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FOR MANIPUR CLASS 11 PREPARATION

Manipur Board Class 11 Syllabus 2027 Chemistry

EXAM	YEAR	TYPE	SUBJECT
Manipur Class 11	2027	Syllabus	Chemistry

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	18	28
II.	Structure of atom	18	
III.	Classification of elements and periodicity in properties	12	
IV.	Chemical bonding and molecular structure	18	
V.	Thermodynamics	20	24
VI.	Equilibrium	22	
VII.	Redox reactions	12	
VIII.	Organic Chemistry : Some basic Principles and Techniques	20	18
XIII.	Hydrocarbons	20	
	Total	**160**	**70**

Note: A minimum of 4 marks must be allotted to each unit.

Unit I : Some basic Concepts of Chemistry (18 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, Empirical and Molecular formula, Stoichiometry and Stoichiometric calculations.

Unit II : Structure of Atom (18 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 principle 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. (12 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, A ionization enthalpy electron gain enthalpy, electronetivity, periodic trends in chemical properties.

Unit IV : Chemical Bonding and Molecular Structure. (18 periods)

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

Unit V : Thermodynamics (20 periods)

Thermodynamic Terms, Applications, First law of thermodynamics, Heat capacity, Relationship between C_p and $C_{v,}$ Measurement of ΔU and ΔH, Calorimetry, Enthalpy change, $\Delta_r H$ of a Reaction-Reaction Enthalpy, Enthalpies for different types of reactions, Entropy, Spontaneity, Gibbs energy change and equilibrium, Third law of thermodynamics (brief introduction).

Unit –VI : Equilibrium (22 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, Hydrolysis of salts and pH of their solutions, buffer solutioins, Handerson - Hasselbalch equation, solubility Equilibria of sparingly soluble salts common ion effect.

Unit – VII : Redox Reactions (12 periods)

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

Unit – VIII : Organic Chemistry – some basic principles and Techniques. (20 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 purification of organic compounds, Qualitative Analysis of organic compounds, Quantitative Analysis.

Unit –IX : Hydrocarbons (20 periods)

General introduction, classification of Hydrocarbons.

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.

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CHEMISTRY
PRACTICALS
CLASS- XI

Evaluation scheme for Examination		Marks
A	Volumetric Analysis	8
B	Salt Analysis	8
C	Content Based Experiment	5
D	Project Report	5
E	Class Record	2
F	Viva Voce	2
	Total =	30

A. Quantitative estimation (18 Periods)

- 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 solution of sodium carbonate.

B. Qualitative analysis (18 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 experiment

(i) Basic Laboratory Technique : (3 Periods)

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: (7 Periods)

1. Determination of melting point of an organic compound.
2. Determination of boiling point of an organic compound.

3. Crystallization of impure sample of any one of the following:
Alum, Copper sulphate, Benzoic acid

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

(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 (5 Periods)

One of the experiments:

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

(b) Study in 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 (12 Periods)

D. PROJECTS

Scientific investigations involving laboratory testing and collecting information from other sources.
A few suggested Projects

- Checking the bacterial contamination in drinking water by testing sulphide ion
- Study of the methods of purification of water
- Testing the hardness, presence of Iron, Fluoride, Chloride, etc., depending upon the regional variation in drinking water and study of causes of presence of these ions above permissible limit (if any).
- Investigation of the foaming capacity of different washing soaps and the effect of addition of Sodium carbonate on it • Study the acidity of different samples of tea leaves.
- Determination of the rate of evaporation of different liquids Study the effect of acids and bases on the tensile strength of fibers.
- Study of acidity of fruit and vegetable juices.

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-XI.
Published by : NCERT, New Delhi.

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

REFERENCE BOOK :

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

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

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

4. Comprehensive Practical Chemistry for Class XI (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 XI
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 : XI
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	37	18	26
Short Answer (SA-II)	10	40	20	29
Very Short Answer (VSA)	7	21	07	10
MCQ	10	22	10	14
Total:	**36**	**180**	**70**	**100**

WEIGHTAGE TO CONTENT:

III

	UNITS/CONTENTS:	Marks
1	Some basic concepts of chemistry	28
2	Structure of atom	
3	Classification of Elements and Periodicity in properties	
4	Chemical bonding and Molecular structure	
5	Thermodynamics	24
6	Equilibrium	
7	Redox reactions	
8	Organic Chemistry: Some basic Principles and Techniques	18
9	Hydrocarbons	
	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: XI
Time: 3 hours
Full Marks: 30

Sl. No.	Form of Exercise	Nature of Exercise	Skill to be tested						
			Manipulative Skill	Observational Skill	Drawing Skill	Reporting Skill	Related Under-standing	Total Marks	Estimated Time (Mins.)
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.** Basic Laboratory techniques: Cutting and Rounding, Bending, Drawing out of jet of glass tubes, Boring of cokes; **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 1 1 1 1	1 1 1 1 1	0 0 0 0 0	2 2 2 2 2	1 1 1 1 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**