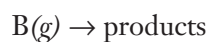


INTEGRATED RATE LAW PART II

NAME _____

SECTION _____

1. The reaction:



follows simple second order kinetics. When the initial concentration of B is 0.500 M, the initial rate of the reaction is determined to be $8.40 \times 10^{-3} \text{ M s}^{-1}$. When the initial concentration of B is tripled, what change would you expect to observe in the initial rate of the reaction?

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

3. a. The decomposition of $\text{NOCl}(g)$



is a second order reaction with a rate constant of $0.0480 \text{ M}^{-1} \cdot \text{sec}^{-1}$ at 200 °C. In an experiment at 200 °C, the initial concentration of NOCl was 0.400 M. What is the concentration of NOCl after 15.0 minutes have elapsed?

- b. How many minutes will it take for the concentration of $\text{NOCl}(g)$ to drop to 0.150 M?
4. Derive a mathematical equation for the half-life for a reaction which follows simple second order kinetics.
5. The initial concentration of NOCl , described in 3a. above, is 0.400 M. Calculate the half-life for the decomposition reaction.
6. Describe how a plot of \ln [concentration] versus time can provide the rate constant for a reaction which follows simple second order kinetics.

7. Using the following data, establish that the decomposition of NO_2 according to the reaction,



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

Time (sec)	$[\text{NO}_2]$ (M)
0	0.0100
25	0.0088
50	0.0079
75	0.0071
100	0.0065
150	0.0055
175	0.0051
200	0.0048
250	0.0042
300	0.0038

