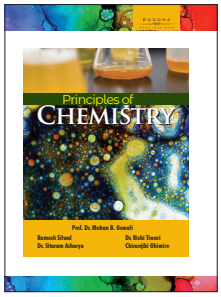
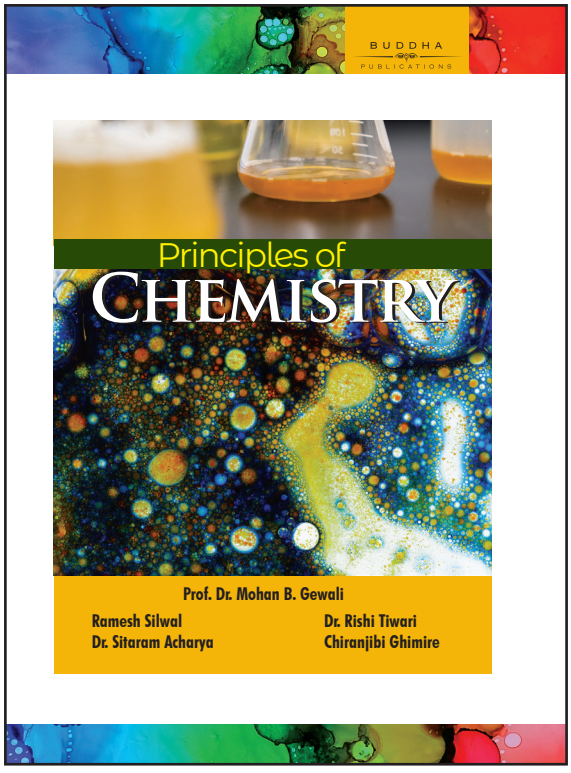
BUDDHA PUBLICATIONS



Principles of CHEMISTRY -I

GRADE XI



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SYLLABUS

Chemistry

GENERAL AND PHYSICAL CHEMISTRY

7.1.2.3 Combined gas equation
7.1.2.4 Dalton's law of partial pressure
7.1.2.5 Graham's law of diffusion
7.1.3 Ideal gas and ideal gas equation
7.1.4 Universal gas constant and its significance
7.1.5 Deviation of real gas from ideality (Solving related numerical problems based on gas laws)

7.2 Liquid state
7.2.1 Physical properties of liquids
7.2.1.1 Evaporation and condensation
7.2.1.2 Vapour pressure and boiling point
7.2.1.3 Surface tension and viscosity (qualitative idea only)
7.2.2 Liquid crystals and their applications

7.3 Solid state
7.3.1 Types of solids
7.3.2 Amorphous and crystalline solids
7.3.3 Efflorescent, Deliquescent and Hygroscopic solids
7.3.4 Crystallization and crystal growth
7.3.5 Water of crystallization
7.3.6 Introduction to unit crystal lattice and unit cell

8. Chemical Equilibrium 3
8.1 Physical and chemical equilibrium
8.2 Dynamic nature of chemical equilibrium
8.3 Law of mass action
8.4 Expression for equilibrium constant and its importance
8.5 Relationship between Kp and Kc
8.6 Le Chatelier's Principle (Numericals not required)

INORGANIC CHEMISTRY

9. Chemistry of Non-metals 4

9.1 Hydrogen
9.1.1 Chemistry of atomic and nascent hydrogen
9.1.2 Isotopes of hydrogen and their uses
9.1.3 Application of hydrogen as fuel
9.1.4 Heavy water and its applications

9.2 Allotropes of Oxygen
9.2.1 Definition of allotropy and examples
9.2.2 Oxygen: Types of oxides (acidic, basic, neutral, amphoteric,peroxide and mixed oxides)
9.2.3 Applications of hydrogen peroxide
9.2.4 Medical and industrial application of oxygen

9.3 Ozone
9.3.1 Occurrence
9.3.2 Preparation of ozone from oxygen
9.3.3 Structure of ozone
9.3.4 Test for ozone
9.3.5 Ozone layer depletion (causes,effects and control measures)
9.3.6 Uses of ozone

9.4 Nitrogen 5
9.4.1 Reason for inertness of nitrogen and active nitrogen
9.4.2 Chemical properties of ammonia [Action with $CuSO_4$ solution, water, $FeCl_3$ solution, Conc. HCl,Mercurous nitrate paper, O_2]
9.4.3 Applications of ammonia
9.4.4 Harmful effects of ammonia
9.4.5 Oxy-acids of nitrogen (name and formula)
9.4.6 Chemical properties of nitric acid [HNO_3 as an acid and oxidizing agent (action with zinc, magnesium, iron, copper, sulphur, carbon, SO_2 and H_2S)
9.4.7 Ring test for nitrate ion

9.5 Halogens 5
9.5.1 General characteristics of halogens
9.5.2 Comparative study on preparation (no diagram and description is required),
9.5.2.1 Chemical properties [with water, alkali, ammonia, oxidizing character, bleaching action] and uses of halogens (Cl_2, Br_2 and I_2)
9.5.3 Test for Cl_2, Br_2 and I_2
9.5.4 Comparative study on preparation (no diagram and description is required), properties (reducing strength, acidic nature and solubility) and uses of haloacids (HCl, HBr and HI)

9.6 Carbon 3
9.6.1 Allotropes of carbon (crystalline and amorphous) including fullerenes (structure, general properties and uses only)
9.6.2 Properties (reducing action, reaction with metals and nonmetals) and uses of carbon monoxide

9.7 Phosphorus
9.7.1 Allotropes of phosphorus (name only)
9.7.2 Preparation (no diagram and description is required), properties (basic nature ,reducing nature, action with halogens and oxygen) and uses of phosphine

9.8 Sulphur 8
9.8.1 Allotropes of sulphur (name only) and uses of sulphur
9.8.2 Hydrogen sulphide (preparation from Kipp's apparatus with diagram,) properties (Acidic nature, reducing nature, analytical reagent) and uses
9.8.3 Sulphur dioxide its properties (acidic nature, reducing nature, oxidising nature and bleaching action) and uses
9.8.4 Sulphuric acid and its properties (acidic nature, oxidising nature, dehydrating nature) and uses
9.8.5 Sodium thiosulphate (formula and uses)

10. Chemistry of Metal 5

10.1 Metals and Metallurgical Principles
10.1.1 Definition of metallurgy and its types (hydrometallurgy, pyrometallurgy, electrometallurgy)

10.1.2 Introduction of ores

10.1.3 Gangue or matrix, flux and slag, alloy and amalgam

10.1.4 General principles of extraction of metals (different processes involved in metallurgy) – concentration, calcination and roasting, smelting, carbon reduction, thermite and electrochemical reduction

10.1.5 Refining of metals (poling and electro-refinement)

10.2 Alkali Metals 5

10.2.1 General characteristics of alkali metals

10.2.2 Sodium [extraction from Down's process, properties (action with Oxygen, water, acids nonmetals and ammonia) and uses]

10.2.3 Properties (precipitation reaction and action with carbon monooxide) and uses of sodium hydroxide

10.2.4 Properties (action with CO_2, SO_2, water, precipitation reactions) and uses of sodium carbonate

10.3 Alkaline Earth Metals

10.3.1 General characteristics of alkaline earth metals

10.3.2 Molecular formula and uses of (quick lime, bleaching powder, magnesia, plaster of paris and epsom salt)

10.3.3 Solubility of hydroxides, carbonates and sulphates of alkaline earth metals (general trend with explanation)

10.3.4 Stability of carbonate and nitrate of alkaline earth metals (general trend with explanation)

11. Bio-inorganic Chemistry 3

11.1 Introduction

11.2 Micro and macro nutrients

11.3 Importance of metal ions in biological systems (ions of Na, K, Mg, Ca, Fe, Cu, Zn, Ni, Co, Cr)

11.4 on pumps (sodium-potassium and sodium-glucose pump)

11.5 Metal toxicity (toxicity due to iron, arsenic, mercury, lead and cadmium)

ORGANIC CHEMISTRY

12. Basic Concept of Organic Chemistry 6

12.1 Introduction to organic chemistry and organic compounds

12.2 Reasons for the separate study of organic compounds from inorganic compounds

12.3 Tetra-covalency and catenation properties of carbon

12.4 Classification of organic compounds

12.5 Alkyl groups, functional groups and homologous series

12.6 Idea of structural formula, contracted formula and bond line structural formula

12.7 Preliminary idea of cracking and reforming, quality of gasoline, octane number, cetane number and gasoline additive

13. Fundamental Principles of Organic Chemistry 10

13.1 IUPAC Nomenclature of Organic Compounds (upto chain having 6-carbon atoms)

13.2 Qualitative analysis of organic compounds (detection of N, S and halogens by Lassaigne's test)

13.3 Isomerism in Organic Compounds

13.4 Definition and classification of isomerism

13.5 Structural isomerism and its types: chain isomerism, position isomerism, functional isomerism, metamerism and tautomerism

13.6 Concept of geometrical isomerism (cis & trans) & optical isomerism (d & l form)

13.7 Preliminary Idea of Reaction 13.7.2 Electrophiles, nucleophiles and free- radicals

13.7.3 Inductive effect: +I and –I effect

13.7.4 Resonance effect: +R and –R effect Mechanism

13.7.1 Homolytic and heterolytic fission

14. Hydrocarbons 8

14.1 Saturated Hydrocarbons (Alkanes)

14.1.1 Alkanes: Preparation from haloalkanes (Reduction and Wurtz reaction), Decarboxylation, Catalytic hydrogenation of alkene and alkyne

14.1.2 Chemical properties: Substitution reactions (halogenation, nitration & sulphonation only), oxidation of ethane

14.2 Unsaturated hydrocarbons (Alkenes & Alkynes)

14.2.1 Alkenes: Preparation by Dehydration of alcohol, Dehydrohalogenation, Catalytic hydrogenation of alkyne

14.2.1.1 Chemical properties: Addition reaction with HX (Markovnikov's addition and peroxide effect), H_2O, O_3, H_2SO_4 only

14.3 Alkynes: Preparation from carbon and hydrogen, 1,2 dibromoethane, chloroform/iodoform only

14.3.1 Chemical properties: Addition reaction with (H_2, HX, H_2O), Acidic nature (action with Sodium, ammoniacal $AgNO_3$ and preparation of alkane, alkene and alkynes ammoniacal Cu_2Cl_2)

14.4 Test of unsaturation (ethene & ethyne): bromine water test and Baeyer's test

14.5 Comparative studies of physical properties of alkane, alkene and alkyne

14.6 Kolbe's electrolysis methods for the preparation of alkane, alkene and alkynes

15. Aromatic Hydrocarbons 6

15.1 Introduction and characteristics of aromatic compounds

15.2 Huckel's rule of aromaticity
15.3 Kekule structure of benzene
15.4 Resonance and isomerism
15.5 Preparation of benzene from decarboxylation of sodium benzoate, phenol, and ethyne only
15.6 Physical properties of benzene
15.7 Chemical properties of benzene: Addition reaction: hydrogen, halogen, Electrophilic substitution reactions: orientation of benzene derivatives (o, m & p), nitration, sulphonation, halogenations, Friedal-Craft's reaction (alkylation and acylation), combustion of benzene (free combustion only) and uses

APPLIED CHEMISTRY

16. Fundamentals of Applied Chemistry 4

16.1 Fundamentals of Applied Chemistry
16.1.2 Chemical industry and its importance
16.1.3 Stages in producing a new product
16.1.4 Economics of production
16.1.5 Cash flow in the production cycle
16.1.6 Running a chemical plant
16.1.7 Designing a chemical plant
16.1.7 Continuous and batch processing
16.1.8 Environmental impact of the chemical industry

17. Fundamentals of Applied Chemistry 11

17.1 Modern Chemical Manufactures (principle and flow sheet diagram only)
17.1.1 Manufacture of ammonia by Haber's process,
17.1.2 Manufacture of nitric acid by Ostwald's process,
17.1.3 Manufacture of sulphuric acid by contact process,
17.1.4 Manufacture of sodium hydroxide by Diaphragm Cell
17.1.5 Manufacture of sodium carbonate by ammonia soda or Solvay process
17.2 Fertilizers (Chemical fertilizers, types of chemical fertilizers, production of urea with flow-sheet diagram)

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CHAPTER 7 STATES OF MATTER

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CHAPTER 16 FUNDAMENTALS OF APPLIED CHEMISTRY

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