

GUGC Aptitude Test – Covered Topics

Chemistry:

Elements, mixtures

Lavoisier Law

Symbolic representation of atoms and molecules, atomic mass, unit of atomic mass, electrons and nucleons (protons and neutrons)

Oxidation number, ion and ion charge

Reactions between bases and acids

Reaction equations: ion exchange reactions, precipitation reactions, combustion reactions, synthesis reactions

pH calculations, titration and titration reactions

Bohr atom model, Bohr-Sommerfeld model, electron spin, Pauli rule

Energy levels: s, p, d, f and orbitals (basic knowledge)

Electronegativity, electron pairs

Covalent and ionic bonds, metal bonds

Lewis notation from binary compounds and polyatomic compounds

Polar and apolar compounds

Intermolecular forces

Nomenclature anorganic and organic compounds and ions (basic level)

Stoichiometry: molar mass, molar volume, Avogadro constant, ideal gas law, mass density

Concentration and concentration units, calculation of masses, volumes, concentrations, excess and limiting reagentia

Reaction rate: factors influencing reaction rate, explanation via collision theory model

Chemical equilibrium: equilibrium constant, factors influencing chemical equilibrium, calculations with equilibrium data

Redox reactions: completion of redox reactions and interpretation of oxidators and reductors

Sigma and pi bonds

Solubility of ionic compounds

Basic thermochemistry (enthalpy, entropy, free energy) for simple chemical reactions

Electrode potentials

Mathematics:

Algebra: Quadratic equation, binomial theorem, arithmetic, geometric and harmonic means and series, theory of equations, vectors, matrix algebra, complex numbers.

Trigonometry: trigonometric functions, formulae and equations, relations between sides and angles of a triangle.

Two-dimensional analytical/coordinate geometry: Cartesian coordinates, locus, equation of a straight line, equation of a circle.

Differential calculus: functions of a real variable, limits and continuity, derivatives, geometrical interpretation of the derivative, maximum and minimum values of functions.

Integral calculus: indefinite and definite integrals, integration by parts, substitution, partial fractions, areas under curves.