

Chemistry B Final Study Guide

Stoichiometry (Chapter 9)

- Balancing Equations
- Law of conservation of mass
- Stoichiometric calculations
 - mole-mole
 - mole-mass
 - mass-mole
 - mass-mass

Energy vs. Heat (Chapter 10)

- Measurement of heat, temperature, and energy
- Temperature conversions
- Kinetic/Potential energy
- Specific Heat Capacity calculations

Modern Atomic Theory (Chapter 11)

- Atomic emission spectra
- Wave mechanical model of the atom
- Electron configurations
- Trends on the periodic table

Chemical Bonding (Chapter 12)

- Ionic vs. Covalent bonds
- Dipole and polar covalent bonds
- Electronegativity
- Lewis dot structures
- VSEPR theory

Gases (Chapter 13)

- Pressure vs. Force
- Units of pressure and temp (STP)
- Boyle's, Charles', and Avogadro's Law equations and concepts
- Ideal Gas Law and Combined Gas Law equations and concepts
- Stoichiometric calculations

Liquids and Solids (Chapter 14)

- Intermolecular forces (dipole-dipole and London dispersion forces)
- Hydrogen bonding (specialized dipole-dipole)
- Phase change diagrams (triple point etc.)
- Ionic compounds (do not contain molecules)
- Boiling point (molar heat of vaporization)/Freezing point (molar heat of fusion)

Solutions (Chapter 15)

- Heterogeneous vs. homogeneous
- Conductivity
- Rate of dissolution
- Solubility (saturated, unsaturated, supersaturated) affected by temperature
- Molarity (moles solute per liter solution)
- Polarity

Acids and Bases (Chapter 16)

- Characteristics of acids and bases
- Arrhenius, Bronstead-Lowry, and Lewis
- Conjugate acids and bases
- Neutralization
- pH/hydrogen ion and hydroxide ion calculation

Equilibrium (Chapter 17)

- Factors that affect equilibrium
- Dynamic equilibrium
- Equilibrium constant
- Le Chatelier's principle

Organic Chemistry (Chapter 20)

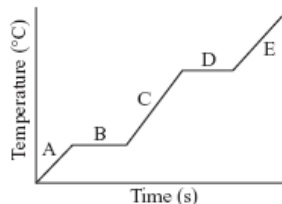
- Alkanes
- Structural Formulas
- Alkenes and Alkynes
- Alcohols
- Esters
- Nomenclature

Sample Problems

- What are the products of the reaction $\text{Na}_3\text{PO}_4 + \text{ZnSO}_4 \rightarrow$
- Aqueous solutions of copper (II) sulfate and sodium sulfide are mixed. A solid is formed.
 - Write a molecular, complete ionic and net ionic equation for the above statement
- In the reaction $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$, what is the mole ratio of nitrogen to ammonia?
- For the reaction $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{NaNO}_3 + \text{AgCl}$, how many moles of silver chloride, AgCl , are produced from 7 mol of silver nitrate AgNO_3 ?
- How many moles of oxygen are produced by decomposing 41.1 g of H_2O_2 according to the equation



- A 5.0 g sample of silver is heated from 0°C to 35°C and absorbs 42 J of energy as heat. What is the specific heat of silver?
- How many calories of heat were added to 5.0×10^2 g of water to raise its temperature from 25°C to 55°C ?
- Convert 5.42 calories to joules
- Write an expression that defines specific heat
- The pressure of a sample of gas is 500. mm Hg and the volume is 30.0 L. If the volume is changed to 50.0 L, what is the new pressure?
- A balloon has a volume of 1.20 L at 24.0°C . The balloon is heated to 48.0°C . Calculate the new volume of the balloon.
- Gaseous chlorine is held in two separate containers at identical temperature and pressure. The volume of container 1 is 1.30 L, and it contains 6.70 mol of the gas. The volume of container 2 is 2.20 L. How many moles of the gas are in container 2?
- Convert 3.6×10^2 atm to torr.
- The unusually high boiling point of H_2O is primarily due to the presence of what?
- The escape of molecules from the liquid phase into the vapor phase at the surface of a liquid is called what?
- Which region of the line contains both the solid phase and the liquid phase?
- Which region of the line contains only the vapor phase?
- What type of diagram is this called?



- If the pressure above a liquid is decreased, the boiling point of the liquid will do what?
- Which substance has the highest vapor pressure? CH_4 KCl H_2S H_2O
- A 75.80-g sample of NaCl is dissolved in 250.0 mL of solution. Calculate the molarity of this solution.
- Calculate the mass of silver nitrate (in grams) in a 145 mL solution of 4.31 M AgNO_3
- What number of moles of solute is present in 25.0 mL of 2.00 M HCl ?
- Determine the equilibrium constant (units deleted) for the system $\text{N}_2\text{O}_4(g) \rightleftharpoons 2\text{NO}_2(g)$ at 25°C .
The equilibrium concentrations are shown here:
 $[\text{N}_2\text{O}_4] = 4.27 \times 10^{-2} M$ $[\text{NO}_2] = 1.41 \times 10^{-2} M$
- Write the equilibrium expression for the reaction
 $3\text{O}_2(g) \rightleftharpoons 2\text{O}_3(g)$
- What is the equilibrium expression for the following reaction is
 $2\text{A}(s) + 3\text{B}(l) \rightleftharpoons \text{C}(aq) + 4\text{D}(aq)$
- According to the Bronsted-Lowry model, what is an acid? What is a base?
- In your text, look at Example 16.1 and 16.2. Complete the self-check
- What is an amphoteric substance? What is K_w ? What does it represent? How is it calculated? How is it used to determine the strength of an acid or base? Look at Example 16.3. Complete the self-check.
- The pH of a solution is 10. What is its OH^- concentration?
- Name the following compounds

