PRACTICE: REACTION MECHANISMS

1. Consider the following reaction mechanism.

step 1:
$$NO(g) + O_2(g) \rightarrow NO_3(g)$$

step 2: $NO_3(g) + NO(g) \rightarrow 2 NO_2(g)$

- (a) Write the overall balanced chemical equation for the reaction.
- (b) What is the reaction intermediate in this reaction?
- 2. Consider the following reaction mechanism.

step 1:
$$CIO^{-}(aq) + H_2O(I) \rightarrow HOCI(aq) + OH^{-}(aq)$$

step 2: $Br^{-}(aq) + HOCI(aq) \rightarrow HOBr(aq) + CI^{-}(aq)$
step 3: $OH^{-}(aq) + HOBr(aq) \rightarrow H_2O(I) + BrO^{-}(aq)$

- (a) Write the overall balanced chemical equation for the reaction.
- (b) List the reaction intermediates.
- (c) What is the catalyst in this reaction?
- 3. Consider the following reaction mechanism.

step 1:
$$Cl_2(g) \rightarrow 2 Cl(g)$$

step 2: $\{ N_2O(g) + Cl(g) \rightarrow N_2(g) + ClO(g) \} \times 2$
step 3: $2 ClO(g) \rightarrow Cl_2(g) + O_2(g)$

- (a) Write the overall balanced chemical equation for the reaction.
- (b) List the reaction intermediates.
- (c) What is the catalyst in this reaction?
- 4. An certain chemical reaction occurs by a two-step reaction mechanism. Step 1 is endothermic and step 2 is exothermic. The overall reaction is endothermic. Sketch a potential-energy diagram for the reaction. Label the activation energies for step 1 (E_{a.1}) and step 2 (E_{a.2}).