CHEMISTRY

1.	Introduction to fundamental concepts of chemistry
2.	Atomic structure
3.	Gases
4.	Liquids
5.	Solids
6.	Chemical equilibrium
7.	Reaction kinetics
8.	Thermo-chemistry and energetics of chemical reactions
9.	Electrochemistry
10.	Chemical bonding
11.	S and p block elements
12.	Fundamental principles of organic chemistry
13.	Chemistry of hydrocarbons
14.	Alcohols and phenols
15.	Aldehydes and ketones
16.	Carboxylic acids

TOPICS

1. **Introduction to fundamental concepts of chemistry**
   a. Atomic mass
   b. Empirical formula
   c. Molecular formula
   d. Concept of mole
   e. Avogadro's number
   f. Stoichiometry

2. **Atomic Structure**
   a. Concept of orbitals
   b. Electronic configuration
   c. Discovery and properties of proton (positive rays)
   d. Quantum numbers
   e. Shapes of orbitals

3. **Gases**
   a. Properties of gases
   b. Gas laws
   c. Boyle's law
   d. Charles's law
   e. General gas equation
   f. Kinetic molecular theory of gases
   g. Ideal gas equation

4. **Liquids**
   a. Properties of liquids
   b. Intermolecular forces
   c. Hydrogen bonding
   d. Vapor pressure
   e. Boiling point and external pressure

5. **Solids**
   a. Types of solids
   b. Ionic solids
   c. Molecular solids

6. **Chemical Equilibrium**
   a. Reversible and irreversible reactions
   b. State of chemical equilibrium
   c. Solubility product
   d. The Le Chatelier's principle
   e. Synthesis of ammonia by Haber's Process
   f. Buffer solutions

7. **Reaction Kinetics**
    a. Rate of reaction
    b. Determination of the rate of chemical reaction
    c. Factors affecting rate of reaction
    d. Order of reaction and its determination

8. **Thermochemistry and energetic of chemical reactions**
    a. Definitions of terms used in thermodynamics
    b. Energy in chemical reactions
    c. First Law of thermodynamics
    d. Enthalpy of a reaction
    e. Hess's law of constant heat summation

9. **Electrochemistry**
    a. Oxidation number or state
    b. Explanation of electrolysis
    c. Electrode potential

10. **Chemical Bonding**
    a. Energetic of bond formation
    b. Atomic sizes
    c. Atomic radii
    d. Ionic radii
    e. Covalent radii
    f. Ionization energy
    g. Electron affinity
    h. Electro negativity
    i. Bond energy
    j. Bond length
    k. Types of bonds
    l. Electrovalent or Ionic Bond
    m. Covalent bond
    n. Sigma and Pi bond
    o. Hybridization
    p. sp^3-Hybridization
    q. sp^2-Hybridization
    r. *sp*-hybridization

11. **S and p Block Elements**
    a. Electronic configuration
    b. Chemical properties of s-block elements
    c. Group1 Elements (Alkali Metals)
    d. Atomic and Physical properties
    e. Group2 Elements (Alkaline earth metals)
    f. Physical and chemical properties

12. **Fundamental principles of organic chemistry**
    a. Classification of organic compound
    b. Isomerism

13. **Chemistry of hydrocarbons**
    a. Open chain and closed chain hydrocarbons
    b. Benzene: Properties, reactions

14. **Alcohols and phenols**
    a. Alcohols:
        1) Classification
        2) Reactivity
    b. Phenols:
        1) Physical properties
        2) Reactivity

15. **Aldehydes and ketones**
    a. Reactions

16. **Carboxylic acids**
    a. Physical properties
    b. Reactivity