

Honors Chemistry

Semester 1 Outline 2011-2012

I. Chapter 1: Introduction

- a. Density Calculations
- b. Temperature conversions ($^{\circ}\text{C}$, $^{\circ}\text{F}$, K)
- c. Scientific Notation
 - i. Expressing a number in scientific notation.
 - ii. Addition and subtraction
 - iii. Multiplication and division
- d. Significant Figures
 - i. Determining the number of significant figures
 - ii. Addition and subtraction
 - iii. Multiplication and division
- e. The Factor-Label Method of Solving Problems
- f. Classification of matter
- g. Physical vs chemical properties

II. Chapter 2: Atoms, Molecules, and Ions

- a. Atomic number, mass number, and isotopes
- b. Empirical and Molecular formulas
- c. Formulas of ionic compounds
- d. Naming compounds (nomenclature)
 - i. Ionic compounds
 - ii. Molecular compounds
 - iii. Acids
 - iv. Bases
- e. Atomic theory
- f. Atomic structure

III. Chapter 3: Stoichiometry

- a. Calculating average atomic mass
- b. Calculations involving molar mass of an element and Avogadro's number.
 - i. Converting between moles of atoms and mass of atoms
 - ii. Calculating the mass of a single atom
 - iii. Converting mass in grams to number of atoms
- c. Calculations involving molecular mass
 - i. Calculating molecular mass
 - ii. Calculating the number of moles in a given amount of a compound
 - iii. Calculating the number of atoms in a given amount of a compound
- d. Calculations involving percent composition
 - i. Calculating percent composition of a compound
 - ii. Determining empirical formula from percent composition
 - iii. Calculating mass from percent composition
- e. Experimental determination of empirical formulas
- f. Determining the molecular formula of a compound
- g. Calculating the amounts of products and reactants
- h. Limiting reagent calculations

- i. Calculating the percent yield of a reaction.

Chapter 4: Reactions in Aqueous Solution

- a. Applying solubility rules and precipitation reactions
- b. Writing molecular, ionic, and net ionic equations
- c. Oxidation-reduction reactions
 - i. Assigning oxidation numbers
 - ii. Writing and balancing oxidation/reduction half-reactions
 - iii. Using an activity series
- d. Concentrations of solutions (molarity, etc.)
- e. Dilution of solutions
- f. Solution stoichiometry
 - i. Gravimetric analysis (Stoichiometry through precipitation reactions)
 - ii. Titrations
- g. Classification of reactions

Please remember that this outline is only a guide. It is not meant to be a substitute for a comprehensive review of the material.

Information and equations that will be included on the final.

$$^{\circ}\text{C} = 5(^{\circ}\text{F} - 32)/9 \quad \text{K} = ^{\circ}\text{C} + 273.15 \quad ^{\circ}\text{F} = 9^{\circ}\text{C}/5 + 32$$

$$\text{Avogadro's Number} = 6.022 \times 10^{23}$$

$$\text{Density}(d) = \text{mass}/\text{Volume}$$

$$\text{Molarity}(M) = \text{mol solute}/\text{L solution}$$

$$\% \text{ Yield} = (\text{actual}/\text{theoretical}) * 100$$

$$\text{Molar Mass} = \text{grams of substance} / \text{moles of substance}$$

$$M_1V_1 = M_2V_2$$

$$1\mu = 10^{-6}$$

$$1\text{n} = 10^{-9}$$