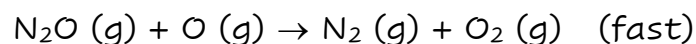
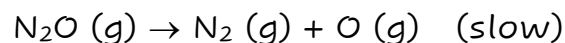


Reaction Mechanisms

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



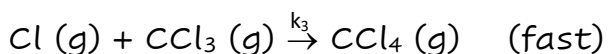
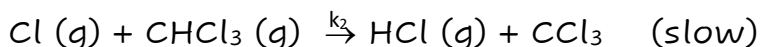
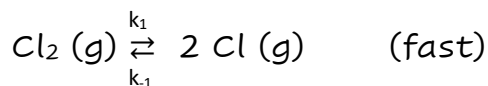
a) Write an equation for the overall reaction



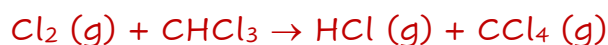
b) Write the rate law for the overall reaction

$$\text{rate} = k[\text{N}_2\text{O}]$$

2. Below is the proposed mechanism for the gas phase reaction of chloroform, CHCl_3 and chlorine.



a) Write the overall reaction



b) What is the rate law?

$$\text{rate} = k_2[\text{Cl}][\text{CHCl}_3]$$

$$\text{rate}_F = \text{rate}_R \quad k_1[\text{Cl}_2] = k_{-1}[\text{Cl}]^2$$

$$[\text{Cl}] = \sqrt{k_1/k_{-1}[\text{Cl}_2]} \quad \text{rate} = k_2\sqrt{k_1/k_{-1}} \sqrt{[\text{Cl}_2]} [\text{CHCl}_3]$$

$$\text{rate} = k[\text{Cl}_2]^{1/2}[\text{CHCl}_3]$$

d) Are there intermediates in the reaction? If so what are they?

The intermediates are Cl and CCl_3 .

e) What is the molecularity of each elementary reaction?

1) Unimolecular and 2) and 3) bimolecular