Chem 1020 Spring 2011
Chapters 13/14 Study Guide

The final exam is comprehensive, with a slight additional emphasis on chapters 13 and 14 (since you haven't been tested on them yet). Use the study guides from exams 1-3 to help review that material, and include the following material from chapters 13 and 14. Material covered is sections 13.1-13.7, 14.1-14.5, and 14.9.

Chapter 13 **(Molarity worksheet, experiment 16)**

- Definition of solution, solute, and solvent
- Polarity in determining whether or not a solution will form, like dissolves like
- Function and properties of soaps, micelles, emulsions (p. 343 and experiment 15)
- Process of soluble ionic solid dissolving in polar solvent; why is a polar solvent required?
- Solubility, saturated, unsaturated, and supersaturated solutions
- Mass percent concentration: calculation of mass % and using mass % as a conversion factor (g solute per 100 g solution)
- Molarity: calculation of solution molarity and using molarity as a conversion factor (moles solute per 1 L solution)
- Process of preparing a solution by dissolving a solid and using a volumetric flask
- Dilution: identifying stock and diluted solutions (before and after dilution), and calculating concentrations and volumes of solutions before or after dilution using the dilution equation, $M_1V_1 = M_2V_2$ (will be given on exam)

Chapter 14 **(pH calculations worksheet)**

- Identification and common properties of acids and bases
- Arrhenius theory of acids and bases, formation and purpose of hydronium (H_3O^+) and hydroxide (OH^-) ions
- Relationship of hydronium and hydroxide ion concentrations to acidity/basicity of solution
- The pH scale: meaning of numbers, acidic, neutral, and basic pH – significance of logarithmic scale
- Relationship between pH and hydronium ion concentration
- Relationship between pOH and hydroxide ion concentration
- Relationship between pH and pOH
- Conversion between any acid or base measurements: pH, pOH, $[H_3O^+]$, $[OH^-]$ using the equations (shown below) which will be **provided** on the exam.
- Acid-base neutralization reactions (same as a double displacement, remembering H^+ and OH^- combine to form H_2O)

These equations will be given on the final exam, as well as the standard solubility rules, periodic table, and conversion sheet:

$$D = \frac{m}{V}$$

$$\%\ \text{yield} = \frac{\text{actual yield}}{\text{theoretical yield}} \times 100\%$$

$$M = \frac{\text{mol solute}}{\text{L solution}}$$

$$M_1V_1 = M_2V_2$$

$$\text{mass}\ \% = \frac{\text{mass solute}}{\text{mass solution}} \times 100\%$$

Avogadro's number = 6.022×10^{23} particles/mol

$$\text{pH} = -\log\ [H_3O^+]$$

$$\text{pOH} = -\log\ [OH^-]$$

$$\text{pH} + \text{pOH} = 14$$

$$[H_3O^+] = 10^{-\text{pH}}$$

$$[OH^-] = 10^{-\text{pOH}}$$