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FOR MANIPUR CLASS 12 PREPARATION

Manipur Board Class 12 Syllabus 2027 Chemistry

EXAM	YEAR	TYPE	SUBJECT
Manipur Class 12	2027	Syllabus	Chemistry

CHEMISTRY

THEORY

Class XII

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

Units	Titles	No. of Periods	Marks
I.	Solutions	18	25
II.	Electrochemistry	18	
III.	Chemical Kinetics	16	
IV.	d- and f-Block elements	18	15
V.	Coordination compounds	16	
VI.	Haloalkanes and Haloarenes	18	30
VII.	Alcohols, Phenols and Ethers	16	
VIII.	Aldehydes, Ketones and Carboxylic acids	18	
IX.	Amines	10	
X.	Biomolecules	12	
	Total =	**160**	**70**

Unit I: Solutions **(Periods 18)**

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 II: Electrochemistry **(Periods 18)**

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 III: Chemical Kinetics **(Periods 16)**

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 IV: The d- and f- Block Elements (Periods 18)

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 V: Coordination Compounds (Periods 16)

Werner's Theory of coordination Compound, Difinition of some important terms pertaining to Coordination Compounds, Nomenclature of Coordination compouds, isomerism in coordination compounds, Bonding in coordination compounds, Bonding in metal carbonyl, stability of coordination compounds and importance and application of coordination compounds.

Unit VI: Haloalkanes and Haloarenes (Periods 18)

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 VII: Alcohols, Phenols and Ethers (Periods 16)

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 VIII: Aldehydes, Ketones and Carboxylic acids (Periods 18)

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 IX: Amines: (Periods 10)

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 X: Biomolecules (Periods 12)

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.

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CHEMISTRY
PRACTICALS
CLASS- XII

Evaluation scheme for Examination		Marks
A	Volumetric Analysis	08
B	Qualitative Analysis of Salt	08
C	Content Based Experiment	05
D	Project Work	05
E	Class Record	02
F	Viva Voce	02
	Total =	30

Practical Syllabus (60 Periods)

A. Volumetric Analysis (8 Periods)

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

(a) Oxalic acid
(b) Ferrous ammonium sulphate
(Students will be required to prepare standard solutions by weighing themselves)

B. Qualitative analysis (15 Periods)

Determination of one cation and one anion in a given salt

Cations : Pb^{+2}, Cu^{+2}, As^{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 Experiments

1. Chemical Kinetics: (7 Periods)

(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).

2. Thermohemistry (7 Periods)

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,

3. Electrochemistry (3 Periods)

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.

4. Chromatography (3 Periods)

(a) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f values.
(b) Separation of constituents present in an inorganic mixture containing two cations only (constituents having wide difference in R_f values to be provided).

5. Preparation of Inorganic compounds (2 Periods)

(a) Preparation of double salt of ferrous ammonium sulphate or potash alum.
(b) Preparation of potassium ferric oxalate.

6. Preparation of Organic compounds (4 Periods)

Preparation of any two of the following compounds:

(a) Acetanilide
(b) Di-benzal acetone
(c) P-Nitro acetanilide
(d) Aniline yellow or 2-Naphthol aniline dye
(e) Iodoform

7. Test for Functional Groups in Organic compounds (6 Periods)

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

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

D. PROJECT WORK

Scientific investigations involving laboratory testing and collecting information from other sources.

A few suggested Projects.

(i) Study of the presence of oxalate ions in guava fruit at different stages of ripening.

(ii) Study of quantity of casein present in different samples of milk.

(iii) Preparation of soybean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.

(iv) Study of the effect of Potassium Bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)

(v) Study of digestion of starch by salivary amylase and effect of pH and temperature on it.

(vi) Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc.

(vii) Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).

(viii) Study of common food adulterants in fat, oil, butter, sugar, turmeric power, chilli powder and pepper.

Note: Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

E. CLASS RECORD

F. VIVA VOCE

Prescribed Textbooks :

1. Chemistry Part - I
   Textbook for Class-XII.
   Published by : NCERT, New Delhi.

2. Chemistry Part - II
   Textbook for Class-XII.
   Published by : NCERT, New Delhi.

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. Saraswati Lab Manual Chemistry for Class XII (NCF 2023 Aligned)
   By : R.P. Manchanda.
   Published by : New Saraswati House (India) Pvt. Ltd., New Delhi - 110002.

4. Comprehensive Practical Chemistry for Class XII (New Edition)
   By :Dr. N.K. Verma, Dr B.K. Vermani and Dr. Neera Verma
   Published by : Laxmi Publications (P) Ltd., New Delhi - 110 002.

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

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DESIGN OF QUESTION PAPER

Subject : **CHEMISTRY**
Paper : Theory
Class : XII
Time : 3 hours
Full Marks : 70

I	**WEIGHTAGE TO OBJECTIVES:**				
	Objectives			**Marks**	**Percentage**
	Knowledge(K)			10	15
	Understanding(U)			35	50
	Application(A) Including Analysis, Synthesis and Evaluation			21	30
	Skill(S)			4	5
	Total:			70	100
II	**WEIGHTAGE TO FORMS OF QUESTIONS:**				
	Forms of Questions	**No. of Question**	**Time (in minute)**	**Marks**	**Percentage**
	Essay/Long Answer(E/LA)	3	60	15	21
	Short Answer (SA-I)	6	36	18	26
	Short Answer (SA-II)	10	40	20	29
	Very Short Answer (VSA)	7	21	7	10
	MCQ	10	23	10	14
	Total:	36	180	70	100
III	**WEIGHTAGE TO CONTENT:**				
	Sl.No	**UNITS/CONTENTS:**			**Marks**
	1	I. Solutions			25
	2	II. Electrochemistry			
	3	III. Chemical Kinetics			
	4	IV. d- and f- Block Elements			15
	5	V. Coordination compounds			
	6	VI. Haloalkanes and Haloarenes			30
	7	VII. Alcohols, Phenols and Ethers			
	8	VIII. Aldehydes, Ketones and Carboxylic acids			
	9	IX. Amines			
	10	X. Biomolecules			
				Total:	**70**
	Note: A minimum of 4 marks must be allotted to each unit				
IV	SCHEME OF SECTIONS : Nil				
V	SCHEME OF OPTIONS : 1. Internal option will be given in Essay Type Question. 2. Internal option will be given in three questions of SA-I including one case- study based question.				
VI	DIFFICULTY LEVEL: Difficult : 35% of the total marks Average : 50% of the total marks Easy : 15% of the total marks				

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

NOTE- (i) Two questions out of 10 (ten) questions of MCQ will be assertion & reason type question.
(ii) Only one question of SA-I will be Case Study based question.

DESIGN OF QUESTION PAPER

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.)
			Manipula-tive Skill	Observat-ional Skill	Drawing Skill	Report-ing Skill	Related Under-standing		
1	Category A	Quantitative Estimation	1	3	0	2	2	8	45
2	Category B	Qualitative Analysis	1	1	0	4	2	8	90
3	Category C	Any one of the Experiments in the category C of the syllabus may be given **Eg.** **Chemical Kinetics**: Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid. **Or,** **Thermochemistry**: Enthalpy of dissolution of copper sulphate or potassium nitrate. **Or,** 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. **Or,** **Surface chemistry**: Preparation of one lyophilic or one lyophobic sol. **Or,** **Preparation of an Inorganic compound**: preparation of double salt of ferrous ammonium sulphate or potash alum or potassium ferric oxalate. **Or,** **Preparation of one Organic compound**: Acetanilideor Di-benzal acetone or P-Nitro acetanilide or Aniline yellow or 2-Naphthol aniline dye or iodoform **Or,** Test for Functional Groups in Organic compounds: **Or,** Characteristic tests for carbohydrates, fats and proteins in pure samples and their detection in given Food Stuffs.	1	1	0	2	1	5	30
4	Project Work	A report on scientific investigations involving laboratory testing and collecting information from other sources in one of the areas suggested in syllabus or any other innovative topic should be submitted.	1	1	0	2	1	5	15
5	Class record							2	
6	Viva Voce							2	
TOTAL								**30**	**180**