Midterm Review Chem 002 – WS11

1. MSDS and Safety

a. Read over Safety Practices in the Chemistry Laboratory pp. 1-14.

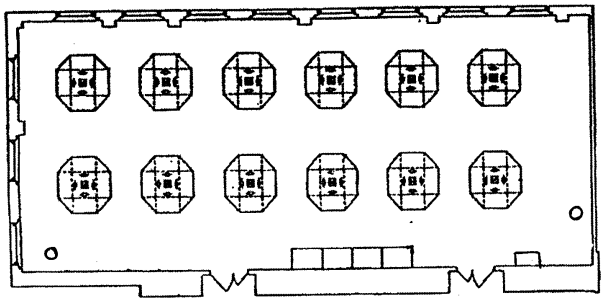
a. Know the MSDS information for the first five experiments.

Zinc: HCl, Zinc& (implications of Bunsen burners)

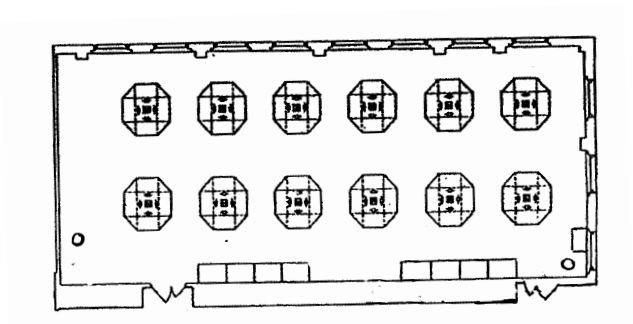
EF: Aluminum, Copper, Copper Chloride, HCl& (implications of Bunsen burners)

13 TT: NH_3, $Ba(NO_3)_2$, $Cu(NO_3)_2$, $Fe(NO_3)_3$, $NiSO_4$, K_2CrO_4, KNO_3, $K_2C_2O_4$, KSCN, NaCl, Na_2S, H_2SO4, $SnCl_2$

b. **Room Diagram** – Be able to label equipment in <u>your</u> room.
Balances, Distilled Water, Exits, Fire Extinguishers, Hoods, Safety Blankets, Safety Showers, Waste Containers



Room 201



Room 212

2. Determining the Thickness of a Coating

a. Read over *Statistical Analysis of Zinc Coated Washers* – pp. 53-72.

b. Know how to determine the volume of a coating based on the mass and density of the coating.
V = m / d

c. Know how to determine the surface area of the item, if given the SA equation for that shape.

d. Know how to determine the thickness of the coating from the volume and the surface area.
thickness = volume / surface area

e. Be able to determine the percent error, if given the expected thickness of the coating.

3. Statistical Analysis

a. Read over *Statistical Analysis of Zinc Coated Washers* – pp. 53-72.

b. Know Equations 1-5 and know the names of each equation.

1. Average or mean: $\mathbf{x_{bar} = \Sigma x_i / n}$ where <u>n</u> is the number of entries
2. Standard Deviation: $\mathbf{\sigma = [\Sigma (x_i - x_{bar})^2 / n]^{1/2}}$ Recall: squareroot $x = x^{1/2}$
3. Estimate of the Standard Deviation: $\mathbf{s = [\Sigma (x_i - x_{bar})^2 / (n-1)]^{1/2}}$
4. Confidence Interval (CI) for a single value: $\mathbf{CI_{single} = \pm ts}$
5. Confidence Interval (CI) for the mean: $\mathbf{CI_{mean} = \pm ts / (n^{1/2})}$

c. Know the differences between equations 2-3 and 4-5 and when each of these equations is applicable.

4. The Empirical Formula of a Compound

a. Read over *Determining the Empirical Formula of Copper Chloride* – pp. 73-86.
b. Know how to determine the percent composition of a compound, if given initial and final masses.
c. Be able to determine the empirical formula of the compound by determining the formula weights and mass percents of compounds.

5. Mystery of the Thirteen Test Tubes

a. Read over *Mystery of the Thirteen Test Tubes* – pp 109-122.
b. Be able to complete overall reactions and net ionic reactions.
c. Know the basic solubility rules that apply to the ions in the experiment.
    1. <u>All nitrates of all metals are soluble</u>.
    2. <u>All sodium, potassium, and ammonium salts are soluble</u>.
    3. <u>All chlorides are soluble</u> except silver, lead (II), and mercury (I).
    4. <u>All sulfates are soluble except barium</u>, calcium, strontium, lead (II), and mercury (I).
    5. <u>Carbonates and chromates of sodium, potassium, and ammonium are soluble</u>; all others are insoluble.
    6. <u>Sulfides of barium</u>, calcium, magnesium, <u>sodium, potassium, and ammonium are soluble</u>; all others are insoluble.
    7. Hydroxides of sodium, potassium, and ammonium are soluble. Hydroxides of barium and calcium are moderately soluble.
    8. Everything else will be considered insoluble!
d. Given a precipitation chart be able to determine what compounds were in a set of unknowns.
e. Be able to give the **flame color** for sodium, potassium, iron, barium, and copper.

6. Dimensional Analysis & Using Exponential Notation and Significant Figures

a. Read over Dimensional Analysis #1-3 – pp 15-28 and Sig Figs pp. 35-52.
b. Be able to do *Dimensional Analysis* problems like those in sets #1-3 and *Using Exponential Notation and Significant Figures* problem sets 1 and 2.
c. Know the **<u>Rules for Significant Figures</u>**.
    1. All non-zero digits are significant, for example, 123 has three significant figures.
    2. Zeros between non-zero digits are significant, for example, 12.507 has five significant figures.
    3. Zeros to the left of the first non-zero digit are not significant, for example, 1.02 has three significant figures, 0.12 has two significant figures, and 0.012 also has two significant figures.
    4. If a number ends in zeros to the right of the decimal point, those zeros are significant, for example, 2.0 has two significant figures and 2.00 has three significant figures.

7. Handouts – Graphing, Nomenclature and Redox

a. Read over handouts.
b. Be able to do problems similar to those in the handout.