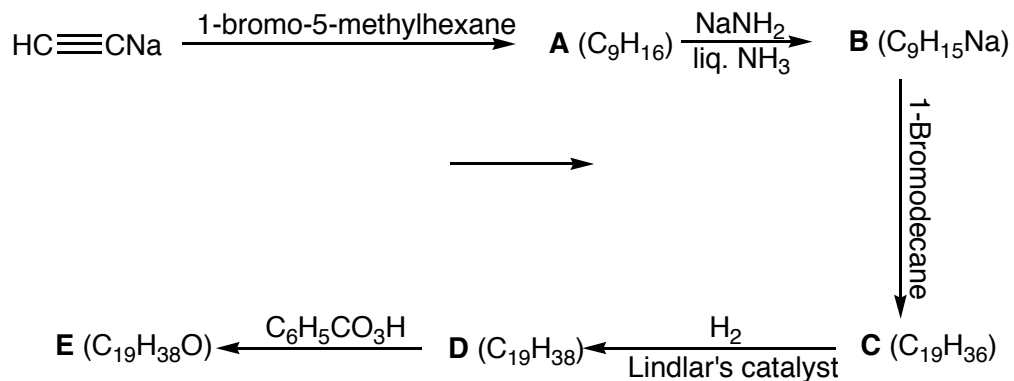
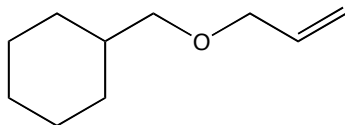


1. Write a mechanism that explains the formation of tetrahydrofuran (THF) from the reaction of 4-chloro-1-butanol and aqueous sodium hydroxide.
2. Outlined below is a synthesis of the gypsy moth sex attractant **E**. Give the structure of the gypsy moth sex attractant **E** and of the intermediates, **A-D**, in the synthesis.



3. Synthesize the following ether using the Williamson ether synthesis.



4. Draw the expected product of a Sharpless asymmetric epoxidation of the following allylic alcohol using (+)-diethyl tartrate as the chiral catalyst.

