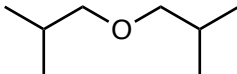
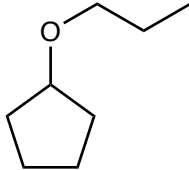
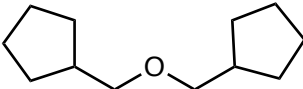
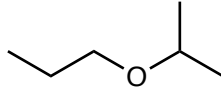
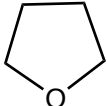
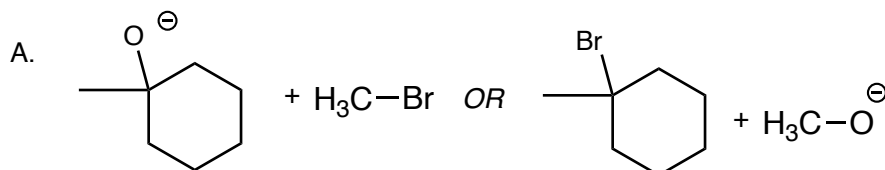


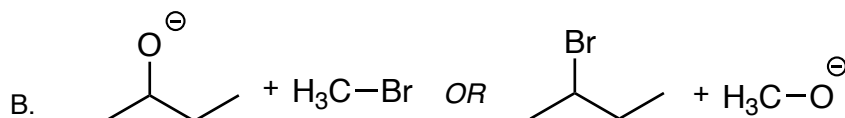
Chapter 14 Practice Problems

Solutions

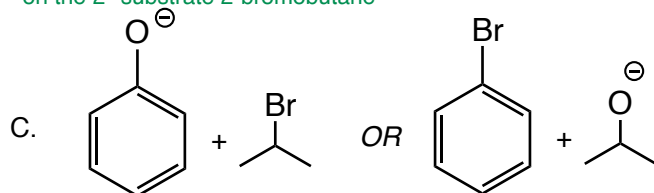
- 1
- A. This is a condensation reaction of a 1° alcohol to form a symmetrical ether 
- B. This is a Williamson ether synthesis 
- C. This is a condensation reaction of a 1° alcohol to form a symmetrical ether 
- D. This is a Williamson ether synthesis 
- E. This is a condensation reaction of a 1° alcohol to form a symmetrical ether. In this case the "two" alcohols are part of the same molecule 



• Only the FIRST method is feasible because an SN2 nucleophilic attack can't be performed on 3° substrates



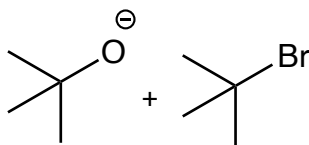
• Both ways are possible, but the first method is preferable since nucleophilic attack on methyl bromide will be easier than on the 2° substrate 2-bromobutane



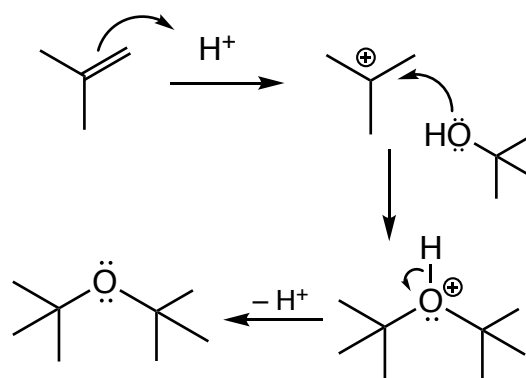
• Only the FIRST method is feasible because an SN2 nucleophilic attack can't be performed on an aryl substrate

3

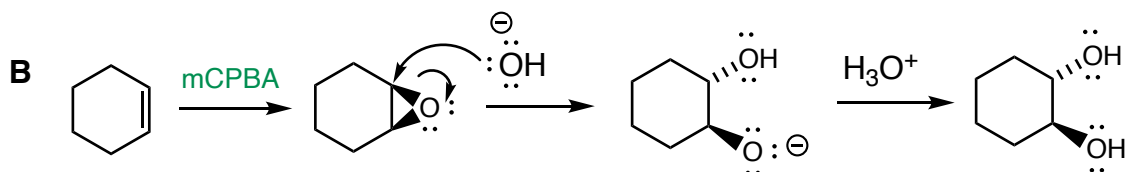
• The Williamson ether synthesis CANNOT be used since it would require an SN2 nucleophilic attack on a 3° substrate!



• The mechanism for acid catalyzed formation is below:



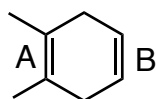
A 1. $\text{OsO}_4, \text{H}_2\text{O}$
 2. tert-BuOOH/NaOH or $\text{KMnO}_4, \text{NaOH}, \text{H}_2\text{O}$



4

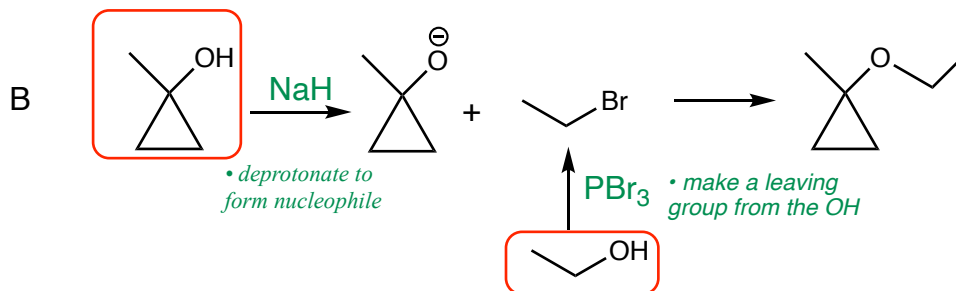
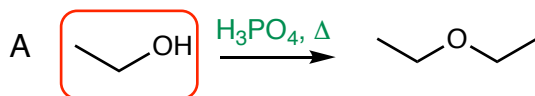
Note: as in the $\text{S}_{\text{N}}2$ reaction, attack occurs from the opposite side of the bonds to O

5

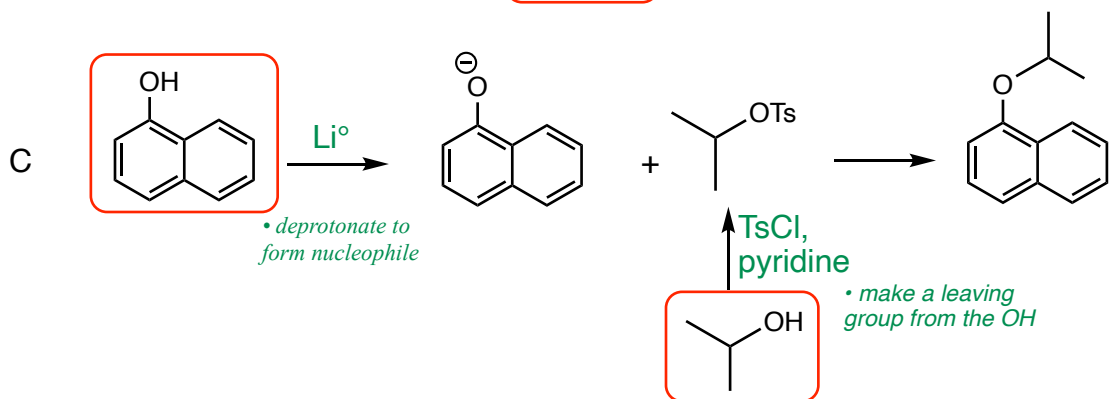


- double bond A is tetrasubstituted while double bond B is disubstituted
- increasing substitution increases the rate of reaction with electrophiles because the $\text{C}=\text{C}$ bond becomes increasingly electron rich
- therefore, bond A reacts much faster than the bond B with the electrophilic peroxyacid to form only the observed product

Note: starting material alcohols are boxed in red



6



7

