CHEMISTRY

THEORY
COURSE STRUCTURE
CLASS XI

One Paper ***Time : 3 Hours*** ***Marks : 70***

Units	Title	No. of Period	Marks
I.	Some basic concepts of Chemistry	14	18
II.	Structure of atom	14	
III.	Classification of elements and periodicity in properties	6	
IV.	Chemical bonding and molecular structure	14	
V.	States of matter : Gases and Liquids	12	16
VI.	Thermodynamics	14	
VII.	Equilibrium	16	18
VIII.	Redox reactions	8	
IX.	Hydrogen	8	
X.	s-Block elements	12	
XI.	Some p-block elements :	12	18
XII.	Organic Chemistry : Some basic Principles and Techniques	12	
XIII.	Hydrocarbons	12	
XIV.	Environment al chemistry	6	
	Total	**160**	**70**

Note: A minimum of 3 marks must be allotted to each unit.

Unit I : Some basic Concepts of Chemistry (14 Periods)

Importance of Chemistry, Nature of Matter, properties of matter and their measurement, uncertainty in measurement, laws of Chemical combination, Dalton's Atomic Theory, Atomic and Molecular Masses, Mole concept and Molar Masses, percentage composition, Stoichiometry and Stoichiometric calculations.

Unit II : Structure of Atom **(14 Periods)**

Discovery of electron, proton and neutron; atomic number, isotopes and isobars. Thompson's model and its limitations, Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertaintuy principle, concept of orbitals, quantum numbers, shapes of s- , p and d orbitals, rules for filling electrons in orbitals – Aufbau principle, Pauli exclusion principles and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbitals.

Unit III : Classification of Elements and Periodicity in Properties. **(6 periods)**

Why do we need to classify elements ? Genesis of periodic classification, Modern Periodic Law and the present form of the perioidic Table, nomenclature of elements with Atomic Number>100, Electronic configurations of elements and the periodic table, Electronic configuration and types of elements , s-, p-d-f- Blocks, Periodic Trends in Properties of Elements – atomic radii , ionic radii, electron gain enthalpy, electronetivity, periodic trends in chemical properties.

Unit IV : Chemical Bonding and Molecular Structure. **(14 periods)**

Kossel – Lewis Approach to Chemical Bonding, Ionic or Electrovalent Bond, Bond parameters, The Valence shell Electron Pair Repulsion (VSEPR) Theory, Valence Bond Theory, Hybridisation, Molecular Orbital Theory, Bonding in some Homonuclear Diotomnic molecules, hydrogen Bonding.

Unit IV : States of matter **(12 periods)**

Intermolecular Forces, hermal Energy, intermolecular Forces vs Thermal Interaction, The Gaseous State, The Gas Laws, Ideal Gas Equation, Kinetic Energy and Molecular Speeds, Kinetic Molecular Theory of Gas, Behaviour of Real Gases : Deviation from Ideal Gas Behaviour, Liquefaction of Gases, Liquid State.

Unit VI : Thermodynamics **(14 periods)**

Thermodynamic Terms, Applications, Measurement of ΔU and H, Calorimetry, Enthalpy change, $_{r}H$ of a Reaction-Reaction Enthalpy, Enthalpies for different types of reactions, Spontaneity, Gibbs energy change and equilibrium.

Unit –VII : Equilibrium (16 periods)

Equilibrium in physical processes, equilibrium in chemical processes – Dynamic Equilibrium, Law of Chemical Equilibrium and Equilibrium constant, Homogenous Equilibria, Heterogeneous Equilibria, Application of Equilibrium constants, Relationship between Equilibrium constant K, Reaction Quotient Q and Gibbs Energy G, Factors Affecting Equilibria Ionic Equilibrium in solution, Acids, Bases and salts, Ionization of Acids and Bases, buffer solutioins, solubility Equilibria of sparingly soluble salts.

Unit – VIII : Redox Reactions (8 periods)

Classical idea of Redox reactions – Oxidation and Reduction Reactions, Redox Reactions in terms of Electron Transfer Reactions, Oxidation Number, Redox Reactions and Electrode Processes.

Unit – IX : Hydrogen (8 periods)

Position of Hydrogen in the perioidic table, Dithydrogen, H_2, Preparation and types of hydride, properties of Dihydrogen,; Hydrides, water, Hydrogen Peroxide (H_2O_2), Heavy water, D_2O; Dihydrogen as a fuel.

Unit – X : The s- Block Elements (12 periods)

Group 1 elements : Alkali Metals, General Characteristics of the compounds of the Alkali Metals, Anomalous properties of Lithium, some important compounds of sodium, Biological Importance of sodium and potrassium, Group 2 elemetns : Alkaline Earth Metals, General characteristics of compounds of the Alkaline Earth Metals, Anomalous Behaviors of Beryllium, Some important compounds of calcium, biological importance of Magnesium and calcium.

Unit –XI : The p-Block Elements (12 periods)

Group 13 Elements : The boron family, Important Trends and Anomalous properties of Boron, Some Important compound of Boron, Uses of Boron and Aluminum and their compounds, Group 14 Elements : The Carbon family, Important Trends and Anomalous behavior of carbon, Allotropes of carbon, some important compounds of carbon and silicon.

Unit – XII : Organic Chemistry – some basic principles and Techniques. (12 periods)

General Introduction, Tetra valance of carbon : shapes of organic compounds, structural representations of organic compounds, classification of organic compounds, Nomenclature of organic compounds, Isomerism, Fundamental concepts in organic Reaction Mechanism, Methods of compounds, Methods of purification of organic compounds, Qualitative Analysis of organic compounds, Quantitative Analysis.

Unit –XIII : Hydrocarbons (12 periods)

Classification, Alkanes- Nomenclature, isomerism, conformations (ethane only), Preparations, Physical properties, chemical reactions including free radical mechanism of halogenations, combustion and pyrolysis.

Alkenes – Nomenclature, structure of double bond (ethene) geometrical isomerism, physical properties, methods of preparation; chemical reactions : addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.

Alkynes – Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions : acidic character of alkynes, addition reaction of – hydrogen, halogens, hydrogen halides and water.

Aromatic hydrocarbons – Introduction, IUPAC nomenclature; Benzne,: resonance, aromaticity; chemical properties: mechanism of electrophilic substitution – nitration sulphonation, halogenations, Friedel Craft's alkylation and acylation; directive influence of functional group in mono-substituted benzene; carcinogenicity and toxicity.

Unit – XIV : Environmental Chemistry (6 periods)

Environmental pollution – Air, water and soil pollutions, chemical reactions in atmosphere, smogs, major atmospheric pollutants; acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming – pollution due to industrial wastes; green chemistry as an alternative tool for reducing pollution, strategy for control of environmental pollution.

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CHEMISTRY

PRACTICALS

CLASS - XI

	Evaluation Scheme for Examination	Marks
A.	Volumetric Analysis	10
B.	Salt Analysis	8
C.	Content Based Experiment	6
D.	Class Record and Viva	6
	Total	**30**

A. Quantitative estimation **(Periods 18)**

- Using a chemical balance.
- Preparation of standard solution of oxalic acid.
- Determination of strenght of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.
- Preparation of standard solution of sodium carbonate.
- Determination of strength of a given solution of hydrochloric acid by titrating it against standard sodium carbonate solution.

B. Quanlitative analysis **(Periods 18)**

Determination of one anion and one cation in a given salt

Cations : Pb^{2+}, Cu^{2+}, As^{3+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Ni^{2+}, Zn^{2+}, Co^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+} Mg^{2+}, NH_4^+

Anions : CO_3^{2-}, S^{2-}, SO_3^{2-}, SO_4^{2-}, NO^-_2, NO^-_3, Cl^-, Br^-, I^-, PO_4^{3-}, $C_2O_4^{2-}$, CH_3COO^-

(Note : Insoluble salts excluded)

C. Content based experiment

(i) Basic Laboratory Techniques : **(Periods 3)**

1. Cutting glass tube and glass rod
2. Bending a glass tube
3. Drawing out a glass jet
4. Boring a cork

(ii) Characterization and Purification of Chemical Substances : (Periods 7)

1. Determination of melting point of an organic compound
2. Determination of boiling point of organic compound
3. Crystallization involving impure sample of any one of the following : Alum, Copper sulphate, Benzoic acid

(iii) Experiments related to pH change (Periods 7)

(a) Any one of the following experiments :

- Determination of pH of some solutions obtained from fruit juices, varied concentrations of acids, bases and salts using pH paper or universal indicator.
- Comparing the pH of solutions of strong and weak acids of same concentration.
- Study of the pH change in titration of a strong base using universal indicator.

(b) Study of pH change by common-ion effect in case of weak acids and weak bases.

(iv) Chemical equilibrium (Periods 5)

One of the following experiments :

(a) Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either ions.

(b) Study of the shift in equilibrium between $[Co(H_2O)_6]_{2+}$ and chloride ion by changing the concentration of either of the ions.

(v) Detection of nitrogen, sulphur, chlorine (Periods 12)

D. Class record and viva voce.

PRESCRIBED TEXTBOOKS :

1. Chemistry Part I & II (Textbook for class XI)
Published by : The Council of Higher Secondary Education, Manipur with copy right from the NCERT, New Delhi.

REFERENCE BOOK :

1. A Textbook of Chemistry Book-I
by : R.L. Madan
Published by: Macmillan Publishers India Pvt. Ltd.
2. Conceptual Chemistry for Class XI
By : S.K. Jain
Published by : S. Chand & Company Ltd., New Delhi.
3. Dinesh Companion Chemistry for Class XI
By : S.K. Malhotra
Published by : S. Dinesh & Co., Jalandhar City
4. Practical Chemistry for Class XI
By : R.P. Manchanda.
Published by : Saraswati House Pvt. Ltd., New Delhi.
5. A Textbook of Practical Chemistry for Class XI
By : Dr. N. Nila Singh and Dr. K. Nabachandra Singh
Published by : Writer's Book Store, Paona Bazar, Imphal
6. Comprehensive Practical Chemistry for Class XI
By : Dr. N.K. Varma, B.K. Vermani and Dr. Neera Verma
Published by : Laxmi Publications (P) Ltd., New Delhi.
7. Dinesh Manual Practical in Chemistry for Class XI
By : V.K. Sharma
Published by : S. Dinesh & Co., Jalandhar City
8. Pradeep's New Course Chemistry for Class XI
By : S.C. Kheterpal, S.N. Dhawan & P.N. Kapil
Published by : Pradeep Publications, Jalandhar.

DESIGN OF QUESTION PAPER

Subject : CHEMISTRY
Unit/Paper : Theory
Class : XI
Time : 3 Hours
Full Marks : 70

Essay/Long Answer (E/LA)	3	60	15	21
Short Answer Type-I (SA-I)	7	42	21	30
Short Answer Type-II (SA-II)	10	40	20	29
Very Short Answer (VSA)	10	30	10	14
MCQ	4	8	4	6
Total:	34	180	70	100

Abbreviation : K (Knowledge), U (Understanding), A (Application), E (Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ (Multiple Choice Question).

DESIGN OF QUESTION PAPER

Subject : Chemistry
Paper : Practical
Class : XI
Full Marks : 30
Time : 3 Hours

Sl. No.	Form of Exercise	Nature of Exercise	Skill to be tested						
			Manipulative Skill	Observational Skill	Drawing skill	Reporting Skill	Related Understanding	Total Marks	Estimated Time (Mins.)
1.	Category A	Quantitative Estimation	1	3	0	4	2	10	45
2.	Category B	Qualitative Analysis	1	1	0	4	2	8	90
3.	Category C	Any one of the Experiments listed in the Category C of the syllabus may be given e.g., Basic Laboratory techniques: Cutting and Rounding, Bending, Drawing out of jet of glass tubes, Boring of corks;	1	2	0	2	1	6	40
		Or, Characterization and Purification of Chemical Substances;	1	2	0	2	1		
		Or, Determination of melting point, boiling point; Crystallization etc.;	1	2	0	2	1		
		Or, Experiments related to pH determination of solutions	1	2	0	2	1		
		Or, Experiments on equilibrium ionic reactions;	1	2	0	2	1		
4.	Class record							3	5
5.	Viva Voce							3	

CHEMISTRY

THEORY

Class XII

One Paper ***Time : 3 Hours*** ***Marks : 70***

Units	Titles	Period	Marks
I.	Solid state	12	23
II.	Solutions	12	
III.	Electrochemistry	12	
IV.	Chemical Kinetics	10	
V.	Surface chemistry	6	
VI.	General Principles and Processes of Isolation of Elements	6	19
VII.	p-Block elements	16	
VIII.	d- and f-Block elements	10	
IX.	Coordination compounds	8	
X.	Haloalkanes and Haloarenes	12	18
XI.	Alcohols, Phenols and Ethers	12	
XII.	Aldehydes, Ketones and Carboxylic acids	12	
XIII.	Amines	8	
XIV.	Biomolecules	10	10
XV.	Polymers	8	
XVI.	Chemistry in everyday life	6	
	Total	**160**	**70**

Note: A minimum of 3 marks must be alloted to each unit.

Unit I: Solid State **(Periods 12)**

General characersitic of solid state, Amorphous and Crystalline solids, classification of crystalline solids, crystal lattices and unit cell, Number of Atom in a unit cell, close packed structures, Packing Efficiency, Calculation Involving unit cell Dimensions, Imperfection in solids, Electrical and Magnetic Properties.

Unit II: Solutions **(Periods 12)**

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties - relative lowering of vapour pressure, Raoult's law, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, van't Hoff factor and calculations involving it.

Unit III: Electrochemistry **(Periods 12)**

Electrochemical cells, Galvanic cells, Nernst Equation, Conductance of Electrolytic Solutions, Electrolytic Cells and Electrolysis, Batteries, Fuel cells and corosion.

Unit IV: Chemical Kinetics **(Periods 10)**

Rate of a reaction (average and instantaneous), factors affecting rates of reaction : concentration, temperature, catalyst; order and molecularity of reactions; rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions); concept of collision theory (elementary idea, no mathematical treatment), Activation energy, Arrhenious equation.

Unit V: Surface Chemistry **(Periods 6)**

Adsorption - physisorption and chemisorption; factors affecting adsorption of gases on solids; catalysis : homogeneous and heterogeneous, activity and selectivity : enzyme catalysis; colloidal state; distinction among true solutions, colloidal solutions and suspensions; lyophilic, lyophobic, multimolecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsion-elements idea of nano materials.

Unit VI: General Principles and Processes of Isolation of Elements **(Periods 6)**

Principles and method of extraction - concentration, oxidation, reduction , Thermodynamic Principles of Metallurgy, Electrochemical principles of Metallurgy and refining, uses of aluminium, copper, zinc and iron.

Unit VII: The p-Block elements **(Periods 16)**

Group 15 elements : Dinitrogen , Ammonia, Oxides of Nitrogen, Nitric Acid, phosphorus Allotropic Forms, Phosphine, Phosphorus Halides, oxo acid of phosphorus.

Group 16 elements : Dioxygen, Simple oxides ozone, sulphur Allotopic Forms, Sulphur Dioxides, Oxoacids of sulphur, Sulphuric acid.

Group 17 elements : Chlorine, Hydrogen chloride, oxoacids of halogens, Interhalogen compounds.

Group 18 elements : General introduction, electronic configuration. Occurrence, trends in physical and chemical properties, uses.

Unit VIII: The d- and f- Block Elements **(Periods 10)**

General introduction, electronic configuration, occurence and characteristics of transition metals, general trends in properties of the first row transition metals - metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation.

Lanthanoids - electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences.

Actinoids - Electronic configuration, oxidation states and comparison with lanthanoids.

Some application d- and f- Block elements.

Unit IX: Coordination Compounds **(Periods 8)**

Werner's Theory of co-ordination Compound, Difinition of some importnat terms pertaining to Co-ordincation Compounds, Nomenclature of Co-ordination compouds, isomerism in co-ordination compounds, Bonding in metal carbonyl, stability of co-ordination compounds and importance and application of co-ordination compounds.

Unit X: Haloalkanes and Haloarenes **(Periods 12)**

Haloalkanes : Classification, Nomenclature, nature of C-X bond, Method of preparation of Haloalkanes, physical and chemical properties, mechanism of substitution reactions. Stability of carbocations, R-S and D-L configurations.

Haloarenes : Nature of C-X bond, method of preparation of Haloarenes substitution reactions (directive influence of halogen for mono substituted compounds only, stability of carbocations R-S and D-L configurations) Uses and environmental effects of- dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons DDT.

Unit XI: Alcohols, Phenols and Ethers **(Periods 12)**

Classification, Nomenclature structures of functional groups, preparations, properties and reaction of alcohol and phenols. Preparation, Physical properties and chemical reactions of Ethers.

Unit XII: Aldehydes, Ketones and Carboxylic acids **(Periods 12)**

Nomenclature and structure of carboyl group, preparation of aldehydes and ketones, physical properties and chemical reactions, uses of aldehydes

and ketones. Nomenclature and structure of carboxyl groups - Methods of Preparation of Carboxyclic acids, physical properties and chemical reactions, uses of carboxylic acids.

Unit XIII: Amines: **(Periods 8)**

Structure of Amines, classification and nomenclature of amines, preparation of amines, physical properties and chemical reactions, Methods and preparation of diazonium salts , physical properties, chemical reactions and its importance in synthesis of aromatic compounds.

Unit XIV: Biomolecules **(Periods 10)**

Carbohydrates : Structure of glucose and fructose, disaccharides, polysaccharides, cellulose and importance of carbohydrates..

Protiens : Aminoacids and its classification, structure of protein and denaturation of protein.

Enzymes : Mechanism of Enzyme action.

Vitamins : Classification and Importance of Vitamins.

Nucleic acids : Chemical compostion, function of nucleic acids.

Hormones : Its functions.

Unit XV: Polymers **(Periods 8)**

Classification of polymers -- types of polymerisaton reactions, molecular mass of polymers, biodegradable polymers of commercial importance.

Unit XVI: Chemistry in Everyday life **(Periods 6)**

Drugs and their classification, Drug-target interaction, Therapeutic action of differrent classes of drugs, chemicals in food, cleansing agents.

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CHEMISTRY

PRACTICALS

CLASS - XII

	Evaluation Scheme for Exmamination	Marks
A.	Volumetric Analysis	10
B.	Salt Analysis	8
C.	Content Based Experiment	6
D.	Class record and viva	6
	Total =	**30**

Practicals Syllabus

A. Determination of concentration/molarity of $KMnO_4$ solution by titrating it against a standard solution of : **(Periods 8)**

(a) Oxalic acid,

(b) Ferrous ammonium sulphate

(Students will be required to prepare standard solutions by weighing themselves)

B. Qualitative Analysis : **(Periods 14)**

Determination of one cation and one anion in a given salt.

Cations : Pb^{2+}, Cu^{2+}, As^{3+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Ni^{2+}, Zn^{2+}, Co^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+;

Anions : CO^{2-}, S^{2-}, SO_3^{2-}, SO_4^{2-}, NO_2^-, NO_3^-, Cl^-, Br^-, I^-, PO_4^{3-}, $C_2O_2^{2-}$, CH3COO$^-$;

(Note : Insoluble salts excluded)

C. Content based experiment

(i) Surface Chemistry **(Periods 6)**

(a) Preparation of anyone lyophilic and one lyophobic sol.
Lyophillic sol - starch, egg albumin and gum.
Lyophobic sol - aluminum hydroxide, ferric hydroxide, arsenious sulphide.

(b) Study of the role of emulsifying agents in stabilizing the emulsions of different oils.

(ii) Chemical Kinetics **(Periods 4)**

(a) Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.

(b) Study of reaction rates of any one of the following :

(i) Reaction of iodide ion with hydrogen peroxide at room temperature using different concentrations of iodide ions.

(ii) Reaction between potassium iodate KIO_3 and sodium sulphite: (Na_2SO_3) using starch solution as indicator (clock reaction).

(iii) Thermo chemistry **(Periods 4)**

Any one of the following experiments :

(a) Enthalpy of dissolution of copper sulphate or potassium nitrate.

(b) Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH).

(c) Determination of enthalpy change during interaction (Hydrogen bond formation) between acetone and chloroform.

(iv) Electrochemistry **(Periods 2)**

Variation of cell potential in $Zn/Zn^{2+} || Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.

(v) Chromatography **(Periods 2)**

(i) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f values.

(ii) Separation of constituents present in an inorganic mixture containing two cations only (constituents having wide difference in R_f values to be provided).

(vi) Preparation of Inorganic Compounds **(Periods 4)**

(a) Preparation of double salt of ferrous ammonium sulphate or potash alum.

(b) Preparation of potassium ferric oxalate;

(vii) Preparation of Organic Compounds **(Periods 4)**

Preparation of any two of the following compounds

(i) Acetanilide;

(ii) Di-benzal acetone;

(iii) p-Nitro acetanilide;

(iv) Aniline yellow or 2-Naphthol aniline dye;

(v) Iodoform

(viii) Test for Functional Groups in Organic compounds (Periods 6)
Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (primary) groups.

(ix) Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given Food Stuffs. (Periods 4)

D. Class record and viva

Prescribed Textbooks :

1. Chemistry Part I & II (Textbook for class XII)
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Reference Book :

1. A Textbook of Chemistry Book-II
by : R.L. Madan
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2. Conceptual Chemistry for Class XII
By : S.K. Jain
Published by : S. Chand & Company Ltd., New Delhi.
3. Dinesh Companion Chemistry for Class XII (Vol. I & II)
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Published by : S. Dinesh & Co., Jalandhar City
4. Practical Chemistry for Class XII
By : R.P. Manchanda.
Published by : Saraswati House Pvt. Ltd., New Delhi.
5. A Textbook of Practical Chemistry for Class XII
By : Dr. N. Nila Singh and Dr. K. Nabachandra Singh
Published by : Writer's Book Store, Paona Bazar, Imphal
6. Comprehensive Practical Chemistry for Class XII
By : Dr. N.K. Varma, B.K. Vermani and Dr. Neera Verma and K.K. Rehani
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DESIGN OF QUESTION PAPER

Subject : CHEMISTRY
Unit/Paper : Theory
Class : XII
Time : 3 Hours
Full Marks : 70

I — WEIGHTAGE TO OBJECTIVES

Objectives	Marks	Percentage
Knowledge (K)	14	20
Understanding (U)	28	40
Application (A) Including Analysis, Synthesis and Evaluation	28	40
Total :	70	100

II — WEIGHTAGE TO FORM OF QUESTIONS:

Form of Questions	No. of question	Time (in minute)	Marks	Percentage
Essay/Long Answer (E/LA)	3	60	15	21
Short Answer Type-I (SA-I)	7	42	21	30
Short Answer Type-II (SA-II)	10	40	20	29
Very Short Answer (VSA)	10	30	10	14
MCQ	4	8	4	6
Total:	34	180	70	100

III — WEIGHTAGE TO CONTENT:

	UNIT/CONTENTS	Marks
I.	Solid state	23
II.	Solutions	
III.	Electrochemistry	
IV.	Chemical Kinetics	
V.	Surface chemistry	
VI.	General Principles and Processes of Isolation of Elements	
VII.	p-Block elements	
VIII.	d- and f-Block elements	
IX.	Co-ordination compounds	19
X.	Haloalkanes and Haloarenes	
XI.	Alcohols, Phenols and Ethers	
XII.	Aldehydes, Ketones and Carboxylic acids	
XIII.	Amines	18
XIV.	Biomolecules	
XV.	Polymers	
XVI.	Chemistry in everyday life	
	Total	70

Note: A minimum of 3 marks must be allotted to each unit. 10

IV — SCHEME OF SECTIONS : Nil

V — SCHEME OF OPTIONS : Internal option may be given in Essay Type Question only.

VI — DIFFICULTY LEVEL :

Difficulty	: 20%
Average	: 50%
Easy	: 30%

Abbreviation : K (Knowledge), U (Understanding), A (Application), E (Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ (Multiple Choice Question).

DESIGN OF QUESTION PAPER

Subject : CHEMISTRY
Paper : Practical
Class : XII
Full Marks : 30
Time : 3 Hours

Sl. No.	Form of Exercise	Nature of Exercise	Skill to be tested						
			Manipulative Skill	Observational Skill	Drawing skill	Reporting Skill	Related Understanding	Total Marks	Estimated Time (Mins.)
1.	Category A	Quantitative Estimation	1	3	0	4	2	10	45
2.	Category B	Qualitative Analysis	1	1	0	4	2	8	90
3.	Category C	Any one of the experiments listed in the Category C of the syllabus may be given. For the experiments given in the chapter							
		(i) Surface Chemistry	1	2	0	2	1		
		(ii) Chemical Kinetics	1	2	0	2	1		
		(iii) Thermo Chemistry	1	2	0	2	1		
		(iv) Electrochemistry	1	2	0	2	1		
		(v) Chromatography	1	2	0	2	1	6	40
		(vi) Preparation of Inorganic Compound	1	2	0	2	1		
		(vii) Preparation Organic Compounds	1	2	0	2	1		
		(viii) Tests for Functional Groups in Organic Compound	1	2	0	2	1		
		(ix) Carbohydrates, fats and proteins in Food stuffs	1	2	0	2	1		
4.	Class record							3	5
5.	Viva Voce							3	