Advanced Chemistry **NAME: _____PER: _____**

More Practice Concentration vs Time/Half Life

Instructions: Complete the following problems. SHOW ALL WORK in the empty space below the questions. Remembers the units. Round to the correct number of significant figures. Hint: ***Every problem will require you to use both the integrated rate law and half life equation.***

Equations

First Order: $\ln[A]_t - \ln[A]_0 = -kt$

Second Order: $1/[A]_t = kt + 1/[A]_0$

Zero Order: $[A]_t = -kt + [A]_0$

1st Order Half Life: $t_{1/2} = \frac{0.693}{k}$

2nd Order Half Life: $t_{1/2} = \frac{1}{k[A]o}$

Zero Order Half Life: $t_{1/2} = \frac{[A]o}{2k}$

Zero-Order Problems

1. The half-life of a zero order reaction is 94 seconds. If the initial concentration of the reactant is 0.225 M, what would the final concentration be after 13 seconds?

2. What is the half-life of a zero order reaction that initially starts with a concentration of 0.346 M if the concentration was found to be 0.257 M after 187.0 seconds?

First-Order Problems

3. The half-life of a first-order reaction is 13.0 min. If the initial concentration of reactant is 0.130 M, it takes _____ min for it to decrease to 0.0850 M.

4. The following reaction is first order in $[H_2O_2]$: $2H_2O_2\ (l) \rightarrow 2H_2O\ (l) + O_2\ (g)$
A solution originally at 0.600 M H_2O_2 is found to be 0.075 M after 54 min. The half-life for this reaction is _____ min.

Second-Order Problems

5. The half-life of a second-order reaction is 151 seconds. If the initial concentration of the reactant is 0.112 M, what would the final concentration be after 60.0 seconds?

6. What is the half-life of a second order reaction that initially starts with a concentration of 0.550 M if the concentration was found to be 0.450 M after 320.0 seconds?