TOPICS IN CHEMISTRY

General and Inorganic Chemistry

o chemical and physical changes

o mixtures and pure substances; elements and compounds

o states of matter

o atom and atomic mass

o structure of atom; isotopes

o electronic shells, subshells and orbitals; electron configuration

o periodic system of elements

o atomic and ionic radii, ionisation energy, electron affinity and electronegativity

o noble gasses

o chemical bonds

o ionic and covalent compounds; double and triple covalent bond

o intermolecular forces

o molecules and molecular mass

o relative atomic and relative molecular mass; molar mass

o simple gas laws; standard molar volume of gas

o mole, Avogadro's constant

o mass percent composition of a compound

o empirical and molecular formula

o ionic and molecular crystals

o metal bond; alloys

o solutions

o solution stoichiometry: mass percent, molarity and molality

o electrolytic dissociation

o acids, bases and salts

o neutralisation and hydrolysis

o pH, pOH

o enthalpy; exothermic and endothermic processes and reactions

o rate of reaction; activation energy

o equilibrium constant; Le Chatelier's principle

o redox-reactions; oxidation and reduction; oxidation numbers

o galvanic and electrolytic cells; electromotive force

o physicochemical properties of hydrogen

o classification and properties of metals
o alkali metals and their properties
o alkaline earth metals and their properties
o technically important metals: aluminium, iron and copper
o halogen elements and their properties

Organic Chemistry

o classification of organic compounds
o hydrocarbons: classification and properties
o isomerism, stereoisomerism
o reaction of substitution and addition
o cycloalkanes: structure and properties
o aromatic compounds: structure and properties
o mono- and disubstituted benzene derivatives
o alcohols, ethers and phenols: classification, production and properties
o amines: classification and properties
o aldehydes and ketones
o properties and production of formaldehyde, acetaldehyde and acetone
o carboxylic acids: classification and properties
o hydroxy acids, amino acids
o esters, fats and oils: structure and properties; ester bond
o soaps and detergents
o carbohydrates: structure, classification and properties
o proteins: structure and classification; peptide bond
o nucleic acids: structure and classification