CHM 101 A
Preparation for Exam 2
Chapters 4, 5, 6

1. Define molar mass. Calculate the molar mass for an element or compound. Use appropriate units.
2. Define the mole; explain the physical significance of Avogadro's number.
3. Convert between moles, mass, and number of molecules or formula units.
4. Given the mass or moles of a compound, determine the number of atoms or ions of a specified element in the sample.
5. Determine the mass percent composition for a compound from its formula.
6. Determine the empirical formula for a compound from its molecular formula
7. Determine the empirical formula for a compound from its mass (%) composition.
8. Know the relationship between empirical formula and molecular formula for a compound.
9. Understand the concept of solution concentration, and the terms dilute and concentrated.
10. Given the mass of a solute and solvent, determine the mass % composition of the solute.
11. Calculate the molarity of a solution from grams or moles of solute, and solution volume. (Example 4.14)
12. Calculate moles or volume from molarity and volume or moles (like Examples 4.15 and 4.16).
13. Dilution calculations. Describe the process of dilution in terms changes in molarity, volume, and moles.

14. Balance chemical equations.
15. Classify reactions as combination, decomposition, single-displacement, double-displacement or combustion reactions. Describe the three types of double-displacement reactions: precipitation, gas-forming and neutralization.
16. Predict the products of simple reactions: combination reactions to ionic compounds; decomposition reactions to elements; single-displacement reactions involving displacement of a metal or hydrogen; double-displacement reactions; combustion of a hydrocarbon (C_xH_y).
17. Use solubility information and an activity series to predict whether or not a reaction will occur.
    Know: All compounds containing Na^+, K^+, NH_4^+, NO_3^-, $CH_3CO_2^-$ ions are water-soluble.
18. Write an equation for the dissolving of an ionic compound in water.
19. Write net ionic equations for single-displacement and double-displacement reactions. Identify spectator ions.
20. Understand the meaning of a balanced equation. What information does it tell you (at a molecular scale and at a mole scale)? What do the coefficients represent?

21. Use quantitative relationships in chemical reactions including mass/mole and mole/mole. When given the mass or number of moles of a reactant or product, determine the mass or number of moles of another reactant or product.
22. Given amounts of reactants mixed: identify the "limiting reactant" in a reaction; calculate the amount of product that can form; and determine the amount of the other reactant that is leftover and mixed with the product. Define limiting reactant.
23. Define theoretical yield, actual yield or the percent yield for a reaction. Calculate percent yield given actual yield and amount of limiting reactant or theoretical yield.
24. Describe changes that accompany an exothermic process and endothermic process.
25. Define specific heat. Use specific heat to calculate the heat change that accompanies a temperature for a specific substance.
26. Use the *law of conservation of energy* to determine the amount of heat absorbed or emitted by a substance.
27. Calculations such as Example 6.13 – Determining heat changes in chemical reactions.