**Second Semester Exam Review**

Topics:

1. Gases

**Gases Objectives:**

1. Be able to convert between unit of measurement for pressure and temperature.
2. Know what the Kinetic Molecular Theory is and why it is important.
3. Know the relationship between pressure, temperature, and volume.
4. Be able to use the three basic gas laws. (Boyle’s, Charles’, and Gay-Lussac’s)
5. Be able to use the combined gas law.
6. Be able to use the ideal gas law.
7. Be able to use Dalton’s Law.
8. Be able to use Graham’s Law.

2) Solutions, Acids, and Bases

**Solutions, Acids, and Bases Objectives:**

1. Define solution, solute, solvent, soluble, insoluble.
2. Understand colligative properties and how they change the freezing point and boiling point.
3. Know the dissolving process.
4. Know how to tell if a solution is exothermic or endothermic based on where heat is in the equation.
5. Solve molarity problems.
6. Solve dilution problems.
7. Be able to solve for the concentration of ions in solution.
8. Define saturated, unsaturated, and supersaturated solutions.
9. Interpret solubility curves.
10. Distinguish between acids, bases, and salts based on formula, names, and chemical properties.
11. Be able to write the names and formulas of acids and bases.
12. Use the pH scale to identify acids and bases.
13. Compute the pH, pOH, [H3O+], and [OH-].
14. Be able to interpret titration curves.
15. Calculate the concentration of an acid or base by using information from a titration.
16. Thermochemistry

**Thermochemistry Objectives:**

1. Know the difference between heat and temperature.
2. Be able to use the specific heat equation.
3. Be able to solve calorimetry problems and understand calorimetry.
4. Be able to read and label a heating/cooling curve.
5. Use a heating/cooling curve to solve for the heat absorbed or released during a phase change (multi-step Q problems)
6. Be able to read and label a reaction coordinate diagram.
7. Be able to solve molar energy equations (solve for ∆H (enthalpy change) given a reaction).
8. Be able to read a phase diagram and determine normal points (boiling, condensation, melting, freezing, sublimation, and deposition), critical point, and triple point.
9. Know and understand collision theory.
10. Equilibrium and \*Nuclear

**Nuclear and Equilibrium Objectives:**

1. Know the difference between fusion and fission reactions.
2. Understand how Le Chatelier’s Principle works (shifts in equilibrium due to stresses).
3. Be able to set up and solve equilibrium expressions.
4. \*Stoichiometry

**Stoichiometry Unit Objectives:**

1. Be able to convert between mass, moles, volume, particles, and atoms of difference substance by using chemical reactions.
2. Be able to determine which reactant is the limiting reactant and excess reactant.
3. Be able to calculate the amount of product produced based on limiting reactant.
4. Be able to determine that amount of excess product used up and left over.
5. Be able to calculate percent yield.
6. Be able to name and write formulas for hydrates.
7. Be able to determine molecular and empirical formulas.