Chemistry 2500 (Fall 2017): Assignment #14 – Mechanisms

1. For each of the following reaction steps, suggest a possible *first step* using arrows to illustrate the movement of electrons. Identify the electrophile and nucleophile in each reaction.

a)

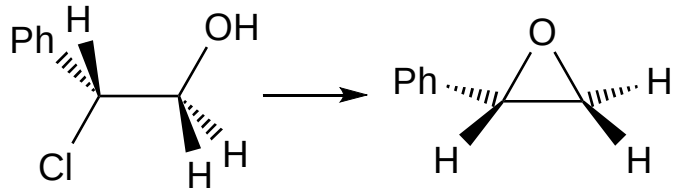
b)

2. Suggest a **reasonable** mechanism (**show electron movement**) for the following reaction.

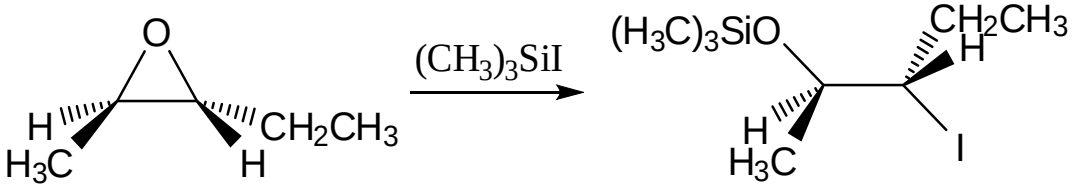
3. Suggest a reasonable mechanism for the following reaction:

$$PhCH_2Cl + CH_3CH_2SH \xrightarrow[\text{ethanol}]{} PhCH_2SCH_2CH_3$$

4. Provide the mechanism for the following reaction.

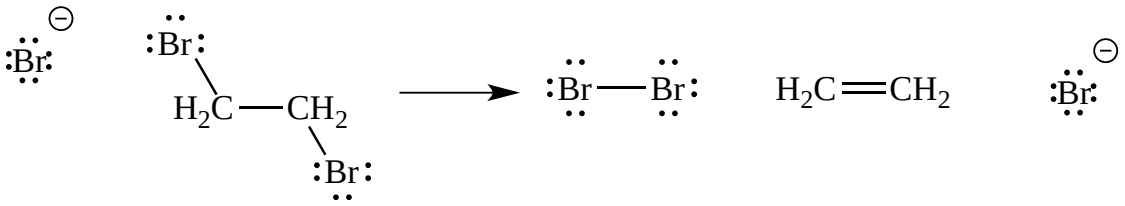


5. Provide the mechanism for the following reaction.



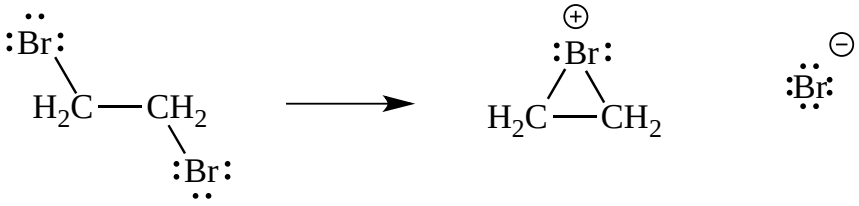
6. Two mechanisms are proposed for the decomposition of dibromoethane:

Mechanism One

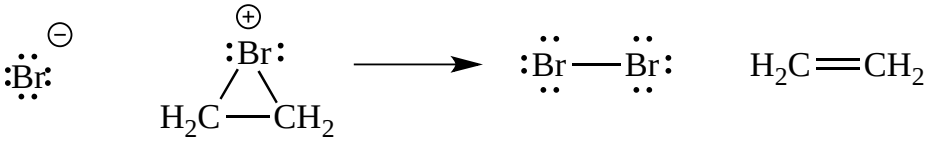


Mechanism Two

1)



2)



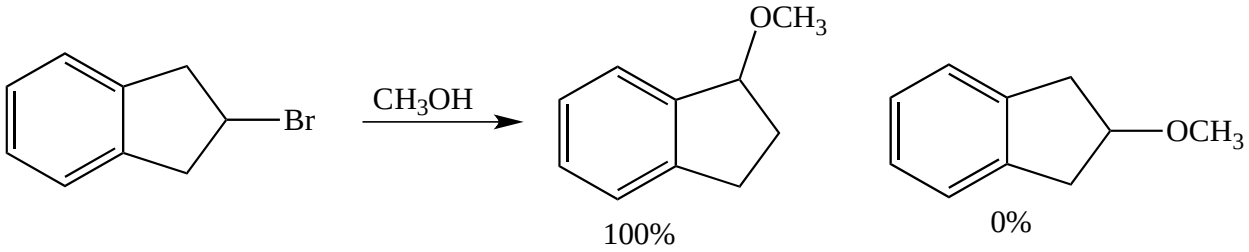
a) How would you classify the overall reaction (what type)?

b) Add arrows to both mechanisms to show electron movement.

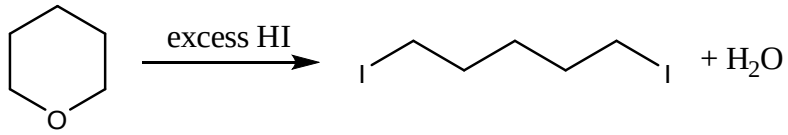
c) Increasing the bromide concentration of this reaction does not affect the reaction rate while doubling the concentration of the dibromoethane doubles the reaction rate. What is the rate law for this reaction?

d) Which mechanism is consistent with the data provided in (c)? Briefly explain.

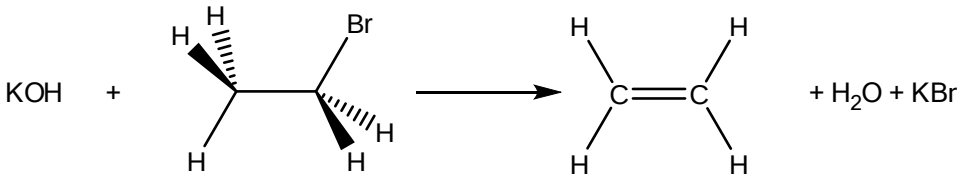
7. Propose a mechanism for the following reaction and explain why none of the expected product is found.



8. Suggest a **reasonable** mechanism (**show electron movement**) for the following reaction.



9. Suggest a **reasonable** mechanism to explain the following reaction.



10. Mustard gas reacts with nucleophiles, even weak nucleophiles, such as water, to form HCl. It undergoes S_N2 reactions much more quickly than the same molecule without the S atom. Propose a mechanism to account for this.