

Name: _____

AP Chemistry PracTest: Rate Laws

- 1.) (True or False) The rate law for a reaction can be determined only by experimental evidence.
- 2.) (True or False) Rate laws are determined from the balanced chemical equation.

3.) The reaction $2 \text{NOBr} \rightarrow 2\text{NO} + \text{Br}_2$ exhibits the rate law:

$$\text{Rate} = k[\text{NOBr}]^2 = -\frac{\Delta[\text{NOBr}]}{\Delta t}$$

where $k = 1.0 \times 10^{-5} \text{ L/mol} \cdot \text{s}$ at 25°C . This reaction is run where the initial concentration of NOBr is $1.00 \times 10^{-1} \text{ M}$.

a.) What is the [NO] after 1.00 hour has passed?

4.) For the reaction: $2\text{N}_2\text{O}_{5(\text{g})} \longrightarrow 4\text{NO}_{2(\text{g})} + \text{O}_{2(\text{g})}$, the following data were collected:

t (minutes)	$[\text{N}_2\text{O}_5]$
0	1.24×10^{-2}
10.	0.92×10^{-2}
20.	0.68×10^{-2}
30.	0.50×10^{-2}
40.	0.37×10^{-2}
50.	0.28×10^{-2}
70.	0.15×10^{-2}

a.) Find the concentration of NO_2 at 3.0 hours (1.8×10^2 minutes).

5.) The reaction: $2 \text{A} \longrightarrow \text{B} + \text{C}$ has a rate constant of $5.0 \times 10^{-2} \text{ mol/L} \cdot \text{s}$ at 25°C . An experiment was run where $[\text{A}]_0 = 1.0 \times 10^{-3} \text{ M}$. Calculate the concentration of B after $5.0 \times 10^{-3} \text{ s}$ has elapsed.

- 6.) A reactant has a -1 (minus one) order. What happens to the initial rate and the rate constant when the concentration is doubled?
- a.) Rate doubles / Rate constant remains constant
 - b.) Rate decreases by $\frac{1}{2}$ / Rate constant remains constant
 - c.) Rate quadruples / Rate constant is half
 - d.) Rate decreases by $\frac{1}{4}$ / Rate constant quadruples
 - e.) Rate is not affected. / Rate constant remains constant