

# Pre-AP Chemistry Final Exam Study Guide

## Unit 1 - Atomic Structure (6)

- Protons, Neutrons, Electrons of Isotopes and Ions
- Mass Spectroscopy
- Calculating Average Atomic Mass from Isotopes and Mass Percentages
- Electron Configurations
- Photoelectron Spectroscopy (PES)

## Unit 2 - Periodicity (6)

- Horizontal Trends = Nuclear Charge
- Vertical Trends = Principal Quantum Energy Levels
- Valence Electrons
- Principal Quantum Energy Levels
- Successive Ionization Energies
- Electronegativity

## Unit 3 - Ionic Compounds (4)

- Particle Diagrams
- Properties
- Chemical Formulas

## Unit 4 - Covalent Molecules (7)

- Particle Diagrams
- Lewis Dot Structures
- VSEPR Shapes and Bond Angles

## Unit 5 - Intermolecular Forces (8)

- State of Matter Changes = Intermolecular Attractions/Physical Changes
- Covalent Network Solids
- Metallic Solids
- Hydrogen Bonding Attractions
- Dipole to Dipole Attractions
- London Dispersion Forces
- Particle Diagrams
- Properties

## Unit 6 - Chemical Reactions (7)

- Chemical Reactions = Bonds/Chemical Changes
- Precipitation Reactions
- Oxidation-Reduction Reactions
- Acid-Base Reactions
- Combination Reactions
- Decomposition Reactions
- Combustion Reactions
- Balancing Reactions
- Reactions in Context

## Unit 7 - Molar Calculations (6)

- Mass to Moles Calculation
- Moles to Mass Calculation
- Moles Proportional to Particles
- Mass Percentage
- Empirical Formula From Moles or Mass/Mass Percentage

## Unit 8 - Stoichiometry (6)

- Moles to Moles Calculation
- Mass to Mass Calculation
- Mass to Moles Calculation
- Moles to Mass Calculation
- Limiting Reactants

## Unit 9 - Gases (8)

- Boyle's Law
- Charles's Law
- Kinetic Molecular Model
- Pressure Proportional to Particles
- Ideal Gas Law
- Combined Gas Law
- Avagadro's Law
- Partial Pressure Calculation

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### Unit 10 - Aqueous Solutions (8)

- Particle Diagram of Ionic Solutions
- Molarity Calculation from moles and Liters
- Moles Calculation from Molarity and Liters
- Molarity Calculation from Mass and Liters
- Dilution Calculation
- Concentration vs. Absorbance
- Solubility of Compounds in Water
- Solubility Curve

### Unit 11 - Acids and Bases (8)

- Arrhenius Acids/Bases
- Bronsted-Lowry Acids/Bases
- Conjugate Acid/Base Pairs
- Particle Diagrams of Acids/Bases
- pH Calculation
- Titration Calculation
- Titration Curves
- Equivalence Point on a Titration Curve

### Unit 12 - Equilibrium (7)

- Definition of Chemical Equilibrium
- Particle Diagram of Equilibrium
- Equilibrium Curves
- Magnitude of Equilibrium Constant (K)
- Concentration Changes According to LeChatelier's Principle

### Unit 13 - Thermochemistry (8)

- Calorimetry
- Potential Energy Diagrams
- Enthalpies of Formation
- Bond Energies
- Hess's Law
- Entropy
- Gibbs Free Energy

### Unit 14 - Kinetics (7)

- Factors to Affect Reaction Rate
- Half-Life
- Collision Model
- Determining Order of a Reaction from Graphs of Concentration vs. Time
- Determining Order of a Reaction from Concentration vs. Initial Rate
- Reaction Mechanisms

### Unit 15 - Electrochemistry (4)

- Calculating Standard Cell Potential
- Identifying Oxidation/Reduction and Anode/Cathode and Electrons Transferred
- Overall Chemical Reaction