

CHEMISTRY 1212 MIDTERM STUDY GUIDE FALL 2009

- ◆ The Midterm Exam is a **written exam** consisting of short answer questions and calculations.
- ◆ You must **show all of your work** to receive **full** credit or **partial** credit on a question. Even if the answer is correct, if you do not show your work you will not receive credit.
- ◆ You will have **1.5 hours** to complete the exam. Exam will be given in **your** lab at **your** regular lab time.
- ◆ Bring pencil or pen and calculator (NO graphing calculators) to the exam.
- ◆ You will **NOT** be allowed to use your lab manual or your lab notebook. You will **NOT** be allowed to **share** a calculator.
- ◆ The Midterm Exam is 60% of your MIDTERM grade.
- ◆ At the end of the semester, the Midterm Exam is 30% of your overall grade.
- ◆ **Best Studying Tip 1:** *Review the quizzes and the pre-lab and post-lab questions at the end of each experiment.*
- ◆ **Best Studying Tip 2:** *Know the formulas/equations and how to use them. For example, you need to know how to calculate moles from either mass or M & L. (You will be given **constants** and the **molecular weights (molar mass)** of the various compounds.)*
- ◆ **Best Studying Tip 3:** *On the CHEM 1212 web page, there are links to copies of the overhead transparencies. If you do not remember how to do a calculation or want to review the other points of the pre-lab lecture, go to this site.
<http://chemistry.lsu.edu/lallen/1212.html>*

Highlights from Experiments 1 – 9

Review the Laboratory Safety section in the lab manual.

- Exp. 1 Know the terms and definitions of solubility, density, miscibility, physical and chemical properties, and be able to determine the densities and layering information of substances from data.

$$\text{Density (g/mL)} = \text{mass (g)} / \text{volume (mL)}$$

- Exp. 2 Be able to calculate theoretical yield and percent yield of alum. Know how experimental errors or changes in procedure would affect the percent yield.

$$\begin{aligned} \text{moles} &= \text{Mass (g)} / \text{Molar Mass (g/mol)} \quad \text{or} \quad \text{Mass(g)} = \text{moles} \times \text{MM(g/mol)} \\ &\text{use stoichiometric ratio of moles to convert from moles of A to moles of B} \\ \text{Percent yield} &= (\text{actual yield} / \text{theoretical yield}) \times 100 \end{aligned}$$

- Exp. 3 Know the different types of Chemical Reactions and their terms. Be able to classify and write a balanced molecular chemical equation from a reaction description. Be able to calculate percent yield of Cu. Know how experimental error would affect the percent yield.

$$\text{Percent yield} = (\text{actual yield} / \text{theoretical yield}) \times 100$$

- Exp. 4 Be able to calculate the amount of citric acid (g) or citric acid (mg) per mL of juice from similar data. Know how experimental errors affect the final results.

$$\text{Molarity (M)} = \text{moles} / \text{L}; \text{ use Molarity and stoichiometric ratio}$$

- Exp. 5 Be able to calculate the Molarity of DCP (standardization of titrant) and calculate how many mL of juice is needed to meet the DRI of Vitamin C from similar data. Know how experimental errors affect the final results.

$$\text{Use mass, molar mass, Molarity, L and stoichiometric ratio}$$

- Exp. 6 Be able to determine which reactant is the limiting reagent (using calculations). Know how to calculate the theoretical yield of the product, $[\text{Ni}(\text{en})_3]\text{Cl}_2$, and the percent yield. Know how experimental errors would affect the final results.

$$\text{Use density, \% composition, mass, molar mass, Molarity, L and stoichiometric ratio to calculate limiting reagents and theoretical yield.}$$

- Exp. 7 Be able to do calculate M and % by mass from similar experimental data. Know how experimental errors in calculations may affect the overall results.

$$\text{Use Dalton's Law } (P_T = P_{O_2} + P_{H_2O}), \text{ Ideal Gas Law } (PV = nRT), \text{ stoichiometric ratio to find M; be able to use density and molar mass to \% by mass}$$

- Exp. 8 Know the basic terms and principles of chromatography. Be able to calculate R_f and use R_f & color of spots to identify food dyes in similar experimental data. Know how errors would affect results of experiment.

$$\text{Use } R_f = (\text{distance traveled by spot}) / (\text{distance traveled by solvent front})$$

- Exp. 9 Be able to do all calculations from this experiment. Be able to use the equation of the line (from graph) to determine the dilute concentration of aspirin in an unknown. Be able to determine amount of aspirin in a tablet. Be able to discuss the results of this experiment.

$$\text{Use mass to Molarity, dilution, and Molarity to mg calculations}$$
$$\text{Be able to determine slope of a graphed line for Beer's Law equation;}$$
$$\text{Use Beer's Law (Absorbance} = \text{slope} \times \text{concentration) to solve for concentration}$$