

## Midterm Review Chem 002 – FS11

### 1. MSDS and Safety

- Read over Safety Practices in the Chemistry Laboratory pp. 1-14.
- Know the MSDS information for the first five experiments.

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

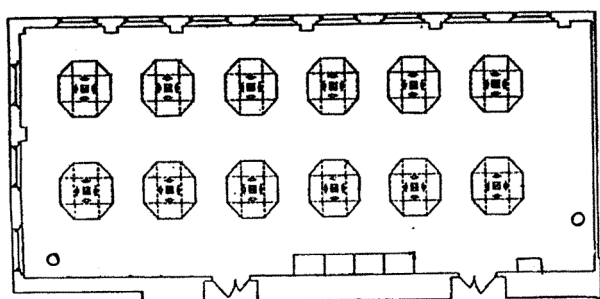
**EF:** Aluminum, Copper, Copper Chloride, HCl& (implications of Bunsen burners)

**TM:** NaCl, SiO<sub>2</sub>, CaCO<sub>3</sub>, HCl, K<sub>2</sub>CO<sub>3</sub>

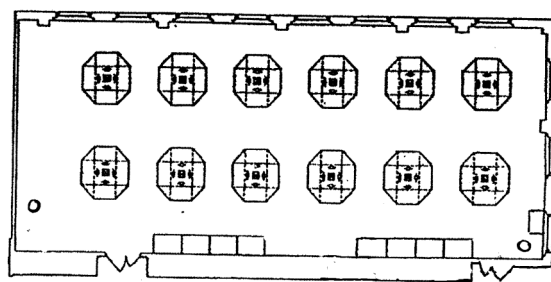
**13 TT:** NH<sub>3</sub>, Ba(NO<sub>3</sub>)<sub>2</sub>, Cu(NO<sub>3</sub>)<sub>2</sub>, Fe(NO<sub>3</sub>)<sub>3</sub>, NiSO<sub>4</sub>, K<sub>2</sub>CrO<sub>4</sub>, KNO<sub>3</sub>, K<sub>2</sub>C<sub>2</sub>O<sub>4</sub>, KSCN, NaCl, Na<sub>2</sub>S, H<sub>2</sub>SO<sub>4</sub>, SnCl<sub>2</sub>

- 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

- Read over *Statistical Analysis of Zinc Coated Washers* – pp. 53-61.
- Know how to determine the volume of a coating based on the mass and density of the coating.

$$V = m / d$$

- Know how to determine the surface area of the item, if given the SA equation for that shape.
- Know how to determine the thickness of the coating from the volume and the surface area.

$$\text{thickness} = \text{volume} / \text{surface area}$$

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

### 3. Statistical Analysis

- Read over *Statistical Analysis of Zinc Coated Washers* – pp. 53-61.
- Know Equations 1-5 and know the names of each equation.

1. Average or mean:  $\bar{x} = \sum x_i / n$  where  $n$  is the number of entries

2. Standard Deviation:  $\sigma = [\sum (x_i - \bar{x})^2 / n]^{1/2}$  Recall: squareroot  $x = x^{1/2}$

3. Estimate of the Standard Deviation:  $s = [\sum (x_i - \bar{x})^2 / (n-1)]^{1/2}$

4. Confidence Interval (CI) for a single value:  $CI_{\text{single}} = \pm ts$

5. Confidence Interval (CI) for the mean:  $CI_{\text{mean}} = \pm ts / (n^{1/2})$

- 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

- Read over *Determining the Empirical Formula of Copper Chloride* – pp. 77-85.
- Know how to determine the percent composition of a compound, if given initial and final masses.
- Be able to determine the empirical formula of the compound by determining the formula weights and mass percents of compounds.

#### 5. Separating Components of a Mixture

- Read over *Separating the Components of a Ternary Mixture* – pp. 95-111.
- Be able to make a flowchart if given a table of components in a mixture.
- Know how to determine the percent of each of the components in the mixture.
- Know how to determine the percent recovery and the percent error of the overall composition.

#### 6. Mystery of the Thirteen Test Tubes

- Read over *Mystery of the Thirteen Test Tubes* – pp. 117-121.
- Be able to complete overall reactions and net ionic reactions.
- Know the basic solubility rules that apply to the ions in the experiment.
  - All nitrates of all metals are soluble.
  - All sodium, potassium, and ammonium salts are soluble.
  - All chlorides are soluble except silver, lead (II), and mercury (I).
  - All sulfates are soluble except barium, calcium, strontium, lead (II), and mercury (I).
  - Carbonates and chromates of sodium, potassium, and ammonium are soluble; all others are insoluble.
  - Sulfides of barium, calcium, magnesium, sodium, potassium, and ammonium are soluble; all others are insoluble.
  - Hydroxides of sodium, potassium, and ammonium are soluble.  
Hydroxides of barium and calcium are moderately soluble.
  - Everything else will be considered insoluble!
- Given a precipitation chart be able to determine what compounds were in a set of unknowns.
- Be able to give the **flame color** for sodium, potassium, iron, barium, and copper.

#### 7. Dimensional Analysis & Using Exponential Notation and Significant Figures

- Read over Dimensional Analysis #1-3 – pp 15-28 and Sig Figs pp. 35-52.
- 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.
- Know the **Rules for Significant Figures**.
  - All non-zero digits are significant, for example, 123 has three significant figures.
  - Zeros between non-zero digits are significant, for example, 12.507 has five significant figures.
  - 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.
  - 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.

#### 8. Handouts – Graphing, Nomenclature and Redox

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