

TOPICS FOR HIGH SCHOOL CHEMISTRY SCHOLARSHIP EXAMINATION
Indiana Section - American Chemical Society

Laboratory (procedures, equipment, safety)

Nomenclature (IUPAC, common)

Mathematics (scientific notation, significant digits)

Descriptive chemistry

Atomic structure (quantum numbers, electron configurations, orbitals, spectra)

Periodic properties (atomic and ionic radii, electronegativity)

Mass relationships (atomic weights, molar weights, percentage composition, empirical formulas)

Stoichiometry (limiting reagents, theoretical yield, percent yield, net ionic equations)

Thermochemistry (calorimetry, heat of reaction, phase changes, bond energies)

Gas laws (Boyle, Charles, Avogadro, ideal, Dalton, kinetic theory, van der Waals)

Bonding (Lewis theory, valence bond theory, molecular orbital theory, magnetic properties)

Molecular structure (Lewis structures, valence shell electron pair repulsion model)

Solutions (concentration units, colligative properties, solution stoichiometry)

Thermodynamics (enthalpy, entropy, free energy)

Chemical equilibrium (non-ionic)

Acids, bases and ionic equilibrium (strengths, pH, pOH, K_a , K_{sp})

Oxidation-reduction reactions (oxidation numbers, equations, cell potentials, electrochemistry)

Nuclear chemistry (nuclear structure, reactions, decay processes, half-life)

Kinetics (activation energy, reaction rate, order of reaction, catalysis)

Solids and liquids (crystal structures, intermolecular forces, phase diagrams)

Organic chemistry and biochemistry (introductory ideas, simple functional groups, elementary structures of biological importance)

The above topics are meant to be a guide to the contents of the exam. Parenthetical topics are only meant to be examples. These topics are neither equally important nor equally weighted.