REVISED SYLLABUS AS PER CIRCULARNO.53_Circular_2021

SUBJECT – CHEMISTRY

SUBJECT CODE 043

CLASS 11TH (2021-22)

Prescribed Books :

1. **Chemistry Part-I, Class -XI, Published by NCERT.**
2. **Chemistry Part-II, class-XI, Published by NCERT.**

SYLLABUS FOR SESSION
2021-22 CLASS XI Term-I

S	UNIT	Periods	Marks
1	Some Basic Concepts of Chemistry	10	11
2	Structure of Atom	12	
3	Classification of Elements and Periodicity in Properties	6	4
4	Chemical Bonding and Molecular Structure	14	6
5	Redox Reactions	4	
6	Hydrogen	4	5
7	Organic Chemistry: Some basic Principles and Techniques	10	9
	TOTAL	60	35

UNIT I:

Some Basic Concepts of Chemistry: General Introduction: Importance and scope of Chemistry. Atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.

Working Words

Significant figures, Gram molecular mass, Mole, Molarity, Molality, limiting reagent, Molecular formula, Empirical formula.

PRACTICAL: **Basic Laboratory Techniques**

1. Cutting glass tube and glass rod
2. Bending a glass tube
3. Drawing out a glass jet
4. Boring a cork

ACTIVITY: To draw a chart on career/fields in chemistry.

UNIT II:

Structure of Atom: 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 orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.

Working Words

Isoelectronic, Electromagnetic radiations, Spectrum, Wavelength: Frequency, Velocity, Orbital, Orbit, Electronic Configuration, Quantum number.

ACTIVITY: Crossword puzzle

Classification of Elements and Periodicity in Properties: Modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.

Working Words

s-block, p-block, d- block, f - block, Atomic radius, Amphoteric oxide, Electronegativity, Metallic Character, Screening Effect, Penetration Effect, Ionization enthalpy.

PRACTICAL: **Basic Laboratory Techniques**

1. Drawing out a glass jet
2. Boring a cork

ACTIVITY: MNEMONICS ACTIVITY

UNIT III:

Chemical Bonding and Molecular Structure:

Valence electrons, ionic bond, covalent bond, bond parameters, 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 diatomic molecules(qualitative idea only), Hydrogen bond.

Working Words

Lewis concept, Molecular orbital, Atomic orbitals, Hydrogen bonding, Bonding orbital, Anti bonding orbital, Hybridization, Sigma bond, Pie bond,

Dipole moment, Partial ionic character, VSEPR theory, Paramagnetic, Diamagnetic, Bond Order, Bond length.

PRACTICAL: Quantitative Estimation

i. Using a mechanical balance/electronic balance.
ii. Preparation of standard solution of Oxalic acid.
iii. Determination of strength of a given solution of Sodium hydroxide by titrating it against standard solution of Oxalic acid.
iv. Preparation of standard solution of Sodium carbonate.
v. Determination of strength of a given solution of hydrochloric acid by titrating it against standard Sodium Carbonate solution.

ACTIVITY: To represent structures using clay/balloons etc./Clay and stick model (VSEPR THEORY)

UNIT IV:

Redox Reactions:

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

Working Words

Oxidation, Reduction, Oxidation number, Oxidizing agent, Reducing agent, Standard Electrode Potential.

Hydrogen: Position of hydrogen in periodic table, occurrence, isotopes, hydrides-ionic covalent and interstitial; physical and chemical properties of water, heavy water, hydrogen as a fuel.

Working Words

Ionic hydride, Molecular hydride, Deficient hydride, Calgon, Hard water, Amphoteric, Oxidizing agent, Reducing agent.

PRACTICAL: **Quantitative Estimation**

- Using a mechanical balance/electronic 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 Oxalicacid.
- 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.

ACTIVITY: Multiple type questions Quiz (QUIZIZZ)

UNIT V:

Organic Chemistry: Some basic Principles and Techniques: General introduction, 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.

Working Words

Tetracovalency, Catenation, Functional groups, Homologous series, Isomerism, Heterolytic cleavage, Homolytic Cleavage,Carbocation, Carboanion, Free radical, Nucleophiles, Electrophiles, Inductive Effect, Electromeric effect, Resonance Effect, Hypercojugation, Sigma bond, Pi bond.

PRACTICAL:Characterization of Chemical Substances (2 Marks)

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

ACTIVITY: Crossword puzzle

PRACTICAL EVALUATION:

Term I: **A 15-mark Practical** would be conducted under the supervision of subject teacher. This would contribute to the overall practical marks for the subject.

OR

In case the situation of lockdown continues until Nov-Dec 2021, a *Practical Based Assessment (pen-paper) of 15 marks* would be conducted at the end of Term I.

Term-I Evaluation Scheme

S. No	Practical	Marks
1.	Volumetric Analysis	8
2.	Content Based experiment	2
3.	Class record and viva(Internal Examiner)	5
TOTAL		15

Micro-chemical methods are available for several of the practical experiments, wherever possible such techniques should be used.

B. Basic Laboratory Techniques

1. Cutting glass tube and glass rod
2. Bending a glass tube
3. Drawing out a glass jet
4. Boring a cork

C. Characterization of Chemical Substances (2 Marks)

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

D. Quantitative Estimation (8 marks)

i. Using a mechanical balance/electronic balance.
ii. Preparation of standard solution of Oxalic acid.
iii. Determination of strength of a given solution of Sodium hydroxide by titrating it against standard solution of Oxalicacid.
iv. Preparation of standard solution of Sodium carbonate.
v. Determination of strength of a given solution of hydrochloric acid by titrating it against standard Sodium

Carbonate solution.

SYLLABUS FOR SESSION
2021-22 CLASS XI Term-II

S.No	UNIT	Periods	Marks
1	States of Matter: Gases and Liquids	9	15
2	Chemical Thermodynamics	14	
3	Equilibrium	12	
4	s -Block Elements	5	11
5	Some p -Block Elements	9	
6	Hydrocarbons	10	9
	TOTAL	59	35

UNIT VI:

States of Matter: Gases and Liquids: 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 behaviour, empirical derivation of gas equation, Avogadro's number, ideal gas equation and deviation from ideal behaviour.

KEY WORDS: Working Words

Absolute zero , Van der waal's forces , Van der waal's constants, Compressibility factor,gas constant.

PRACTICAL: Crystallization of impure sample of any one of the following: Alum.

ACTIVITY:To study properties of three states of matter.

UNIT VII:

Chemical Thermodynamics: Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions.

First law of thermodynamics -internal energy and enthalpy, measurement of □U and □H, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution. Second law of Thermodynamics (brief introduction)

Introduction of entropy as a state function, Gibb's energy change for spontaneous and non- spontaneous processes.

Third law of thermodynamics (brief introduction).

Working Words

Open System, Closed System, Isolated system, State Functions, Internal Energy, Isothermal Process, Adiabatic Process, Isochoric Process, Isobaric Process, Enthalpy, Spontaneous Process, Entropy, Gibbs Free Energy.

PRACTICAL: Crystallization of impure sample of any one of the following: Copper Sulphate, Benzoic Acid.

ACTIVITY: MULTIPLE TYPE QIESTIONS QUIZ(QUIZIZZ)

UNIT VIII:

Equilibrium: 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 poly basic acids, acid strength, concept of pH, buffer solution, solubility product, common ion effect (with illustrative examples).

Working Words

Equilibrium, Physical equilibrium, Chemical equilibrium, Saturated solution, Dynamic, Dynamicity, Equilibrium constant, Dissociation, Homogeneous, Precipitation, Amphoteric substances, Conjugate acid - base pairs, Heterogeneous, Catalyst, PH, Buffer, Solubility product.

ACTIVITY: To find the pH of some daily used samples .

s -Block Elements: Group 1 and Group 2 Elements -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.

Working Words

Sparingly soluble, Thermal stability, Solvay process, Anomalous behavior, Diagonal relationship, Alkaline earth metals, Ionization enthalpy

PRACTICAL: To detect the presence of one cation and one anion in the given salt.

ACTIVITY: Crossword puzzle

UNIT IX:

Some p -Block Elements: General Introduction to p -Block Elements

Group 13 Elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group, Boron - physical and chemical properties.
Group 14 Elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviour of first elements. Carbon-catenation, allotropic forms, physical and chemical properties.

Working Words

Diborane, Ionization energy, Electropositive (or metallic) character, Anomalous properties, Electro negativity, Allotropes.

PRACTICAL: To detect the presence of one cation and one anion tn the given salt.

ACTIVITY: MNEMONICS ACTIVITY

UNIT X:

Hydrocarbons: Classification of Hydrocarbons Aliphatic Hydrocarbons:

Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions.

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, benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of functional group in monosubstituted benzene. Carcinogenicity and toxicity.

Working Words

Acyclic, Aliphatic, Alicyclic, Aromatic, Alkane, Alkene, Alkyne, Combustion, Substitution, Addition, Oxidation, Conformational isomerism, Optical Isomerism, Ozonolysis.

PRACTICAL: Detection of -Nitrogen, Sulphur, Chlorine in organic compounds.

ACTIVITY: To represent structures using clay.

PRACTICAL EVALUATION:

Term II: At the end of Term II, **a 15-mark Practical** would be conducted under the supervision of subject teacher. This would contribute to the overall practical marks for the subject.
OR

In case the situation of lockdown continues beyond December 2021, a *Practical Based Assessment (pen-paper) of 10 marks and Viva 5 marks* would be conducted at the end of Term II by the subject teacher. This would contribute to the overall practical marks for the subject.

TERM-II Evaluation Scheme

S. No	Practical	Marks
1.	Salt Analysis	8
2.	Content Based Experiment	2
3	Project Work and Viva(Internal)	5
TOTAL		15

A. **Qualitative Analysis(Marks 8)**

a. 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-} , NO_2^- , SO_3^{2-} , SO^{2-} , NO_3^-, Cl^- , Br^- , I^- , PO_4^{3-} , $C_2O_4^{2-}$,CH_3COO^- (Note:

Insoluble salts excluded)

b. Detection of -Nitrogen, Sulphur, Chlorine in organic compounds.

B. Crystallization of impure sample of any one of the following: Alum, Copper Sulphate, Benzoic Acid. **(Marks 2)**

PROJECTS scientific investigations involving laboratory testing and collecting information from other sources.