**Study Guide Exam 5 Chemistry 115**

**Chapter 14: Solutions**

* Recognize what can be done to increase the rate of dissolving: heating solution, stirring solution, grinding solute into smaller particles.
* Use “Like dissolves like” Rule and the Solubility Rules to predict what substances are
* Soluble / insoluble in or miscible/immiscible with water or other solvent
* Recognize what occurs at the molecular level when a solute dissolves in water.
* Know definitions for: diffusion, semi‐permeable membrane, osmosis, isotonic, hypertonic, hypotonic, and osmotic pressure

**Chapter 15: Acid and Bases**

* Know **properties of acids and bases**
* Know **Arrhenius** and **Brønsted-Lowry** (B-L) and Lewis definitions for acids and bases

Given an acid-base reaction,

* Classify each reactant as an Arrhenius and/or a Bronsted-Lowry or Lewis acid or base
* Indicate the **conjugate acid-base pairs**.
* Note that conjugate acid-base pairs differ only by an H+ ion.

Recognize hydronium ion,

**H3O+ = H+ + H2O**

* Know the **strong acids**: HCl, HBr, HI, HNO3, HClO3, HClO4, H2SO4.
* Know the common **strong bases**: LiOH, NaOH, KOH, Ca(OH)2, Sr(OH)2, Ba(OH)2.

Recognize water rarely ionizes to form ions

→ It does not conduct electricity.

→ ion-product or dissociation constant for

Water at 25°C, **Kw=[H+][OH**−**] =1.0x10**−**14**

**acidic solutions:** [H3O+] > [OH–], pH < 7

**basic solutions:** [OH–] > [H3O+], pH > 7

**neutral solutions:** [OH–] = [H3O+], pH = 7

Use pH to classify a substance as neutral, strongly or weakly acidic, strongly or weakly basic

Calculate pH or pOH using

* [H+]=10–pH and [OH–]=10–pOH
* pH + pOH = 14.00 (exact)
* Kw=[H+][OH−] =1.0x10−14
* Knowing that because pH is a logarithm, the **number of sig figs for the H+** **concentration** determines the **number of** **decimal places for the pH** and vice versa.
* Calculate the pH of a solution after an acid and a base have reacted and by determining the concentration of excess strong acid or strong base that remains
* ELECTROLYTES
  + Know the difference between an electrolyte and nonelectrolyte
  + Know the difference between a strong electrolyte and weak electrolyte
  + Know the physical basis for the term electrolyte
* Buffer Systems
  + Know a buffer system consists of a weak acid and its conjugate base.
  + Know how the buffer system (weak acid/ conj. base) can neutralize small amounts of H+ or OH−, so a buffered solution can maintain its pH.

**Chapter 18: Nuclear Chemistry**

* Know atomic notation
* Know different types of decay: α, β and γ, positron, electron capture
* Predict products for α, β and other nuclear reactions
* Write and balance nuclear equations
* Know term: parent and daughter nuclide
* Identify relationship between stability of nuclides and # of protons and neutrons
* Identify differences between nuclear reactions and chemical reactions
* Know applications of nuclear chemistry
* Solve problems involving half-life
* Know the difference between fission and fusion