

General Chemistry

Concepts students need to know for class lecture

Name ionic and simple covalent compounds
Write chemical formulas
Balance chemical equations
Identify compounds as ionic or covalent
Use factor label method
Calculate molar masses
Understand and use the mole concept
Carry out stoichiometric calculations
Acid-base theory, especially Arrhenius definition

Concepts students need to know for laboratory

Familiarity with carrying out reactions
Familiarity with quantitative techniques
Ability to measure mass, volume, and temperature

Lecture Objectives

Convert between metric and English units
Predict charges on ions
Classify chemical reactions
Classify compounds as acids or bases
Understand and discuss acid-base theories
Complete and balance chemical equations
Carry out stoichiometric calculations
Calculate theoretical and percent yields
Determine empirical formulas from data
Carry out solution calculations
Carry out calculations involving colligative properties
Calculate stoichiometric changes involving heat
Identify reactions as exothermic or endothermic
Understand the kinetic molecular theory of gases
Work gas law problems
Discuss the Bohr and Quantum atom
Write electron configurations
Relate atomic structure to properties
Understand ionic bond theory
Understand VSEPR Theory
Understand Valence Bond Theory (VBT)
Relate bonding, shapes and properties
Describe hybridization and hybrid orbitals

Describe multiple bonds in terms of VBT
Describe resonance and write resonance forms
Understand basics of Molecular Orbital Theory
Construct molecular and hybrid orbitals
Discuss states of matter and phase changes
Relate states of matter to properties
Discuss colligative properties of matter
Understand and discuss redox reactions
Understand kinetic theory of reactions
Understand principles of reaction equilibria
Carry out equilibria calculations
Understand entropy, enthalpy, and free energy
Calculate entropy, enthalpy, and free energy
Discuss electrochemical cells
Calculate cell potentials
Discuss nuclear reactions, nuclear reactors
Discuss reactions of main group elements
Discuss the production of metals from ores

Laboratory Objectives

Measure mass, volume, and temperature
Measure pH
Learn basics of chromatographic separations
Learn basics of synthetic methods
Quantitatively transfer materials
Learn basics of gravimetric analyses
Measure heat exchanges
Carry out titrations
Carry out distillations
Acquire IR spectra of liquids
Acquire uv-visible absorption spectra
Carry out qualitative analyses
Determine solution concentration from uv-visible spectra
Filter and wash compounds
Recrystallize compounds
Calculate theoretical and percent yields
Use safe laboratory techniques
Properly dispose of laboratory wastes
Learn the use of computers
Use word processing software
Use graphing software
Use spreadsheet software
Write formal laboratory reports