sachchitanand Aphale
Chief Production Officer
Shri Liladhar Atram
Production Officer

Publisher
Shri Vivek Uttam Gosavi,
Controller
Maharashtra State Textbook Bureau, Prabhadevi,
Mumbai - 400 025

The Constitution of India

Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage. I shall always strive to be worthy of it.

I shall give my parents, teachers and all elders respect, and treat everyone with courtesy.

To my country and my people, I pledge my devotion. In their well-being and prosperity alone lies my happiness.

Preface

Dear Students,

We welcome you all to std. XI. For the first time, you are being introduced to the subject of chemistry discipline. You have already been acquainted with some of the concepts of chemistry from standard five onwards, especially in the subject of general science up to standard eight and science and technology for standard nine and ten.

Chemistry is very broad subject that covers many aspects of our everyday experience. This textbook aims to create awareness and to understand certain essential aspects by the national curriculum framework (NCF) which was formulated in 2005, followed by the state curriculum framework (SCF) in 2010. Based on these two framework, reconstruction of the curriculum and prepartion of a revised syllabus has been done and designed now.

The subject chemistry is the study of substances, their properties, structures and transformation. The world is full of chemical substances and we need chemicals for many useful purposes. Our body is a huge chemical factory. Keeping this in mind, the textbook is written in organized manner. You can learn a very basic principles, understand facts and put them into practice by learning in the classroom and laboratory. The textbook is presented in a simple language with relevant diagrams, graphs, tables, photographs. This will help you to understant various terminology, concepts with more clarity. All the illustrations are in color form. The new syllabus focuses on the basic principles, concepts, laws based on precise observations, their applications in everyday life and ability to solve different types of problems. The general teaching - learing objectives of the revised syllabus are further determined on the basis of the 'Principle of constructivism' i.e. self learning.

The curriculum and syllabus is designed to make the students to think independently. The student are encouraged to read, study more through the additional information given in the colored boxes. Activities have been introduced in each chapter. These activities will not only help to understand the content knowledge on your own efforts. QR code have been introduced for gaining the additional information, abstracts of chapters and practice questions/ activities.

The efforts taken to prepare the text book will help the students think about more than just the content of the chemical concepts. Teachers, parents as well as those aspiring condidates preparing for the competitive examinations will also be benefited.

We look forward to a positive response from the teachers and students.

Our best wishes to all !

(Dr. Sunil Magar)
Director
Maharashtra State Bureau of
Textbook Production and
Curriculum Research, Pune 4

Pune
Date : 20 June 2019
Bharatiya Saur : 30 Jyeshtha 1941

- For Teachers -

Dear Teachers,

We are happy to introduce the revised textbook of chemistry for std. XI. This book is a sincere attempt to follow the maxims of teaching as well as develop a 'constructivist' approach to enhance the quality of learning. The demand for more activity based, experiential and innovative learning opportunities is the need of the time. The present curriculum has been restructured so as to bridge the credibility gap that exists in the experience in the outside world. Guidelines provided below will help to enrich the teaching - lerning process and achieve the desired learning outcomes.

- To begin with, get familiar with the textbook yourself.
- The present book has been prepared for construtivism and activity based learning.
- Teachers must skillfully plan and organize the activities provided in each chapter to develop interest as well as to stimulate the thought process among the students.
- Always teach with proper planning.
- Use teaching aids as required for the proper understanding of the subject.
- Do not finish the chapter in short.
- Follow the order of the chapters strictly as listed in the contents because the units are introduced in a graded manner to facilitate knowledge building.
- Each unit is structured in a definite manner. It starts from the basic concepts of general chemistry required for each branch of chemistry. Application of this knowledge will help students to understand further chapters in each unit.
- Each chapter provides solved problems on each and every concept and various laws. The solved problems are put into boxes. Teachers should expalin each step of the problem and give them pratice.
- Ask the students about the related information, backgroud about the chapter. You are provided, for this with the different boxes like 'Can You Recall', 'Do you know?'
- Encourage the students to collect related information by providing them the websites.
- Teaching- learning interactions, processes and participation of all students are necessary and so is your active guidance.
- Do not use the content of the boxes titles 'Do you know'? for evaluation.
- Exercises include parameters such as co-relation, critical thinking, analytical reasoning etc. Evaluation pattern should be based on the given paramerters. Equal weightage should be assigned to all the topics. Use different combinations of questions.


Remember


Try this


Can you recall?


Can you tell?

Front Page : The photograph depicts transmission electron micrograph (TEM) of a few layer Graphene (left). The electron diffraction pattern (hexagonal arrangement of spots corresponds to the hexagonal symmetry of the structure of Graphene (Right).
Picture Credit : Prof. Dr. M. A. More, Department of Physics, Savitribai Phule Pune Universiy, Pune 411007.


Use your brain power


Just think


Activity :


Do you know ?


Exercises


Observe and Discuss


Find out


Internet my friend

Competency Statements - Standard XI	
Area/ Unit/ Lesson	**After studying the contents in Textbook students.....**
General chemistry	• Understand the SI unit of important fundamental scientific quantities. • Explain various fundamental laws of chemical combination, which are applied in day-to-day life. • Relate basic concepts of number of moles and molecules. • Differentiate between quantitative and qualitative analysis. • Develop accuracy, precision, concentration ability in taking accurate reading. • Calculate empirical formula and molecular formula of compounds. • Obtain information about different techniques to purify substance as well as separation of miscible solids and liquids. • Gain the information about various theories, principles, put up by eminent Scientists leading to atomic stucture. • Classify elements isotopes, isobars and isotones. • Understand the duel nature of electron. • Application of concept of quantum number in writing electronic configuration of various elements.
Inorganic chemistry	• Inculcate social and scientific awareness by gaining knowledge of oxidation-reduction concept. • Evaluate oxidation number of elements and balance the redox reaction by different methods. • Categorize oxidizing and reducing agents with their applications. • Classify elements based on electronic configuration. • Understand co-relation between the various properties like atomic size, valency, oxidation state, ionization enthalpy and electronegativity in a group and in a period. • Recognize isoelectronic species. • Compare the trends in physical and chemical properties in group I and group II. Understand the diagonal relationship. • Gain the knowledge of hydrogen from periodic table. • Develop interest in systematic study of elements present in Group 13, Group 14 and group15. • Learn anomalous behaviors of boron, carbon and nitrogen . • Draw the structures of some compounds of boron, carbon and nitrogen. • Elaborate information about various theories to explain nature of bonding in formation of molecules. • Inculcate skill to draw Lewis structure of molecules. • Assign the structures of various compounds with respect to geometry, bond angle and types of bond.

Physical chemistry	• Generate environmental awareness by compiling concepts of adsorption phenomenon. • Learn science behind the fact about colloids in day to day life. • Interpret nature, difference and relation of equilibrium constant. • Design the suitable conditions to get more yield of the desired product. • Differentiate nuclear reactions with ordinary chemical reaction. • Acquire knowledge of natural radioactivity and related terms like nuclear transmutation, nuclear fission, nuclear fusion. • Clarify the beneficial and harmful effects of radioactivity. • State the applications of radioactive elements like carbon dating, nuclear reactor, generation of electricity and medicinal uses. • Develop mathematical skills in finding radioactive decay constant, half life period and nuclear binding energy.
Organic chemistry	• Interpret the structure and functional group of organic compounds. • IUPAC nomenclature of organic compounds. • Understand the influence of electronic displacement and reactivity in organic molecules. • Draw the formulae of various isomers of organic compounds. • Illustrate different methods of preparation and chemical properties of hydrocarbons. • Infer importance of hydrocarbon. • Gain information of medicinal properties of some chemical compounds and chemistry behind food quality and cleasing action.

CONTENTS