

CHEMISTRY
THEORY
COURSE STRUCTURE
CLASS XI

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

Units	Title	Marks
I	Some basic concepts of Chemistry	3
II	Structure of atom	6
III	Classification of elements and periodicity in properties	4
IV.	Chemical bonding and molecular structure	5
V.	States of matter : Gases and Liquids	4
VI.	Thermodynamics	6
VII.	Equilibrium	6
VIII.	Redox reactions	3
IX.	Hydrogen	3
X.	s-Block elements	5
XI.	Some p-block elements :	7
XII.	Organic Chemistry : Some basic Principles and Techniques	7
XIII.	Hydrocarbons	8
XIV.	Environment chemistry	3
Total =		70

Unit I: Some Basic Concepts of Chemistry :**(Periods 14)**

General Introduction : Importance and scope of chemistry . Historical approach to particulate nature of matter , laws of chemical combination. Dalton's atomic theory : concept of elements, atoms and molecules. Atomic and molecular masses. Mole concept and molar mass : percentage composition, empirical and molecular formula; chemical reactions, stoichiometry and calculations based on stoichiometry .

Unit II: Structure of Atom (Periods 16)

Discovery of electron, proton and neutron; atomic number, isotopes and isobars. Thomson'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 uncertainty principle, concept of orbital, quantum numbers, shapes of s, p, and d orbital rules for filling electrons in orbital – Aufbau principle, Pauli exclusion principle and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbital.

Unit III: Classification of Elements and Periodicity in Properties (Periods 8)

Significance of classification, brief history of the development of Periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements – atomic radii, ionic radii. Ionization enthalpy, electron gain enthalpy, electronegativity, valence, Nomenclature of elements with atomic number greater than 100.

Unit IV: Chemical Bonding and Molecular Structure (Periods 16)

Valence electrons, ionic bond, bond parameters, covalent bond : Born Haber Cycle. Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear and heteronuclear diatomic molecules (qualitative idea only), hydrogen bond.

Unit V: States of Matter : Gases and Liquids (Periods 14)

Three states of matter. Intermolecular interactions, types of bonding, melting and boiling points. Role of gas laws in elucidating the concept of the molecule, Boyle's law, Charles' law, Gay Lussac's law, Avogadro's law. Ideal behavior, empirical derivation of gas equation, Avogadro's number. Ideal gas equation. Derivation from ideal behaviour, liquefaction of gases, critical temperature, kinetic energy and molecular speeds (elementary idea)

Liquid State– Vapour pressure, viscosity and surface tension (qualitative idea only, no mathematical derivations).

Unit VI: Chemical Thermodynamics (Periods 16)

Concepts of System, types of systems, surroundings. Work, heat, energy, extensive and intensive properties, state functions.

First law of thermodynamics – internal energy change (ΔU) and enthalpy change (ΔH), Hess's law of constant heat summation, enthalpy of : bond dissociation, combustion, formation, atomization, sublimation. Phase transformation, ionization, and solution.

Introduction of entropy as a state function, Gibbs energy change for spontaneous and nonspontaneous processes, criteria for equilibrium.

Second and third laws of thermodynamics.

Unit VII: Equilibrium (Periods 20)

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle; ionic equilibrium – ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of polybasic acids, acid strength, concept of pH Henderson Equation. Hydrolysis of salts (elementary idea). Buffer solutions, solubility product, common ion effect (with illustrative examples).

Unit VIII: Redox Reactions (Periods 6)

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions in terms of loss and gain of electrons, change in oxidation states.

Unit IX: Hydrogen (Periods 8)

Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen; hydrides – ionic, covalent and interstitial; physical and chemical properties of water, heavy water; hydrogen peroxide-preparation, properties, structure and uses; hydrogen as a fuel.

Unit X: s-Block Elements (Alkali and Alkaline earth metals) Group 1 and Group 2 elements : (Periods 12)

General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens; uses.

Preparation and properties of some important compounds :

Sodium carbonate, sodium hydroxide and sodium hydrogen carbonate, biological importance of sodium and potassium. CaO, CaCO₃ and industrial use of lime and limestone, biological importance of Mg and Ca

Unit XI: Some p-Block Elements (Periods 14)**General Introduction to p-Block Elements**

Group 13 elements : General introduction, electronic configurations, occurrence. Variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group; Boron-physical and chemical properties, some important compounds : borax, boric acid, boron hydrides. Aluminum : reactions with acids and alkalis and uses.

Group 14 elements : General Introduction, electronic configurations, occurrence variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviour of first element, Carbon - catenation, allotropic forms, physical and chemical properties; uses of some important compounds : oxides. Important compounds of silicon and a few uses : silicon tetrachloride, silicones, silicates and Zeolites, their uses and structure of silicates.

Unit XII: Organic Chemistry - Some Basic Principles and Techniques (Periods 16)

General introduction, methods of qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds.

Electronic displacements in a covalent bond : inductive effect, electromeric effect, resonance and hyper conjugation.

Homolytic and heterolytic fission of a covalent bond : free radicals, carbocations, carbanions; electrophiles and nucleophiles, types of organic reactions.

Unit XIII: Hydrocarbons (Periods 16)**Classification of hydrocarbons**

Alkanes – Nomenclature, isomerism, conformations (ethane only) Preparation, physical properties, chemical reactions including halogenation, free radical mechanism, combustion and pyrolysis.

Alkenes – Nomenclature, structure 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 hydrocarbon : Introduction, IUPAC nomenclature; Benzene : resonance aromaticity : chemical properties : mechanism of electrophilic substitution – nitration sulphonation, halogenation, Friedel Craft's alkylation and acylation : directive influence of functional group in mono-substituted benzene; carcinogenicity and toxicity.

Unit XIV: Environmental Chemistry (Periods 6)

Environmental pollution – air, water and soil pollutions, chemical reactions in atmosphere, smog, 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 strength 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. Quantitative 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-} , $\text{C}_2\text{O}_4^{2-}$,
 $\text{C}_6\text{H}_5\text{COO}^-$

(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 $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ 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 : NCERT, New Delhi.
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, Panna 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

REFERENCE BOOK :

Pradeep's New Course Chemistry for Class XI
By : S.C. Kheterpal, S.N. Dhawan & P.N. Kapil
Published by : Pradeep Publications, Jalandhar.

DESIGN
QUESTION PAPER/UNIT TEST

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

I. WEIGHTAGE TO OBJECTIVES :						
Objectives	K	U	A	S	Total	
Percentage of Marks	35	50	15	–	100	
Marks	25	35	10	–	70	
II. WEIGHTAGE TO FORM OF QUESTIONS :						
Forms of Questions	E	SA-I	SA-II	VSA	O	Total
Nb. of Questions	03	07	10	10	4	34
Marks Allotted	15	21	20	10	4	70
Estimated Time in Minutes	45	56	50	21	8	180
III. WEIGHTAGE TO CONTENT :						
Units	Titles					Marks
i.	Some basic concepts of Chemistry					3
i	Structure of Atom					6
ii	Classification of elements and periodicity in properties					4
iv.	Chemical bonding and molecular structure					5
v.	States of matter : Gases and Liquids					4
vi.	Thermodynamics					6
vii.	Equilibrium					6
viii.	Redox reactions					3
ix	Hydrogen					3
x	s-Block elements (Alkali and Alkaline Earth Metals)					5
xi	Some p-block elements :					7
xii.	Organic Chemistry : Some basic principles and Techniques					7
xiii.	Hydrocarbons					8
xiv.	Environmental Chemistry					3
Total =					70	
IV. SCHEME OF SECTIONS : Nil						
V. SCHEME OF OPTIONS: Nil						
VI. DIFFICULTY LEVEL :						
Difficult : 15% marks						
Average : 50% marks						
Easy : 35% marks						

Abbreviation : K (Knowledge), U (Understanding), A (Application), S (Skill), E (Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), O (Objective Type)

DESIGN QUESTION PAPER/UNIT TEST

Subject : Chemistry

Paper : Practical (One Paper)

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; Or, Characterization and Purification of Chemical Substances; Or, Determination of melting point, boiling point; Crystallization etc.; Or, Experiments related to pH determination of solutions Or, Experiments on equilibrium ionic reactions;	1	2	0	2	1	6	40
4.	Class record							3	5
5.	Viva Voce							3	

CHEMISTRY

THEORY

Class XII

One Paper

Time : 3 Hours

Marks : 70

Units	Titles	Marks
I	Solid state	4
II	Solutions	5
III	Electrochemistry	5
IV.	Chemical Kinetics	5
V.	Surface chemistry	4
VI.	General Principles and Processes of Isolation of Elements	3
VII.	p-Block elements	8
VIII.	d- and f-Block elements	5
IX.	Coordination compounds	3
X.	Haloalkanes and Haloarenes	4
XI.	Alcohols, Phenols and Ethers	4
XII.	Aldehydes, Ketones and Carboxylic acids	6
XIII.	Organic compounds containing nitrogen	4
XIV.	Biomolecules	4
X V.	Polymers	3
XVI.	Chemistry in everyday life	3
Total =		70

Unit I: Solid State

(Periods 12)

Classification of solids based on different binding forces : molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three dimensional lattices, packing efficiency, calculation of density of unit cell, packing in solids, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties. Band theory of metals. Conductors, semiconductors and insulators and n & p type semiconductors.

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 14)

Redox reactions, conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and emf of a cell, fuel cells; corrosion.

Unit IV: Chemical Kinetics (Periods 12)

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, Arrhenius equation.

Unit V: Surface Chemistry (Periods 8)

Absorption – 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 electrolytic method and refining; occurrence and principles of extraction of aluminium, copper, zinc and iron.

Unit VII: p-Block elements (Periods 20)

Group 15 elements : General introduction; electronic configuration, occurrence, oxidation state, trends in physical and chemical properties; nitrogen – preparation, properties and uses; compounds of nitrogen : preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorus – allotropic forms; compounds of phosphorus : preparation and properties of phosphine, halides (PCl_3 , PCl_5) and oxoacids (elementary idea only).

Group 16 elements : General introduction; electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; dioxygen : preparation, properties and uses; classification of oxides; Ozone. Sulphur – allotropic forms; compounds of sulphur : preparation, properties and uses of sulphur dioxide; sulphuric acid : industrial process of manufacture, properties and uses, other oxides and oxoacids of sulphur (structures only).

Group 17 elements : General introduction; electronic configuration, oxidation state; occurrence, trends in physical and chemical properties; compounds of halogens; preparation properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structures only)

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

Unit VIII: d and f Block Elements (Periods 12)

General introduction, electronic configuration, occurrence 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. Preparation and properties of $\text{K}_2\text{Cr}_2\text{O}_7$ and KMnO_4 .

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

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

Unit IX: Coordination Compounds (Periods 10)

Co-ordination compounds – Introduction, ligands, co-ordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear co-ordination compounds, bonding; isomerism, importance of co-ordination compounds (in qualitative analysis, extraction of metals and biological systems)

Unit X: Haloalkanes and Haloarenes (Periods 12)

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

Haloarenes : Nature of C-X bond, 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)

Alcohols : Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary and tertiary alcohols; mechanism of dehydration, uses of methanol and ethanol.

Phenols : Nomenclature, General methods of preparation, physical and chemical properties, acidic nature of phenol, electrophillic substitution reactions; uses of phenol.

Ethers : Nomenclature, methods of preparation, physical and chemical properties, uses.

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

Aldehydes and Ketones : Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes; uses.

Carboxylic Acids : Nomenclature acidic nature, methods of preparation, physical and chemical properties; uses.

Unit XIII: Organic Compounds containing Nitrogen : (Periods 10)

Nitro compounds : General methods of preparation and chemical reactions.

Amines : Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.

Cyanides and Isocyanides – will be mentioned at relevant places in context.

Diazonium salts : Preparation, chemical reactions and importance in synthetic organic chemistry.

Unit XIV: Biomolecules (Periods 12)

Carbohydrates : Classification (aldoses and ketoses), monosaccharides (glucose and fructose) D L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); importance.

Proteins : Elementary idea of α – amino acids, peptide bond, polypeptides, proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins; enzymes. Lipids and hormones, their classification and functions.

Vitamins : Classification and functions.

Nucleic acids : DNA & RNA; Chemical constitution of DNA & RNA; Biological functions of nucleic acids.

Unit XV: Polymers (Periods 8)

Classification - Natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers: natural and synthetic like polythene, nylon, polyesters, bakelite, rubber. Biodegradable and nonbiodegradable polymers.

Unit XVI: Chemistry in Everyday life (Periods 8)

Chemicals in medicine - analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines, antioxidants.

Chemicals in food - preservatives, artificial sweetening agents.

Cleansing agents - Soaps and detergents, cleansing action.

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_3^{2-} , S^{2-} , SO_3^{2-} , SO_4^{2-} , NO_2^- , NO_3^- , Cl^- , Br^- , I^- , PO_4^{3-} , $\text{C}_2\text{O}_4^{2-}$, CH_3COO^- ;

(Note : Insoluble salts excluded)

C. Content based experiment

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

- (a) Preparation of any one lyophilic and one lyophobic sol.
Lyophilic 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 :
⊕ Reaction of iodide ion with hydrogen peroxide at room temperature using different concentrations of iodide ions.
⊕ 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 $\text{Zn/Zn}^{2+} || \text{Cu}^{2+}/\text{Cu}$ with change in concentration of electrolytes (CuSO_4 or ZnSO_4) at room temperature.

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

- ⊕ 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

- ⊕ Acetanilide;
⊕ Di-benzal acetone;
⊕ p-Nitro acetanilide;
⊕ Aniline yellow or 2-Naphthol aniline dye;
⊕ 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)
Published by : NCERT, New Delhi.
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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7. Dinesh Manual Practical in Chemistry for Class XII
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Reference Book :

1. Pradeep's New Course Chemistry for Class XII
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**DESIGN
QUESTION PAPER/UNIT TEST**

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

I. WEIGHTAGE TO OBJECTIVES :						
Objectives	K	U	A	S	Total	
Percentage of Marks	35	50	15	-	100	
Marks	25	35	10	-	70	
II. WEIGHTAGE TO FORM OF QUESTIONS :						
Forms of Questions	E	SA-I	SA-II	VSA	O	Total
Nb. of Questions	03	07	10	10	4	34
Marks Allotted	15	21	20	10	4	70
Estimated Time (in Minutes)	45	56	50	21	8	180
III. WEIGHTAGE TO CONTENT :						
Units	Titles					Marks
I	Solid state					4
I	Solutions					5
III.	Electrochemistry					5
IV.	Chemical Kinetics					5
V.	Surface chemistry					4
VI.	General Principles and Processes of Isolation of Elements					3
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X.	Haloalkanes and Haloarenes					4
XI.	Alcohols, Phenols and Ethers					4
XII.	Aldehydes, Ketones and carboxylic acids					6
XIII.	Organic Compounds containing nitrogen					4
XIV.	Biomolecules					4
XV.	Polymers					3
XVI.	Chemistry in everyday life					3
					Total :	70
IV. SCHEME OF SECTIONS : Nil						
V. SCHEME OF OPTIONS: Nil						
VI. DIFFICULTY LEVEL :						
Difficult : 15% marks						
Average : 50% marks						
Easy : 35% marks						
* A weightage of 20% has been assigned to questions which test higher order thinking skills of students.						

VII.	GUIDELINES FOR UNITS 10 TO 13 OF SYLLABUS : These units include question on – <ul style="list-style-type: none"> • Nomenclature : 2 Marks • Reasoning : 5 Marks • Distinguishing between compounds : 2 Marks • Name reactions : 2 Marks • Reaction mechanism : 2 Marks • World problems (conversions) covering properties and reactions of functional groups. : 5 Marks
VIII.	NUMERICALS : Weightage of 8 to 10 marks in total has been assigned to numerical.

Abbreviation : K (Knowledge), U (Understanding), A (Application), S (Skill), E (Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), O (Objective Type)

**DESIGN
QUESTION PAPER/UNIT TEST**

Subject : CHEMISTRY

Paper : Practical (One Paper)

Class : XII

Full Marks : 30

Time : 3 Hours

Sl. No.	Form of Exercise	Nature of Exercise	Skill to be tested						Total Marks	Estimated Time (Mins.)
			Manipulative Skill	Observational Skill	Drawing skill	Reporting Skill	Related Understanding			
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		