Reaction Mechanisms

1. The decomposition of dinitrogen oxide, N_2O is believed to occur by the following two-step mechanism:

$$N_2O(g) \rightarrow N_2(g) + O(g)$$
 (slow)

$$N_2O(g) + O(g) \rightarrow N_2(g) + O_2(g)$$
 (fast)

- a) Write an equation for the overall reaction
- b) Write the rate law for the overall reaction
- 2. Below is the proposed mechanism for the gas phase reaction of chloroform, $CHCl_3$ and chlorine.

$$Cl_2(g) \underset{k_1}{\overset{k_1}{\rightleftharpoons}} 2 Cl(g)$$
 (fast)

$$Cl(g) + CHCl_3(g) \xrightarrow{k_2} HCl(g) + CCl_3$$
 (slow)

$$Cl(g) + CCl_3(g) \xrightarrow{k_3} CCl_4(g)$$
 (fast)

- a) Write the overall reaction
- b) What is the rate law?
- d) Are there intermediates in the reaction? If so what are they?
- e)What is the molecularity of each elementary reaction?