Midterm Review Chem 1319 – WS16

1. MSDS and Safety

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

a. Know the MSDS information for the first three in class experiments.

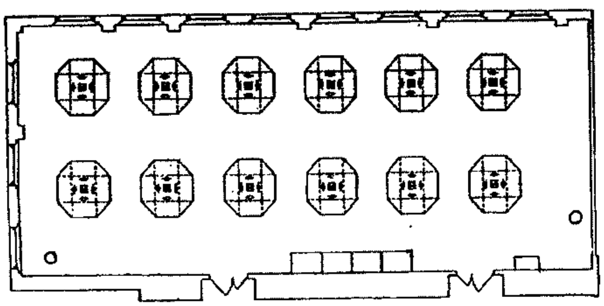
Zinc: HCl, Zinc & (implications of Bunsen burners)

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

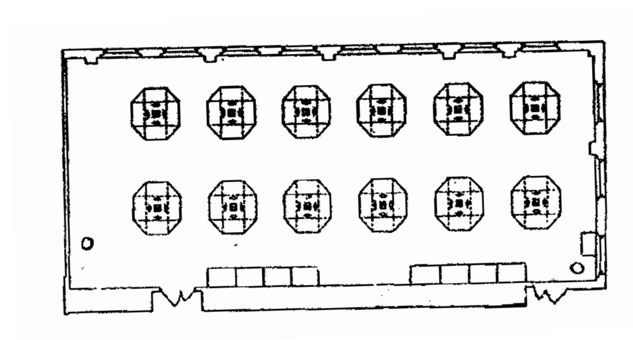
13 TT: NH_3, $Ba(NO_3)_2$, $Cu(NO_3)_2$, $Fe(NO_3)_3$, $NiSO_4$, K_2CrO_4, KNO_3, $K_2C_2O_4$, KSCN, NaCl, Na_2S, H_2SO4, $SnCl_2$, $Pb(CH_3CO_2)_2$, Li_2CO_3

b. **Room Diagram** – Be able to label equipment in your 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. 53-61**.

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. 53-61.**

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

1. Average or mean: $\mathbf{x_{bar} = \Sigma x_i / n}$ where n is the number of entries
2. Standard Deviation: $\boldsymbol{\sigma} = [\Sigma (x_i - x_{bar})^2 / n]^{1/2}$ 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. 77-85**.
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/Fifteen Test Tubes

a. Read over *Mystery of the Thirteen Test Tubes* – **pp. 117-121 and page 213 in the packet**.
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, lithium, lead, 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.
   5. For **<u>addition & subtraction</u>**, decimal places are overwriting the significant figure rule. The answer should have the same number of decimal places as the quantity with the least decimal places. For example, 3.7 m + 9.40 m = 13.1 m.
   6. For **<u>multiplication & division</u>**, the product or quotient should have the same number of significant digits as the quantity with least significant figures. For example, 56.90125 s / 2.45 s = 23.2.

d. Know the **<u>Rules for Proper Exponential Notation</u>**.
   1. There should be only one digit to the left of the decimal point.
   2. Numbers greater than one have positive exponents; those less than one have negative.

7. Packet – Graphing & Nomenclature & Redox

a. Read over information in packet: **pp. 17-24** (*graphing*); **41-52** (*nomenclature*); **69-74** (*redox*).
b. Be able to do problems similar to those in these sections.

8. Out of Lab Activities – Molecular Modeling & Lewis Dot & Solubility

a. Read over handout pp 1-6 (Molecular Modeling & Lewis Dot).
b. Be able to determine the electron configuration & lewis dot structure of atoms and ions.
c. Be able to determine the hybridization, electron & molecular geometries for compounds.
d. For solubility, see above Mystery of the 15 Test Tubes.