

## Midterm Review Chem 002 – FS / 08

### 1. MSDS and Safety

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

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

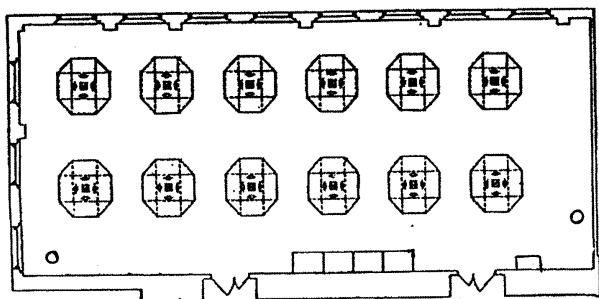
**EF:** Aluminum, Copper, Copper Chloride, HCl& (implications of Bunsen burners)

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

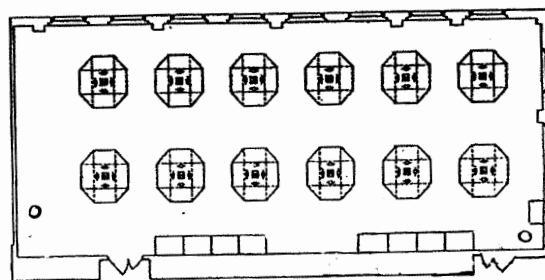
**13 TT:** NH<sub>3</sub>, Ba(NO<sub>3</sub>)<sub>2</sub>, Cu(NO<sub>3</sub>)<sub>2</sub>, Fe(NO<sub>3</sub>)<sub>3</sub>, NiSO<sub>4</sub>, K<sub>2</sub>CrO<sub>4</sub>, KNO<sub>3</sub>, K<sub>2</sub>C<sub>2</sub>O<sub>4</sub>, KSCN, NaCl, Na<sub>2</sub>S, H<sub>2</sub>SO<sub>4</sub>, SnCl<sub>2</sub>

- 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. 51-70.
- 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. 51-70.
- b. Know Equations 1-5 and know the names of each equation.
1. Average or mean:  $\bar{x} = \sum x_i / n$
  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:  $CI_{\text{mean}} = \pm ts / (n^{1/2})$
- 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

- Read over *Determining the Empirical Formula of Copper Chloride* – pp. 71-82.
- 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. 83-102..
- 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 103-114.
- 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 – pp 13-26 and pp. 33-50.
- 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.