

2025 Chemistry Study Guide – Semester 2

Chapters 8, 10-15

Chapter 8: Reactions – Predict Products and Balance

- Combination
 - metal + nonmetal
- Decomposition
 - metal + nonmetal
 - nonmetals
- Combustion
- Single Replacement
 - metal + ionic solution
 - metal + acid
 - metal + water
- Precipitation
- Acid/Base Neutralization
- Molecular, total and net ionic equations

Chapter 12: Gases

- Pressure and pressure conversions
- Combined gas laws
- Ideal gas law
- Kinetic Molecular Theory
- Stoichiometry and gas laws
- Diffusion/effusion and Graham's Law
- Dalton's Law of Partial Pressures
- Mole fractions

Chapter 11: IMF

- Ionic compounds and lattice energy
- IMF
 - London and how it forms
 - Dipole-dipole
 - Hydrogen Bonding
 - Ion-dipole
- Properties of liquids
 - Surface tension
 - Viscosity

- Vapor pressure
- Boiling point
- Heating and cooling curves (no calculations)
- Phase Diagrams
 - Triple point
 - Supercritical fluid

Chapter 10: Thermodynamics

- Collision Theory
- Reaction Profiles
- Exothermic/endothermic
- What is enthalpy?
- Calculate enthalpy
 - Stoichiometry
 - Calorimetry
 - Hess's Law
 - Heat of Formation
- What is entropy?
- Gibbs Free Energy and spontaneity

Chapter 13:

- Solution, colloid, suspension
- Alloys
- Solubility rules
- Like dissolves like rule
- Soluble/insoluble
- Miscible/immiscible
- Unsaturated, saturated, supersaturated
- Henry's Law
- Colligative Properties
 - Freezing point depression
 - Boiling point elevation
- Emulsions, emulsifiers, surfactants
- Concentrations
 - molarity
- Solution Stoichiometry

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- Dilutions

Chapter 15: Acids and Bases

- Acid Nomenclature
- Acid/Base Neutralization reactions
- Arrhenius acids and bases
- Conjugate acids and bases
- Strong and weak acids
- Strong and weak bases
- Electrolytes
- pH scale
- Self-ionization of water equilibrium constant, k_w
- pH and pOH calculations
- Acid/base titrations