

Fundamentals of Chemistry Final Exam Topics

Basic Concepts: Scientific Method, Metric system (memorize prefixes), Scientific Notation, Conversion between units

Introductory Problems: Density, Heat (heat = $s m \Delta T$)

Atomic Theory: Subatomic Particles, Molecular/Formula weights, Valence shell electron configurations (ex. $4s^23d^7$), Periodic trends (size, electronegativity)

Ionic Compounds: Charges, polyatomic ions, names, formulas

Covalent Compounds: Lewis structures, geometry, partial and formal charges, resonance structures

Moles: Grams \longleftrightarrow Mole conversions, balancing equations, stoichiometry problems

Concentration: Molarity ($M = \frac{\text{moles}}{L}$), dilution, w/w, v/v

Ionic Compounds in Water: Solubility rules, predicting products of double displacement reactions

Redox Reactions: Identify oxidation and reduction half reactions

Gas Laws: Ideal gas law, Partial pressure, solubility of gas (temperature and pressure trends)

Intermolecular Forces: Types (London, dipole-dipole, H-bonding), Trends (boiling points, solubility)

States of Matter: Heat problems with change of phase, phase diagrams

Electrolytes: Strong (Ions, strong acids), Weak (weak acids), Non-electrolytes (covalent molecules), Colligative properties (freezing point depression, boiling point elevation, osmosis)

Reaction Rates: Rate Laws, Graphs

Equilibrium: Dynamic, Equilibrium expressions, Le Chatlier's principle, Predicting position for acid/base reactions

Acid and Bases: Memorize strong acids, acid strength and pK_a , Label acids and bases, conjugate pairs, products of acid/base reactions, titration problems

pH: Convert $[H_3O^+]$ \rightarrow pH, pH and acid strength

Nuclear Reactions: Balance nuclear equations, Using half-lives