Manipur Board Class 12 Chemistry Syllabus 2021-22

CHEMISTRY

THEORY

Class XII

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

Units	Titles	No. of Periods	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	12	
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**

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

General charactersitic 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, Band theory of metals, conductors, semiconductors and insulators, n- and 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 12)**

Electrochemical cells, Galvanic cells, EMF of a cell, tandard electrode potential, Nernst Equation, Relation between Gibbs energy change and EMF of a cell, Conductance of Electrolytic Solutions, Kohlrausch's law, Electrolytic Cells and Electrolysis, Batteries, Fuel cells and corrosion.

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-elementary 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 : General introduction, electronic configuration, occurance, oxidation states, trends in physical & chemical properties, Dinitrogen , Ammonia, Oxides of Nitrogen, Nitric Acid, phosphorus Allotropic Forms, Phosphine, Phosphorus Halides, oxo acid of phosphorus.

Group 16 elements : General introduction, electronic configuration, occurance, oxidation states, trends in physical & chemical propertiesDioxygen, Simple oxides ozone, sulphur Allotopic Forms, Sulphur Dioxides, Oxoacids of sulphur, Sulphuric acid.

Group 17 elements : General introduction, electronic configuration, occurance, oxidation states, trends in physical & chemical propertiesChlorine, 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 12)**

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, 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.

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 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 and stereochemical asoects of nucleophilic of substitution reactions.

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

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

Classification, Nomenclature and structures of functional groups, preparations, physical properties and reactions of alcohols and phenols, Mechanism of dehydration, some commercially important alcohols-methanol and ethanol. Preparation, Physical properties and chemical reactions of Ethers.

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

Nomenclature and structure of carbonyl group, preparation of aldehydes and ketones, physical properties and chemical reactions, mechanism of nucleophitic addition, 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 of preparation of diazonium salts , physical properties, chemical reactions and its importance in synthesis of aromatic compounds.

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

Carbohydrates : Classification, Structure of glucose and fructose, monosaccharides, disaccharides (sucrose, lactose, maltose), D,L - configuration, polysaccharides, strach, glycogen, cellulose and importance of carbohydrates..

Protiens : Aminoacids and its classification, peptide bond and peptides, classification and 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, some important polymers 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.

✦✦✦✦✦✦✦

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 $Zn/Zn^{2+} \parallel Cu^{2+}/Cu$ 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. A Textbook of Chemistry (Part - I) for Class-XII.
Published by : The Council of Higher Secondary Education, Manipur with copy right from the NCERT, New Delhi.

2. A Textbook of Chemistry (Part - II) for Class-XII.
Published by : The Council of Higher Secondary Education, Manipur with copy right from the NCERT, New Delhi.

3. 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

Reference Book :

1. Pradeep's New Course Chemistry for Class XII (Vol- I & II)
By : S.C. Kheterpal, S.N. Dhawan & P.N. Kapil
Published by : Pradeep Publications, Jalandhar.

2. Dinesh Companion Chemistry for Class XII (Vol. I & II)
By : S.K. Malhotra
Published by : S. Dinesh & Co., Jalandhar City

3. Practical Chemistry for Class XII
By : R.P. Manchanda.
Published by : Saraswati House Pvt. Ltd., New Delhi.

✦✦✦✦✦✦✦

DESIGN OF QUESTION PAPER

Subject : **CHEMISTRY**
Paper : Theory
Class : XII
Full Mark : 70
Time : 3 Hours

I — WEIGHTAGE TO OBJECTIVES :

Objectives	Marks	Percentage
Knowledge (K)	14	20
Understanding (U)	35	50
Application (A) Including Analysis, Synthesis and Evaluation	21	30
Total :	**70**	**100**

II

Form of Questions	No. of Question	Time (in minute)	Marks	Percentage
Essay/Long Answer(E/LA)	3	60	15	21
Short Answer(SA-I)	7	42	21	30
Short Answer(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:

Sl. No.	UNIT/CONTENTS:	Marks
1	I. Solid State	**23**
2	II. Solutions	
3.	III. Electrochemistry	
4	IV. Chemical Kinetics	
5	V. Surface chemistry	
6	VI. General Principles and Process of Isolation of Elements	19
7	VII. p- Block elements	
8	VIII. d- and f- Block elements	
9	IX. Co- ordination compounds	
10	X. Haloalkanes and Haloarenes	18
11	XI. Alcohols, Phenols and Ethers	
12	XII. Aldehydes, Ketones and Carboxylic acids	
13	XIII. Amines	
14	XIV. Bio molecules	10
15	XV. Polymers	
16	XVI. Chemistry in everyday life	
	Total :	**70**

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

IV SCHEME OF SECTIONS : NIL

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

VI DIFFICULTY LEVEL :

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

Abbreviation : K(Knowledge), U(Understanding), C(Comprehension), Exp.(Expression), Skill(S), E(Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)

https://byjus.com

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	