CLASS XII (2020-21)
CHEMISTRY (THEORY)
Total Periods (Theory 160 + Practical 80)
Time: 3 Hours Max. Marks 70

Unit No.	Chapters	Title	No. of Periods	Marks
Unit- I	Chapters-1	Solid State	10	23
Unit-II	Chapters-2	Solutions	10	
Unit-III	Chapters-3	Electrochemistry	12	
Unit-IV	Chapters-4	Chemical Kinetics	10	
Unit-V	Chapters-5	Surface Chemistry	08	
Unit-VI	Chapters-6	General Principles and Processes of Isolation of Elements	08	19
Unit-VII	Chapters-7	p -Block Elements	14	
Unit-VIII	Chapters-8	d -and f -Block Elements	10	
Unit IX	Chapters-9	Coordination Compounds	10	
Unit -X	Chapters-10	Haloalkanes and Haloarenes	10	28
Unit-XI	Chapters-11	Alcohols, Phenols and Ethers	12	
Unit-XII	Chapters-12	Aldehydes, Ketones and Carboxylic Acids	14	
Unit-XIII	Chapters-13	Organic Compounds containing Nitrogen	10	
Unit-XIV	Chapters-14	Biomolecules	10	
Unit-XV	Chapters-15	Polymers	06	
Unit-XVI	Chapters-16	Chemistry in Everyday Life	06	
		Total		70
		Total (Practical)		30
		Grand Total		100

Chapter Wise Marks Distribution

CHEMISTRY

CLASS XII (2020-21)

Unit No.	Chapters	Title	Marks	Total Marks
Unit- I	Chapters-1	Solid State	04	23
Unit-II	Chapters-2	Solutions	05	
Unit-III	Chapters-3	Electrochemistry	05	
Unit-IV	Chapters-4	Chemical Kinetics	05	
Unit-V	Chapters-5	Surface Chemistry	04	
Unit-VI	Chapters-6	General Principles and Processes of Isolation of Elements	03	19
Unit-VII	Chapters-7	p -Block Elements	08	
Unit-VIII	Chapters-8	d -and f -Block Elements	05	
Unit IX	Chapters-9	Coordination Compounds	03	
Unit -X	Chapters-10	Haloalkanes and Haloarenes	04	28
Unit-XI	Chapters-11	Alcohols, Phenols and Ethers	04	
Unit-XII	Chapters-12	Aldehydes, Ketones and Carboxylic Acids	06	
Unit-XIII	Chapters-13	Organic Compounds containing Nitrogen	04	
Unit-XIV	Chapters-14	Biomolecules	04	
Unit-XV	Chapters-15	Polymers	03	
Unit-XVI	Chapters-16	Chemistry in Everyday Life	03	
		Total	70	70
		Total (Practical)	30	30
		Grand Total	100	100

CLASS XII (2020-21)
CHEMISTRY (THEORY)
Total Periods (Theory 160 + Practical 80)
Time: 3 Hours Max. Marks 70

Unit I : Solid State **10 Periods**

Classification of solods based on different binding forces : molecular, lonic, covalent and metallic solids, amorphous and crystalling solids (elementary idea). Unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency, voids, number of atoms per unit cell in a cubic cell, point defects, electrical and magnetic properties.

Band theory of metals, conductors, semiconductors and insulators and *n* and *p* type semoconductors.

Unit II: Solutions **10 Periods**

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.

Unit III: Electrochemistry **12 Periods**

Redox reactions, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law 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 **10 Periods**

Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst; order and molecularity of a reaction, 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 **08 Periods**

Adsorption- physisorption and chemisorption, factors affecting adsorption of gases on solids, catalysis, homogenous and heterogenous activity and selectivity; enzyme catalysis colloidal state distinction between true solutions, colloids and suspension; lyophilic, lyophobic multi-molecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation, emulsion - types of emulsions.

Unit VI: General Principles and Processes of Isolation of Elements **08 Periods**

Principles and methods 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 **14 Periods**

Group 15 Elements: General introduction, electronic configuration, occurrence, oxidation states, 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 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; Oxoacids of Sulphur (Structures only).

Group 17 Elements: General introduction, electronic configuration, oxidation states, 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 **12 Periods**

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 $K_2Cr_2O_7$ 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 **12 Periods**

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative inclusion, extraction of metals and biological system).

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

Haloalkanes: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions, optical rotation.

Haloarenes: Nature of C-X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only).

Uses and environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

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

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

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

Unit XII: Aldehydes, Ketones and Carboxylic Acids **14 Periods**

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 **12 Periods**

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 text.

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

Unit XIV: Biomolecules **12 Periods**

Carbohydrates - Classification (aldoses and ketoses), monosaccahrides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.

Proteins- Elementary idea of - amino acids, peptide bond, polypeptides, proteins, structure of proteins - primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Hormones -Elementary idea excluding structure.

Vitamins- Classification and functions.

Nucleic Acids: DNA and RNA.

Unit XV: Polymers **06 Periods**

Copolymerization, some important polymers: natural and synthetic like polythene, nylon polyesters, bakelite, rubber. Biodegradable and nonbiodegradable polymers.

Unit XVI: Chemistry in Everyday life **06 Periods**

Chemicals in medicines - analgesics, tranquilizers antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines. Chemicals in food - preservatives, artificial sweetening agents, elementary idea of antioxidants.Cleansing agents- soaps and detergents, cleansing action.

Course Structure : Class- XII

CHEMISTRY (Practical)

Total No. of Periods : 80

Sl No.	Evaluation Scheme for Examination	Marks
1.	Volumetric Analysis	06
2.	Salt Analysis	06
3.	Organic Analysis	04
4.	Viva	04
5.	Lab not book	05
6.	Attendance	05
Total		**30**

Micro-chemical methods are available for several of the practical experiments.

Wherever possible, such techniques should be used.

A. Surface Chemistry

(a) Preparation of one lyophilic and one lyophobic sol Lyophilic sol - starch, egg albumin and gum Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenous sulphide.

(b) Dialysis of sol-prepared in (a) above.

(c) Study of the role of emulsifying agents in stabilizing the emulsion of different oils.

B. Chemical Kinetics

(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 concentration of Iodide ions.

(ii) Reaction between Potassium Iodate, (KIO_3) and Sodium Sulphite: (Na_2SO_3) using starch solution as indicator (clock reaction).

C. Thermochemistry

Any one of the following experiments

i) Enthalpy of dissolution of Copper Sulphate or Potassium Nitrate.

ii) Enthalpy of neutralization of strong acid (HCI) and strong base (NaOH).

iii) Determination of enthaply change during interaction (Hydrogen bond formation) between Acetone and Chloroform.

D. Electrochemistry

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.

E. Chromatography

i) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of Rfvalues.

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

F. Preparation of Inorganic Compounds

i) Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum.

ii) Preparation of Potassium Ferric Oxalate.

G. Preparation of Organic Compounds

Preparation of any one of the following compounds

i) Acetanilide
ii) Di -benzal Acetone
iii) p-Nitroacetanilide
iv) Aniline yellow or 2 - Naphthol Aniline dye.

H. Tests for the functional groups present in organic compounds:

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (Primary) groups.

I. Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given food stuffs.

J. Determination of concentration/ molarity of $KMnO_4$ solution by titrating it against a standard solution of:

i) Oxalic acid,
ii) Ferrous Ammonium Sulphate
(Students will be required to prepare standard solutions by weighing themselves).

K. Qualitative analysis

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

Cation - Pb^{2+}, Cu^{2+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Zn^{2+}, Cu^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+},$[NH4]^{+}$

Anions - V $[CO3]^{2-}$, S^{2-}, $[SO3]^{2-}$, $[SO4]^{2-}$, $[NO2]^{-}$, Cl^{-},Br^{-}, I^{-}, $[PO4]^{3-}$, $[C2O4]^{2-}$, $CH3COO^{-}$

(Note : Water insoluble salts excluded)

Prescribed Books :

1. Chemistry Part-I, Class XII, Published by NCERT.
2. Chemistry Part-II, Class XII, Published by NCERT.
3. Chemistry Lab Manual, Class XII, Published by NCERT.

CLASS XII (2020-21)
CHEMISTRY (THEORY)
Total Periods (Theory 160 + Practical 80)
Time: 3 Hours Max. Marks 70

Chapters	Title	1 Marks	2 Marks	3 Marks	5 Marks	Total Marks
Chapters-1	Solid State	1(2)	2(1)	--	--	04
Chapters-2	Solutions	--	2(1)	3(1)	--	05
Chapters-3	Electrochemistry	--	--	--	5(1)	05
Chapters-4	Chemical Kinetics	1(2)	--	3(1)	--	05
Chapters-5	Surface Chemistry	1(2)	2(1)	--	--	04
Chapters-6	General Principles and Processes of Isolation of Elements	1(1)	2(1)	--	--	03
Chapters-7	p -Block Elements	1(3)	--	--	5(1)	08
Chapters-8	d -and f -Block Elements	--	2(1)	3(1)	--	05
Chapters-9	Coordination Compounds	--	--	3(1)	--	03
Chapters-10	Haloalkanes and Haloarenes	1(1)	--	3(1)	--	04
Chapters-11	Alcohols, Phenols and Ethers	1(1)	--	3(1)	--	04
Chapters-12	Aldehydes, Ketones and Carboxylic Acids	1(1)	--	--	5(1)	06
Chapters-13	Organic Compounds containing Nitrogen	1(2)	--	3(1)	--	04
Chapters-14	Biomolecules	1(1)	--	3(1)	--	04
Chapters-15	Polymers	1(1)	2(1)	--	--	03
Chapters-16	Chemistry in Everyday Life	1(3)	--	--	--	03
	Total No. of Question	1(20)	2(7)	3(7)	5(3)	70
	Total Marks					70

CHEMISTRY QUESTION PAPER DESIGN CLASS - XII (2020-21)

S. No.	Typology of Questions	Very Short Answer-Objective type (VSA) (1 Mark)	Short Answer-I (SA) (2Marks)	Long Answer-I (LA-I) (3 marks)	Long Answer- II (LA-II) (5 marks)	Total Marks	% Weigh-tage 1
1	**Remembering :** Exhibit memory of previously learned material by recalling facts, terms, basic concepts and answers.	2	1	1	–	7	10%
2	**Understanding :** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions and stating main ideas.	6	2	2	1	21	30%
3	**Applying:** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	6	2	2	1	21	30%
4	**Analysing :** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	6	1	2	–	14	20%
	Evaluating: Present and defend opinions by making judgements about information, validity of ideas or quality of work based on a set of criteria.						
	Creating: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	–	1	–	1	7	10%
	Total-	20×1=20	7×2=14	7×3=21	3×5=15	70(37)	100%

QUESTION WISE BREAK UP

Type of Question	Mark per Question	Total No. of Questions	Total Marks
VSA/ Objective	1	20	20
SA	2	7	14
LA-I	3	7	21
LA-II	5	3	15
Total	**3**	**7**	**70**

Choice(s):

There will be no overall choice in the question paper.

However, 33 % internal choices will be given in all the sections.

CLASS XII
THEORY
Half Yearly Examination: 2020-2021
Time: 3 Hours Max. Marks 70

Unit No.	Chapters	Title	Marks	Total Marks
Unit- I	Chapters-1	Solid State	06	23
Unit-II	Chapters-2	Solutions	09	
Unit-III	Chapters-3	Electrochemistry	08	
Unit-VI	Chapters-6	General Principles and Processes of Isolation of Elements	07	19
Unit-VII	Chapters-7	p -Block Elements	12	28
Unit -X	Chapters-10	Haloalkanes and Haloarenes	08	
Unit-XI	Chapters-11	Alcohols, Phenols and Ethers	09	
Unit-XII	Chapters-12	Aldehydes, Ketones and Carboxylic Acids	11	
		Total	70	70
		Total (Practical)	30	
		Grand Total	100	

CLASS XII
THEORY
(Half Yearly Examination) : 2020-2021
Time: 3 Hours Max. Marks 70

Chapters	Title	1 Marks	2 Marks	3 Marks	5 Marks	Total Marks
Chapters-1	Solid State	1(3)	--	3(1)	--	06
Chapters-2	Solutions	1(2)	2(1)	--	5(1)	09
Chapters-3	Electrochemistry	1(3)	2(1)	3(1)	--	08
Chapters-6	General Principles and Processes of Isolation of Elements	1(2)	2(1)	3(1)	--	07
Chapters-7	p -Block Elements	1(2)	2(1)	3(1)	5(1)	12
Chapters-10	Haloalkanes and Haloarenes	1(3)	2(1)	3(1)	--	08
Chapters-11	Alcohols, Phenols and Ethers	1(2)	2(1)	--	5(1)	09
Chapters-12	Aldehydes, Ketones and Carboxylic Acids	1(3)	2(1)	3(2)	--	11
	Total No. of Question	1(20)	2(7)	3(7)	5(3)	0
	Total Marks					70