Chemistry 1411 Lab Name_____
Lab Practical Review

Equipment—Review equipment that we used throughout the semester (glassware, tools, etc.). You do not have to write them down here.

1. Names
2. Uses

Labs 1 & 2—Safety & Density

1. The base metric unit of
   a) Volume of a liquid is the _____ with the symbol _____.

   b) Mass is the _____ with the symbol _____.

2. What safety equipment must always be worn in the lab while anyone is still working?

3. What should be done in the case of chemical injury to the eye? Be thorough.

4. What important information can be found on the MSDS forms? List at least 3 categories.

5. Describe proper lab attire!!

6. When finished with the lab, where should the equipment be returned?

7. What is the proper technique needed to measure the volume of a liquid in a graduated cylinder? Be specific.

8. When creating a line graph for density, the _____ is on the x-axis, the _____ is on the y-axis, and the slope of the line is equal to the _____ of the measured substance.

9. Review the calculations for mean, deviation, average deviation, and relative average deviation. Now, calculate these values for the following set: 1.00, 1.09, 1.04, 0.94, 0.96, 0.99.

Lab 3—Sand & Salt

1. Describe the setup used to separate the sand and salt mixture.

2. What type of mixture was the sand and salt?

3. Calculate the % error if the stock mixture contained 20.00% salt and your group recovered 7.55%. What are some reasons why the % error would be this high?

Lab 4—Flame Tests & Line Spectra

1. Define and give the symbol for each of the following:

    a) wavelength

    b) frequency

    c) energy

2. Give the entire electromagnetic spectrum from radiowaves to gamma rays (include the colors of visible light below it). Then label each end of the spectrum for E, ν, and λ as highest or lowest.

_____ E
_____ ν
_____ λ

_____E
_____ ν
_____ λ

a) Which has a shorter wavelength, yellow or blue light?

b) Which has lower frequency, microwaves or ultraviolet light?

c) Which has higher energy, infrared or green light?

2. What is a bright line spectrum; what causes it? What instrument did you use to visualize the line spectra?

Lab 5—Activity Series (Metal Protectors Inc.)

1. Briefly describe the method used to construct the reactivity series of the metals you tested.

2. A scientist is looking to find a stable metal container to use for a reaction vessel so that the container itself doesn't become a part of the reaction and eventually break down. What metal would you recommend based on the ones you tested and why?

Lab 6—Ionic/ Covalent Nomenclature

Name the following compounds:

1. KBr
2. $BaCl_2$
3. FeI_3
4. CuS
5. $AgNO_3$
6. $NH_4C_2H_3O_2$
7. P_4O_{10}
8. BF_3

Give the chemical formula for the following compounds:

9. Lithium Iodide
10. Sodium Oxide
11. Chromium (III) Chloride
12. Tin (IV) Fluoride
13. Beryllium Oxalate
14. Potassium Chlorate
15. Carbon Monoxide
16. Xenon Hexafluoride

Lab 7—VSEPR

1. VSEPR—what do the letters represent and describe how this theory applies to molecular modeling.

2. What is the octet rule?

3. Name two elements that do not follow the octet rule. Explain why.

4. Draw *Lewis structures* and determine the *molecular geometry* for each of the following molecules:

a) HCl

b) H_2O

c) NH_3

d) CCl_4

Lab 8—Balancing Chemical Equations

Balance the following equations.

1. $NaClO_3 \rightarrow NaCl + O_2$

2. $Na_2CrO_4 + Pb(C_2H_3O_2)_2 \rightarrow NaC_2H_3O_2 + PbCrO_4$

3. $Zn + HCl \rightarrow ZnCl_2 + H_2$

4. $Mg + O_2 \rightarrow MgO$

Lab 9—Recycling Aluminum

1. Describe the setup and techniques used in recycling aluminum.

2. What is the formula for calculating % yield?

Lab 10—Beer's Law

1. What graph was used to determine λ_{max}?

2. What instrument was used throughout the experiment, and what property of the solution used was being analyzed?

3. What two methods were used in this experiment to determine the concentration of the unknown?

Lab 11—Enthalpies of Neutralization

1. Define Specific Heat Capacity.

2. Why was it necessary to determine the calorimeter constant?

3. Write the formula to calculate ΔH.

4. A metal sample weighing 37.9g was heated to 99.0^{o}C, then quickly transferred into a Styrofoam calorimeter containing 100mL of deionized water at a temperature of 20.0^{o}C. The temperature of the water in the Styrofoam cup increased and stabilized at 23.1^{o}C. Assuming that the calorimeter itself didn't absorb any heat, calculate the specific heat of the metal.

5. A student combined 75.0mL of 2.00M HCl and 75.0mL of 2.00M NaOH in a calorimeter. The initial temperature of the acid and base is 23.0^{o}C and increases to a maximum temperature of 28.0^{o}C. Assume the density of the solutions is 1.00g/mL and that the calorimeter itself didn't absorb any heat.

   a) Calculate the heat of reaction in J/mol of water produced.

   b) Is ΔH + or -? Is the reaction endothermic or exothermic?