

## 20012 Chem 111 Exam 4 Review

### Chapter 8.1, 9.1, 9.2, 9.3, 9.4 and 9.6

- The Polyatomics and naming compounds will carry over so you had better know them
  - Know Strong Acids
  - Know Strong Bases
- Identifying Electrolytes and the Van't Hoff Factor ( $i$ )
  - Strong Acids, Strong bases and Ionic Compounds can be strong electrolytes if they are soluble and will have a Van't Hoff Factor = to the number of IONS
  - Weak acids and Weak bases will be weak electrolytes and will have a Van't Hoff factor between 1 and 2 ( $1 < i < 2$ )
  - Non electrolytes are molecular (Covalent Compounds) and insoluble acid, bases or ionic compounds and will have A Van't Hoff factor of 1
- Balance Reactions
  - the moles of elements have to be equal on both sides of the arrow
  - Use Coefficients when balancing! These are the ratios you use when comparing one compound to another in chemical reaction
  - Make sure to put the phases for each compound
- Precipitation Reactions
  - You will HAVE the solubility tables 9.2 and 9.3
  - Know the difference between **Molecular**, **Ionic** and **Net ionic** equations and be able to write each one of them and identify spectator ions
  - When solving ppt problems use the balanced molecular eqn for stoichiometric ratios
- Gravimetric Analysis
  - Used to find the amount of an unknown in a sample by adding another ionic compound to ppt the ion in question
  - These problems are logic type questions so you want to identify your "goal" right off. You're given information about the product and asked to find out about a reactant
- Acid-Base Reactions
  - Arrhenius---Acid produces  $\text{H}_3\text{O}^+$  in aqueous solutions and Bases produce  $\text{OH}^-$  in aqueous solutions
  - Bronsted-Lowery----Acids are proton donors and Bases are proton acceptors
  - GN Lewis-----Acids are lone pair acceptors and Bases are lone pair donors
  - Neutralization Problems (Acid Base Titration)
    - Be able to draw how the reaction happens using arrows from the lone pair to the proton and giving the correct products
    - The number of moles of base = the number of moles of acid This is called the stoichiometric or equivalence point
  - When you have concentrations and volumes you may use the eqn:  
$$(\# \text{H}^+) (\text{M}_\text{H}) (\text{vol}_\text{H}) = (\# \text{OH}^-) (\text{M}_\text{OH}) (\text{vol}_\text{OH})$$
  - When you don't know the concentrations of both the acid and base. Write a balanced molecular equation. Solve for the moles of what you are given the information for (base/ acid) Use stoichiometry to determine the amount of acid/ base present.
- Oxidation-Reduction Reactions
  - Oxidation (LEO): When a species loses electrons (becomes more positive)  
whatever is oxidized is called the reducing agent
  - Reduction (GER): When a species gains electrons (becomes more negative)  
whatever is reduced is called the oxidizing agent
  - Be able to identify if a reaction is an REDOX reaction
  - Oxidation numbers (Oxidation States) help identify if a reaction is a REDOX reaction. Be able to assign Oxidation numbers using TABLE 9.5