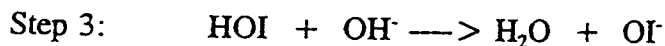
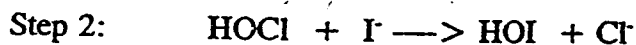
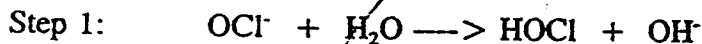


1. Examine the following reaction mechanism:



- (a) Identify the catalyst in the mechanism and explain how you were able to make your identification. H_2O , is used up in step 1 but regenerated in step 3
- (b) Explain why OH^- would be called a reaction intermediate.
It is made in step one but used up in step 3
- (c) List any additional reaction intermediates.



2. The reaction between NO_2 and CO is slow and has the overall equation:

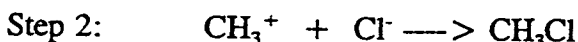


One step in the two-step mechanism of this reaction is:



- (a) Write the equation for the other step in the mechanism.
 $\text{NO}_2 + \text{NO}_2 \longrightarrow \text{NO} + \text{NO}_3$
- (b) State whether your proposed step is slow or fast and explain your choice.
Slow, the overall reaction is slow and the other step is fast

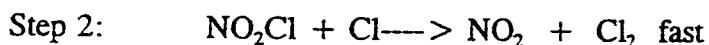
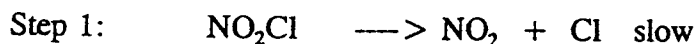
3. The proposed mechanism for a reaction is:



- (a) What is the overall reaction being studied?
 $\text{CH}_3\text{OH} + \text{HCl} \longrightarrow \text{H}_2\text{O} + \text{CH}_3\text{Cl}$
- (b) List any reaction intermediates.



4. The proposed mechanism for a reaction is:

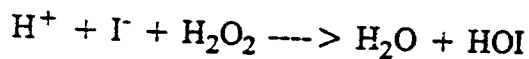


- (a) Describe the overall reaction.

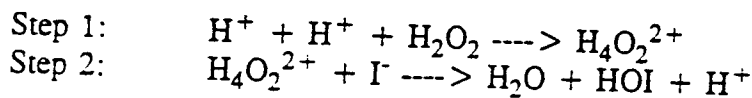


Key.

5. Consider the following fast reaction:

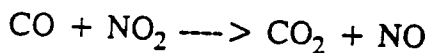


A student proposes the following two-step mechanism for the above fast reaction:



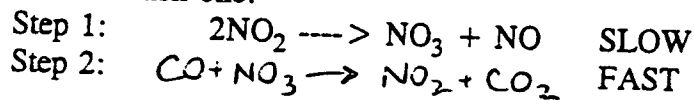
Would you agree or disagree with the proposed mechanism? Explain.

6. Disagree, step 1 involves a 3 particle collision, which is unlikely especially in a fast rx
Consider the following reaction:

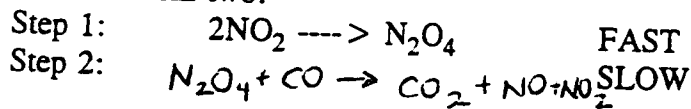


- (a) The first step in each of two proposed reaction mechanisms for the above reaction is listed below. If each proposed reaction mechanism consists of only two steps, determine the second step for each mechanism.

proposed mechanism one:

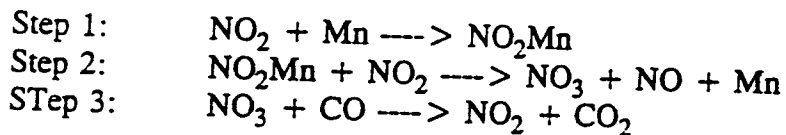


proposed mechanism two:



- (b) Experimental data shows that the rate of the reaction is not affected by a change in the CO concentration. Which of the two proposed reaction mechanisms would be consistent with the data? Explain. *The first mechanism. CO is not a reactant in the rate determining step of this mechanism.*

7. Consider the following reaction mechanism:



- (a) Identify the catalyst. *Mn, NO₂*
(b) Identify a reaction intermediate. *NO₂Mn, NO₃*
(c) Identify the products of the overall reaction. *NO, CO₂*