

Name: _____

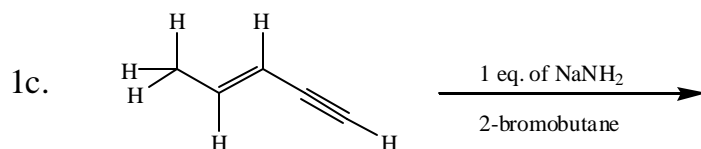
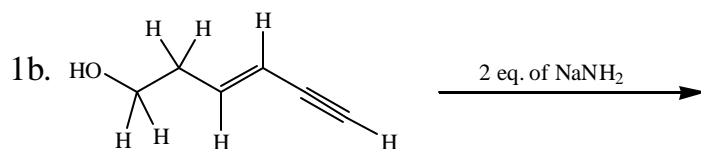
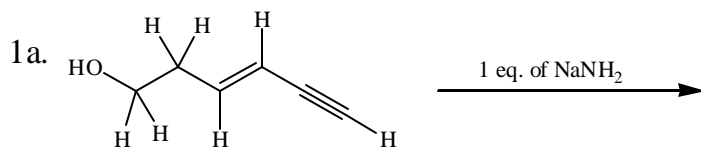
Organic Chemistry: CHEM 331

Fall 2000 - Whittier College

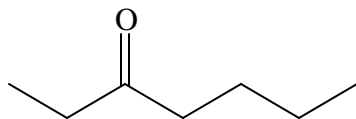
Test #5

September 6, 2001

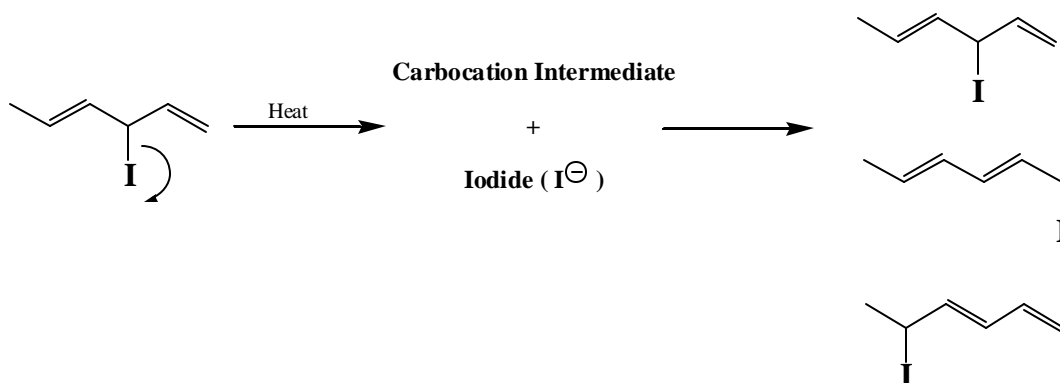
1. Predict the initial products formed in the following reactions. Briefly explain the reasons you predict your product:



2. Complete a retrosynthetic analysis on the following compound with the retrosynthetic analysis ending with hydrocarbons (alkanes, alkenes or alkynes) of 3 carbons or less. Hints: (1) Reagents are not required, but realistic reactions are. (2) There is more than one way to make this molecule, ensure that your analysis describes more than one. (3) The three carbon fragments would be the starting point for the synthesis of this molecule.

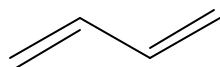


3. When 3-iodohexa-1,4-diene is heated (with no solvent present), the carbon-iodine bond is heterolytically cleaved, generating a carbocation intermediate plus Iodide. This carbocation intermediate is then trapped by the iodide to produce three products: 3-iodohexa-1,4-diene, 1-iodohexa-2,4-diene and 5-iodohexa-1,3-diene.



- 3a. What is the structure of the initial carbocation intermediate (hint: draw what the mechanism arrow shows).
- 3b. What are the resonance structures for the carbocation intermediate?
- 3c. What is the structure of the resonance hybrid?
- 3d. What is the mechanism for formation of the products?
- 3e. Which product do you think is the major product? Briefly explain.

4. Consider the π electrons of butadiene:



4a. Construct a molecular orbital diagram for butadiene by combining the molecular orbitals of ethene.

4b. Label the molecular orbitals.

4c. Depict which orbitals contain the π electrons? Explain.

4d. What is a HOMO and LUMO? Identify them on your diagrams.