**PO 4 Unit Exam (Chapters 12-13)**

**Study Guide**

This exam will consist of only AP Test questions (both multiple choice and FRQ). 95% of this exam will cover chemical kinetics, 5% will cover solution chemistry. Carefully review the class website, notes, textbook, and mastering chemistry problems while studying for this exam.

The following is a list of topics you may want to focus your studies on:

* What is chromatography and how does paper chromatography work with polar or nonpolar solvents? See class website.
* How do you calculate dilution and what would be a good laboratory procedure for actually performing a dilution in the lab?
* How does a spectrophotometer work and why is this instrument used to study chemical kinetics? See class website.
* When using a spectrophotometer, you must make sure that you know what wavelength of light your solution will absorb best. Why? See website and look at absorbance vs wavelength graphs online.
* Why is it important to clean curvettes before using them in a spectrophotometer? What effect would a fingerprint on the curvet have on the data collected? Think about how the spectrophotometer works and why a fingerprint would cause an error.
* If you had two solutions of copper ions, one very diluted and the other one very concentrated, and placed them both into a spectrophotometer at the same wavelength, which one would be absorbing the most light and why?
* How does Beer’s Law relate to spectrophotometry? See class website.
* Can you calculate a problem using Beers Law? See class website.
* Is Beer’s law on the AP testing resource page? What other important kinetics equations and constants are on the resource?
* Can you interpret an absorbance vs concentration graph after plotting data obtained from a spectrophotometry experiment?
* How does the concentration (high or low) of a reactant effect the rate at which the reactant reacts?
* Would pressure (high or low) effect the rate at which a reactant reacted? Why or why not.
* Why must collisions be taken into account when studying kinetics?
* What is activation energy? Can activation energy change for a particular reaction? If so, under what condition and why?
* What is a reaction mechanism? Could you identify a fast or slow step in a purposed mechanism if it was depicted on a graph (energy vs rxn progress)?
* How can a proposed mechanism be determined to be valid?
* How can a rate be determined for an overall reaction from a proposed reaction mechanism?
* What is temperature’s effect on a reaction? What is a catalyst’s effect on a reaction?
* What do graphs of 1st and 2nd order integrated rate laws look like?
* What is half-life?
* If temperature remains constant, what is the relationship between 1st order HALF-LIFE and concentration (or pressure)?