

TOPICS ON CHEMISTRY FOR ADMISSION TEST

GENERAL CHEMISTRY

The SI system of measurement.
Classification of matter.
Elements, symbols of the elements.
The structure of atoms.
Atomic, molecular and molar mass relationships.
Chemical equations and stoichiometry.
Electronic structure of the elements: quantum numbers, orbitals, electron configuration.
Periodic table: main groups, periodic properties.
Types of chemical bonds.
Covalent bond: Lewis structures, molecular shapes, valence bond theory.
Intermolecular forces.
The gaseous state: The gas laws. Stoichiometric relationships with gases. Kinetic - molecular theory of gases.
Liquid and solid states. Phase changes.
Solutions and their properties: Concentration of solutions. Ions in aqueous solution: electrolytes and nonelectrolytes.
Chemical equilibrium. The equilibrium constant.
Acids and bases: The pH in solutions of strong acids and strong bases. Equilibria in solutions of weak acids and weak bases.
Thermochemistry: Energy changes and energy conservation. Expansion work. Energy and enthalpy. Hess's law.
Oxidation and reduction: Oxidation state. The activity series of the elements. Balancing redox reactions.

INORGANIC CHEMISTRY

Hydrogen and oxygen. Compounds of hydrogen and oxygen.
The halogens. Compounds of the halogens.
Noble gases.
Nitrogen, phosphorous, sulfur and their compounds.
Carbon, allotropic forms of carbon, inorganic carbon compounds.
The s- and p-block metals, transition metals.

ORGANIC CHEMISTRY

Covalent bonds of carbon, multiple covalent bonds in carbon compounds.
Hydrocarbons: alkanes, cycloalkanes, alkenes and alkynes.
Aromatic and heteroaromatic compounds.
Alcohols, phenols and ethers.
Aldehydes and ketones.
Carboxylic acids and substituted carboxylic acids.
Carboxylic acid derivatives: esters, amides, anhydrides.
Nitrogen containing organic compounds.
Isomerism in organic chemistry: structural, geometrical and optical isomers.

Textbook: McMurry, J., Fay, R.C. (2012): *Chemistry, 6th Edition*. Pearson Education, Inc., Upper Saddle River, NJ 07458.