1. Give the relative rates of disappearance of reactants and formation of products for each of the following reactions.

   (a) $2\ O_3(g) \rightarrow 3\ O_2(g)$

   (b) $2\ HOF(g) \rightarrow 2\ HF(g) + O_2(g)$

13. The data in the table are for the reaction of NO and O_2 at 660 K.

$$NO(g) + \tfrac{1}{2}\, O_2(g) \rightarrow NO_2(g)$$

Reactant Concentration (mol/L)		Rate of Disappearance of NO (mol/L · s)
[NO]	$[O_2]$	
0.010	0.010	2.5×10^{-5}
0.020	0.010	1.0×10^{-4}
0.010	0.020	5.0×10^{-5}

(a) Determine the order of the reaction for each reactant.

(b) Write the rate equation for the reaction.

(c) Calculate the rate constant.

(d) Calculate the rate (in mol/L·s) at the instant when [NO] = 0.015 mol/L and $[O_2]$ = 0.0050 mol/L.

(e) At the instant when NO is reacting at the rate 1.0×10^{-4} mol/L·s, what is the rate at which O_2 is reacting and NO_2 is forming?

15. Data for the reaction $NO(g) + \frac{1}{2} O_2(g) \rightarrow NO_2(g)$ are given (for a particular temperature) in the table.

Experiment	Concentration (mol/L)		Initial Rate (mol NO/L · h)
	[NO]	$[O_2]$	
1	3.6×10^{-4}	5.2×10^{-3}	3.4×10^{-8}
2	3.6×10^{-4}	1.04×10^{-2}	6.8×10^{-8}
3	1.8×10^{-4}	1.04×10^{-2}	1.7×10^{-8}
4	1.8×10^{-4}	5.2×10^{-3}	?

(a) What is the rate law for this reaction?

(b) What is the rate constant for the reaction?

(c) What is the initial rate of the reaction in experiment 4?