

Chemistry Syllabus

1. Stoichiometry

Chemical formulas and the mole concept. Chemical reaction and equations.
Concentrations of solutions.
Calculations.

2. Atomic theory

Simple model of the atom. Electronic structure: shells.
Electronic structure: sub-shells and orbitals.

3. The Periodic Table of the elements

4. Bonding

Ionic bonding. Covalent bonding. Intermolecular forces. Metallic bonding.
Molecular orbitals and hybridization.

5. States of matter

Changes of state and kinetic theory. Gases. Gases Laws.

6. Energetics

Enthalpy change. Calculation of enthalpy change.
Hess's law. Entropy and free energy. Spontaneity of a reaction.

7. Kinetics

Rates of reactions. Factors affecting the rate of reaction.
Order of reaction and half-life.

8. Equilibrium law

The equilibrium law. Applications of the equilibrium law.

9. Acids and bases

Properties of acids and bases. Strong and weak acids and bases.
Definitions of acids and bases and salt hydrolysis.

10. Oxidation and reduction

Redox reactions. Electrolysis.

11. Organic chemistry

Functional groups and homologous series. Properties of different functional groups.
Isomerism (structural, geometric, optical).

Hydrocarbons

Alkanes (chemical properties). Alkenes (chemical properties, additions reactions, addition polymerization). Arenes (electrophilic substitution reactions).

Halogenoalkanes. Nucleophilic substitution reactions.

Alcohols and ethers.

Aldehydes (properties and reactions).

Carboxylic acids and their derivatives (properties and reactions).

The . OH group in alcohols, phenols and acids.

Esters.

Oils and fat.

Nitrogen compounds.

Amines, amides and amino acids (properties and reactions).