AP Chemistry Chapter 16 Essentials Part 2

KINETICS - Concentration versus Time: The Integrated Rate Equation

- 1) What is the integrated rate equation and what is it used for?
- 2) What is the integrated rate equation for a first order reaction? Be sure to identify each variable.
- 3) What is the half-life equation of a reactant in a first-order reaction?
- 4) Nuclear decay is an example of a first ordered half-life. Does the half-life depend on the initial concentration of the radioactive material?
- 5) What is the integrated rate equation for a second order reaction? Be sure to identify each variable.

6) How does the $t_{1/2}$ of a first order reaction compare to the $t_{1/2}$ of a second order reaction?

7) What is the integrated rate equation for a zero order reaction? Be sure to identify each variable.

- 8) What is the $t_{1/2}$ equation of a first order reaction?
- 9) Given the difference between the rate-law expression and the integrated rate equation describe how to choose which equation to use when solving a kinetics problem.

- 10) What are the units of k for a zero order reaction? For a first order reaction? For a second order reaction?
- 11) For the each of the 3 different ordered reactions (zero, first and second), there is only one type of graph that will produce a straight line. Indicate how the concentration vs. time needs to be plotted for each. See Table 16-3.

12) Summarize the collision theory of reaction rates including what "effective collisions" are.

13) Summarize the transition state theory of reaction rates including what the "transition state" and "activation energy" are.

14) What is the difference between an exothermic and endothermic reaction?