

Final Exam Review
Study Guide
Chemistry I
Dr. Stover

Directions: You must answer ALL of the questions from this study guide. This will be a great help to your preparation for the final exam. This must be done on a separate sheet of paper. No need to copy questions.

Chapter 7- Ionic Bonds and Ionic Compounds/ Chapter 8- The Nature of Covalent Bonding

- **Define** chemical bond.
- **Explain** why most atoms form chemical bonds.
- **Describe** ionic and covalent bonding.
- **List** the six basic steps used in writing Lewis structures.
- **Explain** how to determine Lewis structures for molecules containing single bonds, multiple bonds, or both. Give examples.
- **List and compare** the distinctive properties of ionic and molecular compounds.
- **Describe** the electron-sea model of metallic bonding, and explain why metals are good electrical conductors.
- **Explain** why metal surfaces are shiny.
- **Explain** why metals are malleable and ductile but ionic-crystalline compounds are not.

Chapter 9- Chemical Formulas and Chemical Compounds

- **Explain** the significance of a chemical formula.
- **Determine** the formula of an ionic compound formed between two given ions.
- **Name** an ionic compound given its formula.
- **Name** the ten prefixes used for binary molecular compound from its formula and write the meaning of each prefix.
- **Write** the formula of a binary molecular compound given its name. Give 3 examples.
- **Calculate** the formula mass or molar mass of any given compound.
- **Convert** between mass in grams and amount in moles of a chemical compound, using molar mass.
- **Calculate** the number of molecules, formula units, or ions in a given molar amount of a chemical compound.

Chapter 10- Chemical Quantities

- **What** are three methods for measuring the amount of something?
- **How** is Avogadro's number related to a mole of any substance?
- **How** is the atomic mass of an element related to the molar mass of an element?
- **How** is the mass of a mole of a compound related?
- **How** do you convert the mass of a substance to the number of moles of the substance?
- **What** is the volume of a gas at STP?

Chapter 11- Chemical Reactions

- **List** four observations that suggest that a chemical reaction has taken place.
- **List** three requirements for a correctly written chemical equation.
- **Write** a word equation and a formula equation for a given chemical reaction.
- **Balance** a formula equation by inspection.
- **Define and give** general equations for synthesis, decomposition, single-displacement, and double-displacement reactions.
- **Classify** a reaction as synthesis, decomposition, single-displacement, double-displacement, or combustion.
- **List** three types of synthesis reactions and six types of decomposition reactions.
- **List** four types of single-displacement reactions and three types of double-displacement reactions.
- **Predict** the products of simple reactions given the reactants.

Chapter 12- Stoichiometry

- **How** is a balanced equation like a recipe?
- **How** do chemists use balanced chemical equations?
- **In terms** of what quantities can you interpret of a balanced chemical equation?
- **What** quantities are conserved in every chemical reaction?
- **How** are mole ratios used in chemical calculations?
- **What** is the general procedure for solving a stoichiometric problem? Write the steps for converting mole-mole, mole to grams, grams to mole, mole to RP, RP to moles
- **How** is the amount of product in a reaction affected by an insufficient quantity of any of the reactants?

Chapter 14- The Behavior of Gases

- **Why** are gases easier to compress than solids or liquids are?
- **What** are the three factors that affect gas pressure?
- **How** are the pressure, volume, and temperature of a gas related?
- **When** is the combined gas law used to solve problems?
- **Write** the formula for each of the gas law: Boyle's, Charles', Gay-Lusaac's.

Chapter 16- Concentrations of Solutions

- **How** do you calculate the molarity of a solution? Write formula.
- **What** effect does dilution have on the total moles of solute in solution?
- **What** are two ways to express the percent concentration of a solution?

Chapter 19- Acids, Bases, and Salts

- What** are the properties of acids and bases?
- **How** did Arrhenius define an acid and a base?
 - **What** distinguishes an acid from a base in the Bronsted-Lowry theory?
 - **How** did Lewis define and acid and a base?
 - **How** are $[H^+]$ and $[OH^-]$ related in an aqueous solution?
 - **How** is the hydrogen-ion concentration used to classify a solution as neutral, acidic, or basic?
 - **What** is the most important characteristic of an acid-base indicator?
 - **What** are the products of the reaction of an acid with a base?