Kinetics Worksheet – Reaction Rates and Rate Laws

1) What are the usual units of reaction rate?

2) Concentrations of trace gases in the atmosphere are sometimes expressed in molecules/cm^3. If these units are used for the concentrations, then what are the units for the reaction rate?

3. The compound RX_3 decomposes according to the equation

$3RX_3 \rightarrow R + R_2X_3 + 3X_2$

In an experiment the following data were collected for the decomposition at 100°C. What is the average rate of reaction over the entire experiment?

t(s)	[RX_3](mol L^{-1})
0	0.85
2	0.67
6	0.41
8	0.33
12	0.20
14	0.16

4. Consider the following reaction

$8A(g) + 5B(g) \rightarrow 8C(g) + 6D(g)$

If [C] is increasing at the rate of 4.0 mol $L^{-1}s^{-1}$, at what rate is [B] changing?

5. For the reaction

$3A(g) + 2B(g) \rightarrow 2C(g) + 2D(g)$

the following data was collected at constant temperature. Determine the correct rate law for this reaction.

Trial	Initial [A] (mol/L)	Initial [B] (mol/L)	Initial Rate (mol/(L·min))
1	0.200	0.100	6.00×10^{-2}
2	0.100	0.100	1.50×10^{-2}
3	0.200	0.200	1.20×10^{-1}
4	0.300	0.200	2.70×10^{-1}