CHEMISTRY SYLLABUS
CLASS – XI (2018-19)

FIRST TERM

APRIL

- **SOME BASIC CONCEPTS OF CHEMSTRY**
  - ***Precision and Accuracy***
  - ***Dimensional Analysis***
  - ***Laws of Chemical Combination and Numerical Problems***
  - ***Mole Concept and Numerical Problems***
  - ***Empirical and Molecular Formulae***
  - ***Chemical Equivalents and Volumetric Calculations***
  - ***Chemical Reactions and Numerical Problems***

- **STRUCTURE OF ATOM**
  - ***Subatomic Particles: Their Discovery and Properties***
  - ***Rutherford's Nuclear model and its Limitations***
  - ***Electromagnetic Wave Theory and Quantum theory : Numerical Problems***
  - ***Types Of Spectra***
  - ***Bohr's Atomic Model and Related Concepts: Numerical Problems***
  - ***Quantum Mechanical Model of an Atom***
    - ✓ *de Broglie's Equation and Numerical Problems*
    - ✓ *Heisenberg's Uncertainty Principles Numerical Problems*
    - ✓ *Schrodinger's Wave Equation*
    - ✓ *Quantum numbers*
    - ✓ *Aufbau Principle and (n+l) rule*
    - ✓ *Pauli's Exclusion Principle*
    - ✓ *Hund's Rule of Maximum multiplicity*
    - ✓ *Electronic Configuration of Atoms*

- **PRACTICALS**
  - ***Detection of Anions : Dilute acid Group***
  - ***Confirmatory Tests for Dilute Acid Group Anions***

MAY

- **CLASSIFICATION OF ELEMENTS AND PERIODIC PROPERTIES**
  - ***Mendeleev's Periodic Law and its Limitations***
  - ***Modern Periodic Law***
  - ***Long form Periodic Table***
  - ***Periodic Trends in Properties of Elements***
    - ✓ *Atomic radius, Ionic radius and Covalent radius*
    - ✓ *Ionization Enthalpy*
    - ✓ *Electron Gain Enthalpy*
    - ✓ *Factors which affect these Properties*
  - ***Periodic Trends in Chemical Properties***

- **CHEMICAL BONDING AND MOLECULAR STRUCTURE**
  - ***Kossel-Lewis Approach to Chemical Bonding***
  - ***Formation and Characteristics of Electrovalent Bond***
    - ✓ *Formation of Cation and Anion*

        - ✓ *Variable Electrovalency and Reasons*
        - ✓ *Born-Haber Cycle*
        - ✓ *Lewis Structure of NaCl,Li_2O,MgO,CaO,MgF_2, Na_2S.*
    - ***Formation and Characteristics of Covalent Bond***
        - ✓ *Formation and Types of Covalent Bond*
        - ✓ *Polar and Non-polar covalent Bond*
        - ✓ *Reason for Variable Covalency*
        - ✓ *Lewis Structure of CH_4, NH_3, H_2O, CO_2, ethane, ethane, ethyne.*
        - ✓ *Comparison of Electrovalency and Covalency*
        - ✓ *Formal charge of Ions*
    - ***Deviation from Octet rule and Fajan's Rule***
    - ***VSEPR Theory and Hybridisation***
    - ***Co-ordinate Bond and Structure of Some Molecules***
    - ***Resonance in Simple Inorganic Molecules***
    - ***Hydrogen Bonding***
    - ***Molecular Orbital Theory***

- **PRACTICALS**
    - ***Detection of Anions : Concentrated Acid Group***
    - ***Confirmatory Tests for Concentrated acid group Anions***

JUNE

- **REDOX REACTIONS**
    - ***Concept of Oxidation and Reduction***
    - ***Oxidation number***
    - ***Balancing Redox Reactions in Acidic and Basic medium by Oxidation number and Ion-electron Method***

JULY

- **ORGANIC CHEMISTRY : SOME BASIC PRINCIPLES AND TECHNIQUES**
    - ***Introduction to Organic Chemistry***
    - ***Classification of Organic Compounds***
    - ***IUPAC Rules for Naming of Organic Compounds***
    - ***Structural Isomerism in Organic Compounds***
    - ***Geometrical Isomerism***
    - ***Optical Isomerism***
    - ***Qualitative Detection of Elements present in Organic Compounds***
    - ***Estimation of Carbon, Hydrogen, Nitrogen, Halogens, Sulphur and Phosphorus***
    - ***Types of Chemical Reactions and their Mechanisms***
    - ***Free Radicals and Polar Mechanisms***

- **HYDROGEN AND HYDROGEN PEROXIDE**
    - ***Hydrogen : The Element***
    - ***Hydrides***
    - ***Water : Properties, Hard and Soft water and Heavy water***
    - ***Hydrogen peroxide : Preparation and Properties***
    - ***Calculation of Strength of Hydrogen peroxide***

- **THE STATES OF MATTER : GASES AND LIQUIDS**
    - ***Intermolecular Interactions***
    - ***The Gas Laws and Numerical Problems***
    - ***Dalton's Law and Graham's law: Numerical problems***
    - ***Ideal Gas Equation and Related Calculations***

- ***Kinetic Theory of Gases***
- ***Non-ideal Behavior of Gases and Liquefaction***
- ***Liquid state***

- **PRACTICALS**
  - ***Group –I Cations***
  - ***Group-II Cations***
  - ***Group –III Cations***
  - ***Group –IV Cations***

AUGUST

- **ALIPHATIC HYDROCARBONS : ALKANES**
  - ***Occurrence and Conformation***
  - ***General Methods of Preparation***
  - ***Physical and Chemical Properties***
  - ***Uses***

- **ALIPHAITC HYDROCARBONS : ALKENES**
  - ***General Methods of Preparation***
  - ***Physical and Chemical Properties***
  - ***Markownikoff's Rule with Mechanism***
  - ***Saytzeff's Rule and its Application***
  - ***Uses***

- **GROUP- I : ALKALI METALS**
  - ***General Characteristics of Alkali metals***
  - ***Distinctive Behavior of Lithium***
  - ***Preparation, Properties and Uses of Some Important Compounds***
    - ✓ *Sodium chloride*
    - ✓ *Sodium hydroxide*
    - ✓ *Sodium carbonate and bicarbonate*
    - ✓ *Sodium thiosulphate*
  - ***Biological Importance of Sodium and Potassium***

- **PRACTICALS**
  - ***Cations of Groups – V, VI and zero***
  - ***Volumetric Analysis : Acid-Base Titration***

SEPTEMBER

- **IMPORTANT CHEMICAL REACTIONS AND CONVERSIONS**
  - ***Involving Inorganic Compounds***
  - ***Involving Organic Compounds***

- **PRACTICALS**
  - ***Systematic Salt Analysis***
  - ***Acid-Base Titration***

SECOND TERM

OCTOBER

- **GROUP-2 : ALKALINE - EARTH METALS**
  - ***General Characteristics of Group-II***
  - ***Anomalous Behavior of Beryllium***
  - ***Some Important Compounds : Preparation, Properties and Uses***
    - ✓ *Magnesium chloride hexahydrate*
    - ✓ *Calcium oxide*
    - ✓ *Calcium carbonate*
    - ✓ *Plaster of Paris*
    - ✓ *Manufacture of Cement*
  - ***Biological Importance of Magnesiun and Calcium***

- **ALIPHATIC HYDROCARBONS : ALKYNES**
  - ***General Methods of Preparation***
  - ***Physical and Chemical Properties***
  - ***Acidic Character of Alkynes***
  - ***Uses of alkynes***
  - ***Distinguishing Tests between Alkanes, Alkenes and Alkynes***

- **PRACTICALS**
  - ***Paper Chromatography : Separation of Pigments of Black-ink***
  - ***Identification of one Cation and one Anion present in the Salt***

NOVENBER

- **CHEMICAL THERMODYNAMICS**
  - ***System and Surroundings***
  - ***Properties and State of System***
  - ***Thermodynamic Process and Equilibrium***
  - ***First Law of Thermodynamics and its Significance***
  - ***Work, Heat and Internal energy***
  - ***Heat Capacity and Enthalpy change***
  - ***Second Law of Thermodynamics***
  - ***Entropy***
  - ***Free –energy Change***
  - ***Statement of Third Law***
  - ***Related Numerical Problems using Different concept***
- **GROUP – 13 ELEMENTS**
  - ***General Characteristics of Group-13 Elements***
  - ***Anomalous Behavior of Boron***
  - ***Physical and Chemical Properties of Boron***
  - ***Reactions of Aluminium***
  - ***Preparation and Properties of some Important Compounds***
    - ✓ *Borax and Borax Test*
    - ✓ *Diborane*
    - ✓ *Boric acid*

        - ✓ *Alums*
- **AROMATIC HYDROCARBONS : BENZENE**
    - ***Introduction and Nomenclature***
    - ***Aromaticity***
    - ***Structure of Benzene***
    - ***Preparation of Benzene***
    - ***Properties of Benzene***
    - ***Directive Influence of Functional groups in Monosubstituted Benzene***
    - ***Carcinogenicity and Toxicity of Benzene and Uses***
- **PRACTICALS**
    - ***Preparation of Inorganic Compounds : potash alum***
    - ***Paper chromatography***

DECEMBER

- **CHEMICAL EQUILIB RIUM**
    - ***Introduction : Reversible and Irreversible Changes***
    - ***Physical Equilibrium***
    - ***Chemical Equilibrium***
    - ***Derivation and Relationship between K_c and K_p***
    - ***Le Chatelier's Principle***
    - ***Factors Affecting Physical and Chemical Equilibrium***

- **GROUP-14 ELEMENTS**
    - ***General Characteristics***
    - ***Inert-pair Effect***
    - ***Anomalous Behavior of the First Element***
    - ***Catenation and Allotropy in Carbon : Diamond, Graphite and Fullerine***
    - ***Preparation, properties and Uses of some Important Compounds***
        - ✓ *Carbon monoxide*
        - ✓ *Carbon dioxide*
        - ✓ *Silicon dioxide*
        - ✓ *Silicon carbide*
        - ✓ *Silicon tetrachloride*
        - ✓ *Silicones*
        - ✓ *Silicates and Zeolites*
- **PRACTICALS**
    - ***Volumetric Analysis: Percentage Purity of Given Sample***

JANUARY

- **IONIC EQUILIBRIUM**
    - ***Strong and Weak electrolytes and Non-electrolytes***
    - ***Ostwald's Dilution Law and Numericals***
    - ***Arrhenius, Bronsted-Lowry and Lewis Concept of Acids and Bases***
    - ***Ionic Product of Water : pH, pOH, pK_w***
    - ***pH Indicators and their Choice in Titrimetry***
    - ***Numerical Problems***

- ***Common-ion Effect***
- ***Salt hydrolysis***
- ***Buffer Solutions***
- ***Solubility product***
- ***Numerical on pH, buffer and solubility***

- **ENVIRONMENTAL CHEMISTRY**
  - ***Types of Environmental Polltion***
  - ***Gaseous pollutants***
  - ***Particulate Pollutants***
  - ***Water Pollutants***
  - ***Soil Pollutants***

- **PRACTICALS**
  - ***Volumetric analysis : Determination of Water of Crystallisation***

FEBRUARY

- **REVISION**