Chemistry 115 Study Guide – Exam 1

- Know how to read a measurement to the correct number of significant figures.
- Be able to characterize a substance as an element, compound, or mixture. Know the meaning of homogeneous and heterogeneous. Know what a formula means and how to interpret it.
- Be able to identify metals, non-metals, semi-metals, alkali metals, alkaline earths, transition metals, halogens, and noble gases.
- Know the difference between heat and temperature.
- Know meaning of scientific method
- Know metric units and prefixes, conversions between metric units and English units.
- Be able to identify chemical and physical properties as well as chemical and physical changes.
- Understand Dalton's atomic theory
- Know the components of an atom and some of the experiments that helped to identify these components.
- Know how to determine protons, neutrons, electrons, atomic number, and mass number for and element from the isotopic notation for the element.

Here are some problems to practice as well--

1. Perform the appropriate action on each of the following numbers or calculations
   a. Round 539.2453 to four significant figures. _____
   b. How many significant figures are in 835000? _____
   c. What is the log of 8.36×10^{-4} _____
   d. Write the number 0.0006434535425 in scientific notation with 3 significant figures.

      _____
   e. Write 6.356×10^{4} as a number _____
   f. How many significant figures are in 0.00352000 _____
   g. Perform the following calculations to the correct number of significant figures.

      $8934.5212\ cm - 729.3\ cm =$

      $35.088\ dL + 83.2\ dL =$

$$35.342\ g\ Al_2O_3 \times \frac{1\ mol\ Al_2O_3}{102.2\ g\ Al_2O_3} \times \frac{\overbrace{3\ mol\ O}^{this\ is\ exact}}{1\ mol\ Al_2O_3} \times \frac{16.0\ g\ O}{1\ mol\ O} =$$

2. Races are measured in terms of laps. If one lap is 400. ft, how far does a runner run in mm if they run 0.523 laps?

3. In Hong Kong, the unit of measure is the tael. If one tael is 37.8 g, what is the mass, in ounces, of a hamster that weighs 6.24 tael? (remember that 16 oz = 1 lb)

4. Medicines are often measured in drams. If one liquid ounce is equal to one dram, what is the volume of 3.00 drams in units of mL? (remember 8 oz = 1 cup and 4 cup = 1 qt)

5. A mixture of celery, carrots, and broccoli is prepared from 48.2 g of celery, 83.6 g of carrot, and 28.5 g of broccoli. What is the mass percent of carrot in the mixture?

6. An alloy is 17.5% magnesium. How many grams of magnesium are present in 263 lb of the alloy?

7. In a paint factory, the pink paint contains 4.36 % titanium dioxide. If 3.75 kg of titanium dioxide were used for pink paint last Thursday, how many pounds of pink paint were produced?

8. A cannonball has a mass of 3.25 kg. When the ball is placed in a graduated cylinder containing 600. mL of water, the water level rises to 745 mL. What is the density of the cannonball?

9. A chair is made of a plastic with a density of 2.94 g/mL. If the chair has a mass of 4.29 lb, what is the volume of plastic in the chair in gallons?

10. A sample of granite with a volume of 3.25 L has a density of 7.39 g/mL. What is the mass of the granite sample in ounces?

11. Orange juice sells for $9.25/gal. If orange juice has a density of 1.32 g/mL, how much would it cost to buy 2.50 tons of orange juice?

12. The melting point of wax is 174°C. Calculate the melting point of the wax in °F and in K.

13. A cake requires a temperature of 425°F to bake. What is this temperature in °C? In K?

14. A ham sandwich contains 18 g of protein, 47 g of carbohydrate, and 4.5 g of fat. Using the table on the right, determine the number of Calories in that ham sandwich. (Remember that 1 kcal = 1 Cal)

protein	4 kcal
Fat	9 kcal
carbohydrate	4 kcal

15. How many protons and neutrons are there in an atom of vanadium 53?

16. Write the correct isotopic notation for an atom that has 78 protons and 93 neutrons in its nucleus.