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1. The following data were obtained for the reaction A + B + C → *products*:

Experiment	$[A]_0$	$[B]_0$	$[C]_0$	Initial rate, v_0 $(mol\ L^{-1}\ s^{-1})$
1	1.25 x 10^{-3} M	1.25 x 10^{-3} M	1.25 x 10^{-3} M	0.0087
2	2.50 x 10^{-3} M	1.25 x 10^{-3} M	1.25 x 10^{-3} M	0.0174
3	1.25 x 10^{-3} M	3.02 x 10^{-3} M	1.25 x 10^{-3} M	0.0508
4	1.25 x 10^{-3} M	3.02 x 10^{-3} M	3.75 x 10^{-3} M	0.457
5	3.01 x 10^{-3} M	1.00 x 10^{-3} M	1.15 x 10^{-3} M	?

(a) Write the rate law for the reaction. Explain your reasoning in arriving at your rate law.

(b) What is the overall order of the reaction?

(c) Determine the value of the rate constant.

(d) Use the data to predict the reaction rate for experiment 5.

2. A kinetic study of the reaction 2 A + 2 B ----> products was conducted yielding the following results:

Experiment	[A], M	[B], M	Initial Rate, Ms^{-1}
1	0.10	0.10	25
2	0.05	0.20	100
3	0.10	0.30	225
4	0.20	0.10	25

What is the Rate Law for this reaction?

3. Write the units of the rate constant for the following overall order of reaction.

a) Zeroeth order

b) First order

c) Second order

d) Third order

4. For the reaction $2NO_2 + O_3 \rightarrow N_2O_5 + O_2$ the following observations are made:

- Doubling the concentration of $[NO_2]$ doubles the rate,

- Doubling the concentration of $[O_3]$ doubles the rate. What is the rate law for the reaction?

Write the rate law for this reaction.

5. The following data were collected for the rate of disappearance of NO in the reaction

$$2NO(g) + O_2\ (g) \rightarrow 2NO_2(g)$$

Experiment Number	[NO] (M)	[O$_2$] (M)	initial rate (M/s)
1	0.0126	0.0125	1.41×10^{-2}
2	0.0252	0.0250	1.13×10^{-1}
3	0.0252	0.0125	5.64×10^{-2}

What is the rate law for the reaction?

The value of the rate constant? (include units!)