INTEGRATED RATE LAW PART I

Name

Section

1. The reaction: $A(g) \rightarrow$ products

   follows simple first order kinetics. When the initial concentration of A is 0.500 M, the initial rate of the reaction is determined to be 4.20×10^{-3} M s^{-1}. If the initial concentration of A is tripled, what would be the new initial rate of the reaction?

2. Write the integrated rate law for a reaction that follows simple first order kinetics.

3. The decomposition of H_2O_2 to H_2O follows first order kinetics with a rate constant of 0.0410 min^{-1} at a particular temperature.

   $$H_2O_2(l) \rightarrow 2H_2O(l) + O_2(g)$$

   Calculate the $[H_2O_2]$ after 10 minutes, if $[H_2O_2]_0$ is 0.200 M.

4. The decomposition of N_2O_5 to O_2 and NO_2 follows first order kinetics. If a sample at 25 °C with the initial concentration of N_2O_5 of 1.25×10^{-3} M falls to 1.02×10^{-3} M in 100 minutes, calculate the rate constant for the reaction.

5. Describe how a plot of *ln* [concentration] versus time can provide the rate constant for a reaction that follows simple first order kinetics.

6. Using the following data, establish that the decomposition N_2O_5 according to the reaction,

$$2N_2O_5(g) \rightarrow 2NO_2(g) + O_2(g)$$

follows first order kinetics. Determine the rate constant for the reaction.

Time (sec)	$[N_2O_5]$ (M)
0	1.50×10^{-3}
2000	1.40×10^{-3}
5000	1.27×10^{-3}
7000	1.18×10^{-3}
11000	1.03×10^{-3}
15000	9.00×10^{-4}