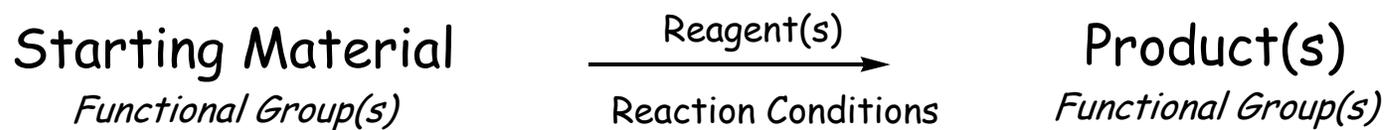


Organic Reactions



Organic Reactions

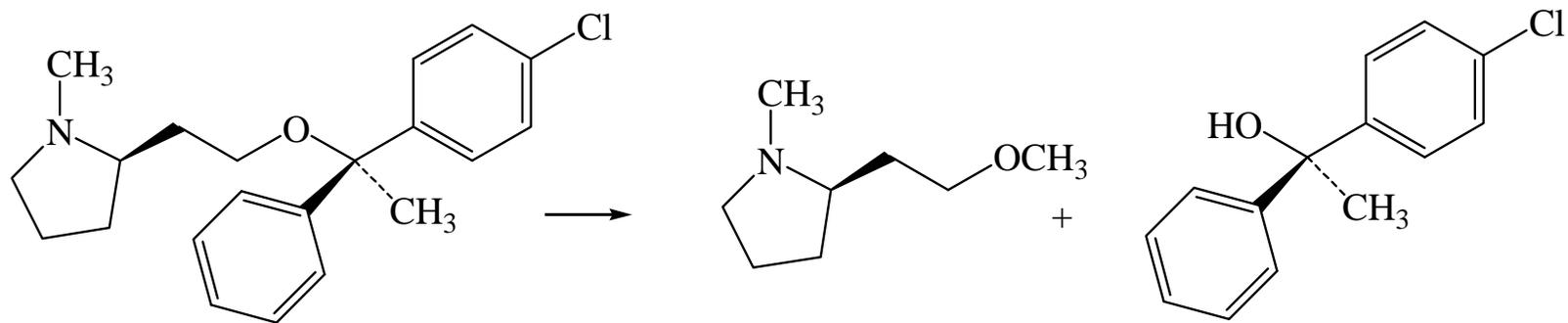
- To solve problems related to reaction chemistry, the reaction mechanism must be determined.
- The reaction mechanism can be determined from the information provided in the problem.
- Prepare a table summarizing starting materials, reagents/reaction conditions and products to organize and learn how to identify the reaction mechanism. (Use notes)

If the starting material and reagent/conditions are provided...

1. Identify the functional group in the starting material.
2. Identify the reacting atom (s). Classify the reacting atom(s) as primary, secondary, tertiary.
3. Identify the reagent. Identify the reaction conditions (acidic, basic, neutral).
4. Use the information in the table to identify the reaction mechanism.
5. Analyze the starting material in relation to the identified reaction mechanism (i.e., for E_2 find adjacent H atoms)
6. Number the atoms in the starting material to keep track of atoms as you work through the mechanism.
7. Draw out the reaction mechanism, including all reaction intermediates. Consider all pathways, resonance in intermediates and all possible products.

Organic Reactions

Example:



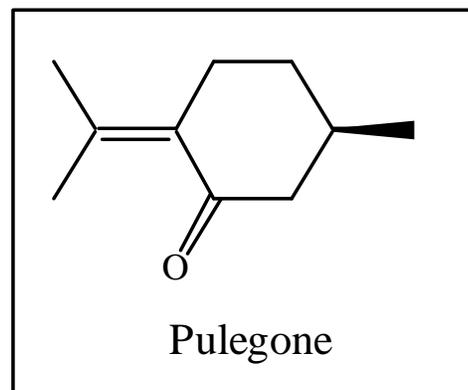
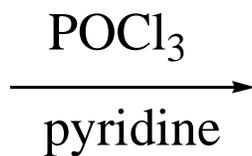
*Clemastine
(antihistamine)*

If the starting material and products are provided...

1. Identify the functional group in the starting material and product(s).
2. Identify the differences in the starting material and product to identify the reacting atom (s). Numbering the atoms in both structures sometimes helps to find the reacting atom. Classify the reacting atom(s) as primary, secondary, tertiary.
3. Consider the possible mechanisms and reagents for conversion of the functional group in the starting material to the functional group in the product using the information in the table.
4. Propose the most likely reaction mechanism based on analysis of the starting material and product. (i.e., if primary carbon reacts, more likely SN_2 than SN_1).
5. Propose a reagent based on analysis of the product.
6. Work through the proposed mechanism with the proposed reagent/conditions to make sure the mechanism and reagent(s) actually give the product given.

Organic Reactions

Example:



If the reagent/reaction conditions and products are provided...

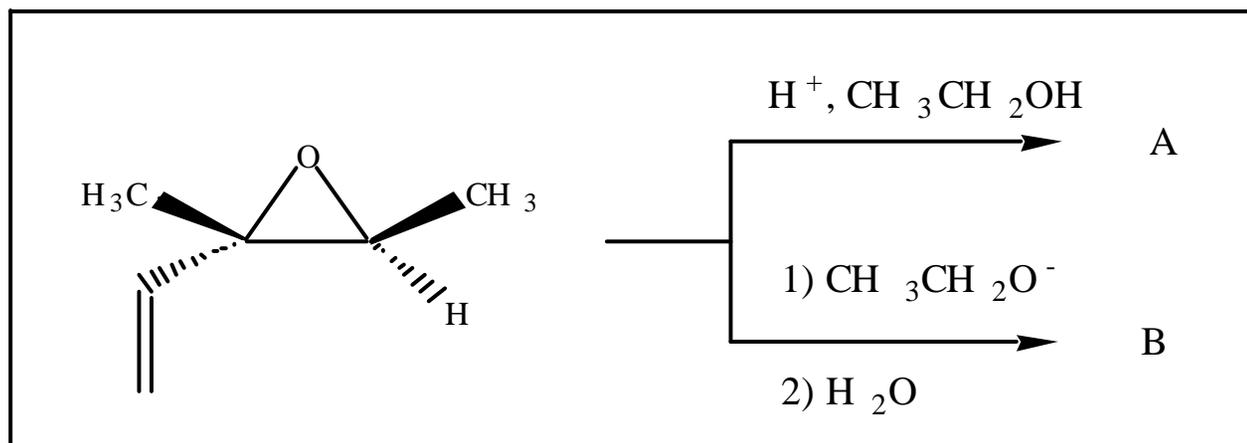
1. Identify the functional group in the product(s) including classifying primary, secondary, and tertiary atoms.
2. Identify the reagent. Identify the reaction conditions (acidic, basic, neutral).
3. Use the information in the table to identify the reaction mechanism.
4. Analyze the product in relation to the identified reaction mechanism (i.e., for E_2 label alkene atoms)
5. Sketch possible structures that could serve as starting materials. (or use choices given in q possible answers)
6. Draw out the reaction mechanism, for each possible starting material. including all reaction intermediates. Consider all pathways, resonance in intermediates and all possible products to make sure the starting material and reagent(s) actually give the product given.

Organic Reactions

- Starting materials or products may be referred to by names, functional group, alkyl substitution or alkene substitution rather than structures.
- Products may be referred to as specific types of isomeric mixtures (positional, cis/trans, diastereomers, enantiomers)
- Regardless of how the starting material/products are presented in the problem, use the mechanism to solve the problem

Organic Reactions

Example:

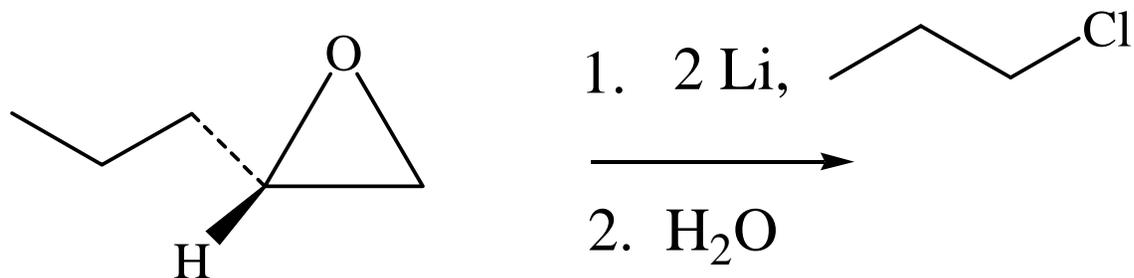


- a) Product A contains a primary alcohol
- b) Product B contains a tertiary allylic alcohol
- c) Both product A and B contain a symmetrical ether.
- d) Neither product A nor product B contains a chiral center.
- e) b & d

Organic Reactions

Example:

The major product(s) of the reaction given below is (are):



- a) a mixture of diastereomers
- b) a mixture of enantiomers
- c) a product with no chiral centers
- d) a single enantiomer
- e) none of these

Organic Reactions

Other problems related to reaction chemistry...

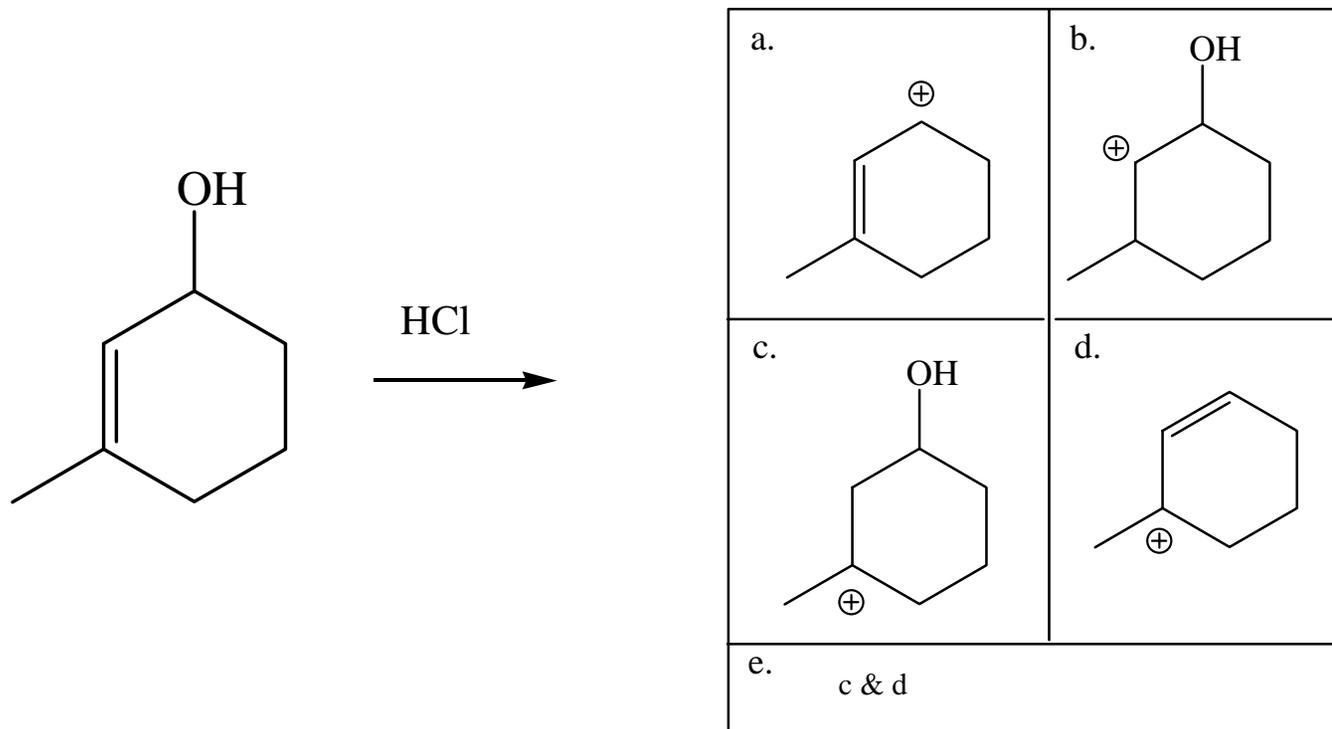
- Identify a reaction intermediate
- Identify a reaction energy diagram
 - Compare rates of reactions

All of these require knowing and understanding the reaction mechanism for the reaction given in the problem

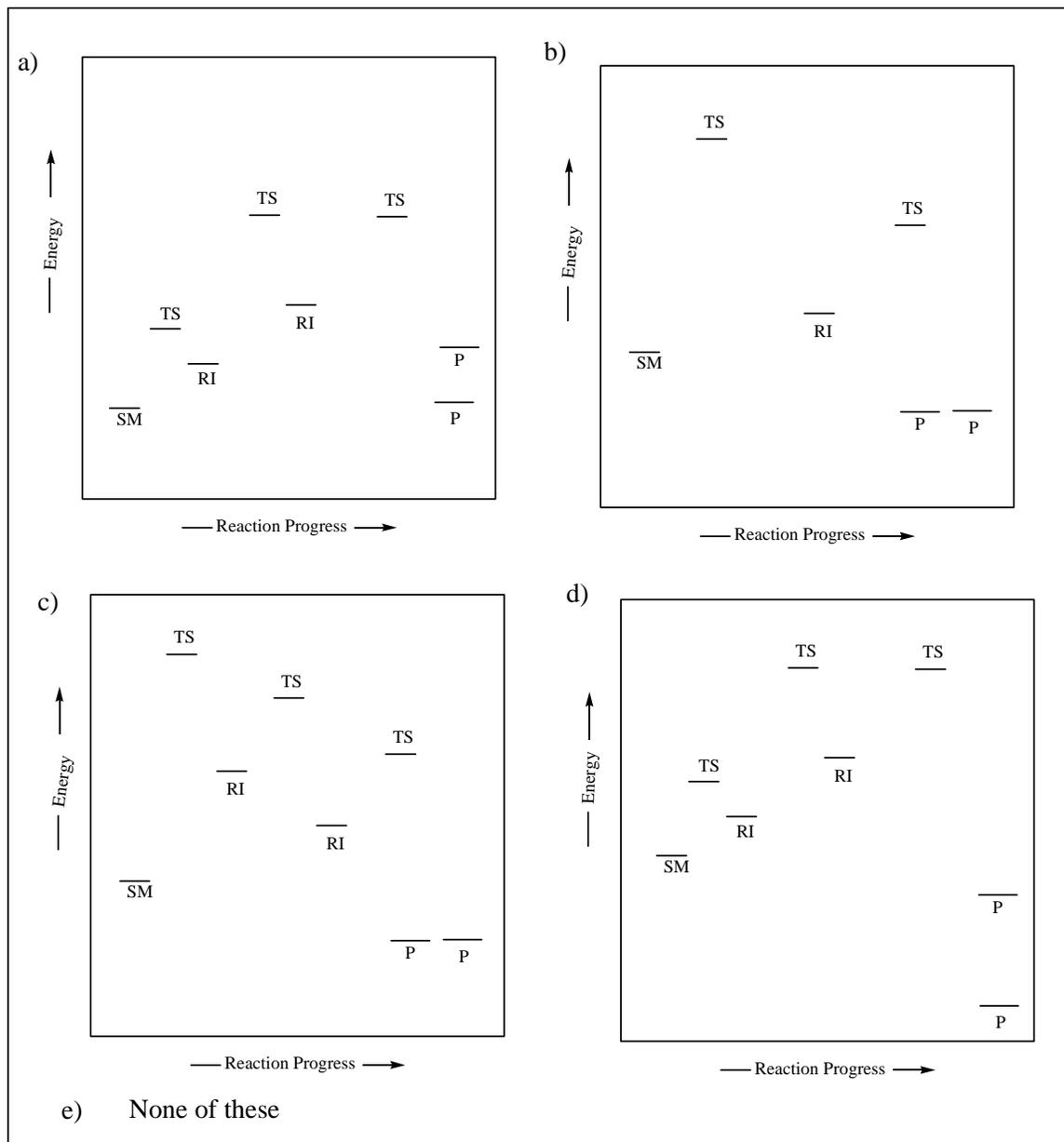
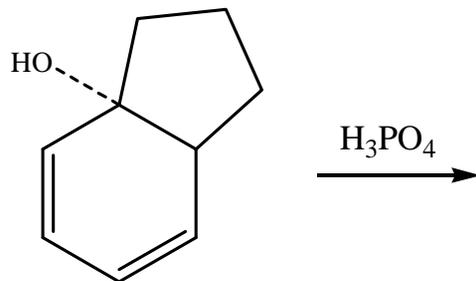
Organic Reactions

Example:

Which of the following reaction intermediates will give rise to the major kinetic product in the reaction below?



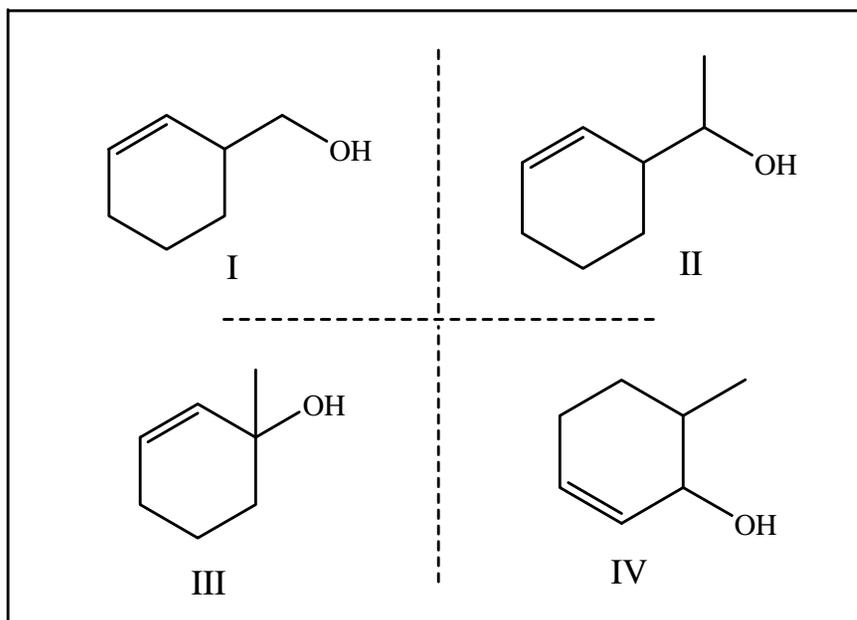
Example:



Organic Reactions

Example:

Rank the rate of the reaction (fastest>>>slowest) of the compounds given below with SOCl_2 .



- a) I>II>IV>III
- b) I>II>III=IV
- c) III>II=IV>I
- d) III>IV>II>I
- e) I>IV=II>III