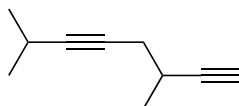
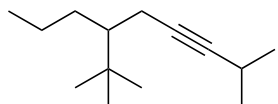
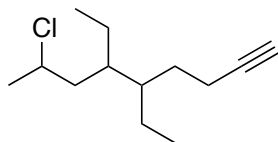


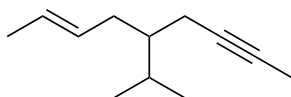
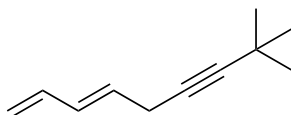
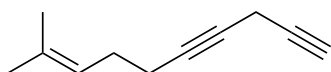
Chemistry 233
Chapter 9 Problem Set

Nomenclature

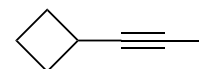
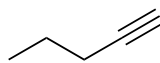
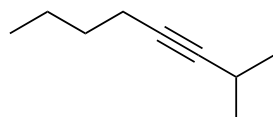
1) Provide the IUPAC name for each of the alkyne containing compounds below.



2) Provide the IUPAC name for each of the enyne compounds below.

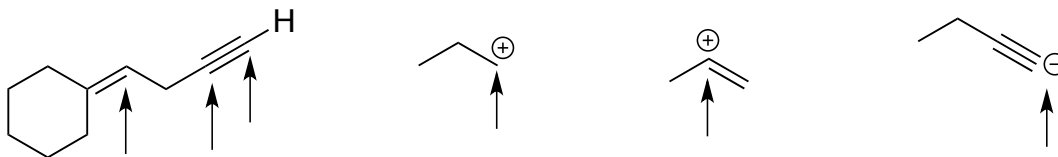


3) Provide the common name for each compound below.



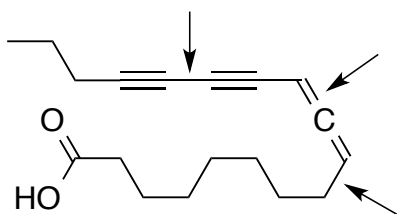
Structure and Properties of Alkynes

4) For each indicated carbon atom determine its hybridization.



5) The smallest cycloalkyne that has been isolated and stored is cyclooctyne. Explain why alkynes do not exist in smaller rings.

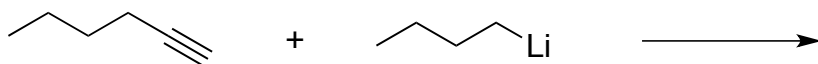
6) Consider phomallenic acid C (shown below), an inhibitor of bacterial fatty acid synthesis.



- Circle the most acidic position.
- What is the shortest C-C single bond?
- How many sp hybridized atoms are present in the molecule?
- For the bonds indicated with arrows, determine the orbitals that make up the bond.

7) Thinking back to our discussion of acid/base chemistry in Chapter 2, explain why sodium amide (NaNH_2) is a strong enough base to deprotonate a terminal alkyne.

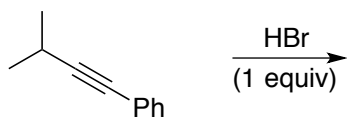
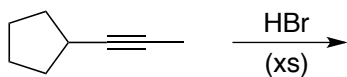
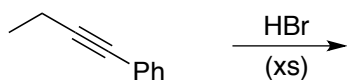
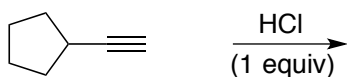
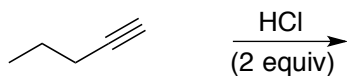
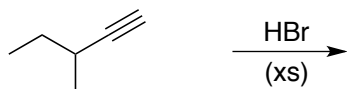
8) Draw the products from the acid base reaction shown below. Label the nucleophilic site in the product. Show curved arrows to demonstrate the flow of electrons.



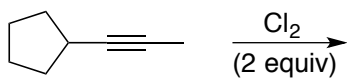
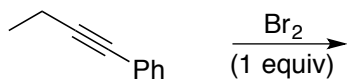
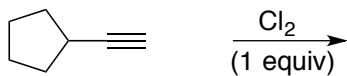
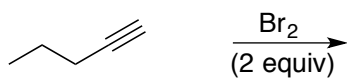
9) Show how the nucleophile generated above would react with iodoethane.

Reactions and Mechanisms

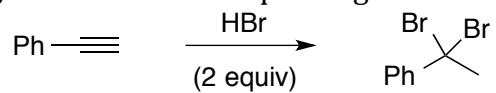
10) Predict the product(s) for each halogen addition below.



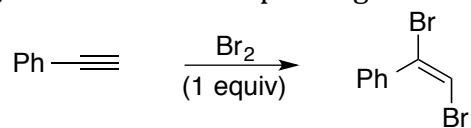
11) Predict the products for each halogenation reaction shown below.



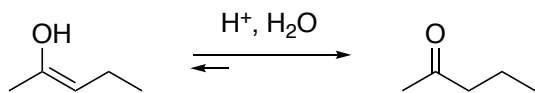
12) Draw the electron pushing mechanism for the reaction shown below.



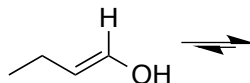
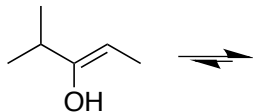
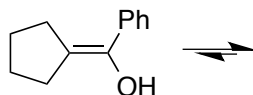
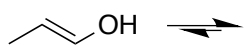
13) Draw the electron pushing mechanism for the reaction shown below.



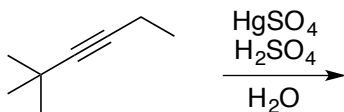
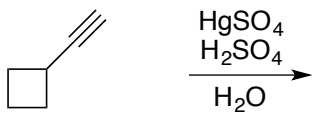
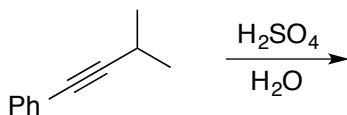
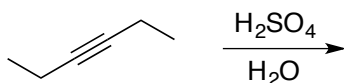
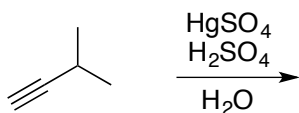
14) Draw the electron pushing mechanism for the acid catalyzed tautomerization of (*Z*)-2-penten-2-ol.



15) Draw the aldehyde/ketone form for the following enol tautomers

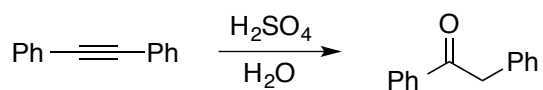


16) Predict the products for the acid and mercury(II) catalyzed hydration reactions shown below.

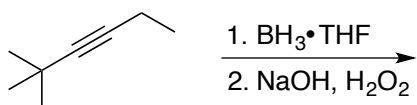
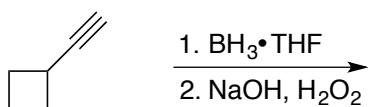
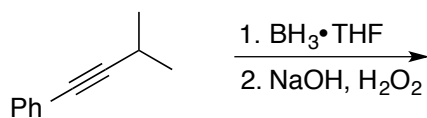
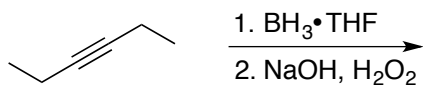
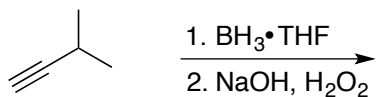


Although Hg^{2+} isn't necessary, it can be used to catalyze the hydration of internal alkynes.

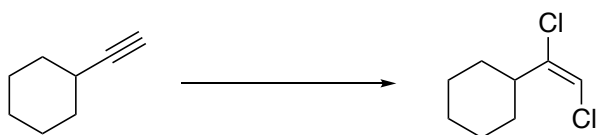
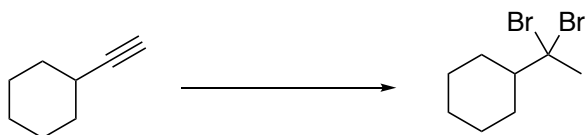
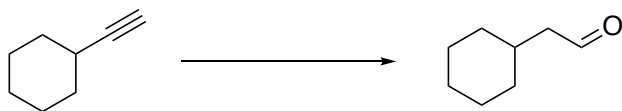
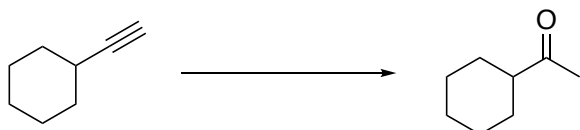
17) Draw the electron pushing mechanism for the acid catalyzed hydration reaction below.



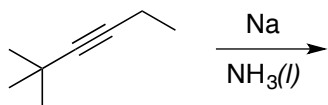
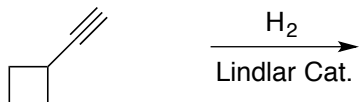
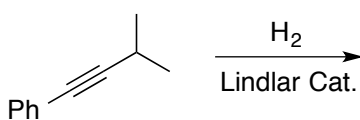
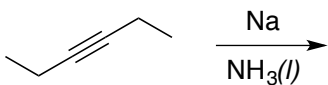
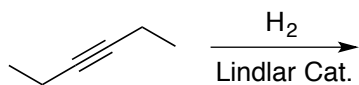
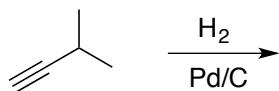
18) Predict the products for the hydroboration-oxidation reactions shown below.



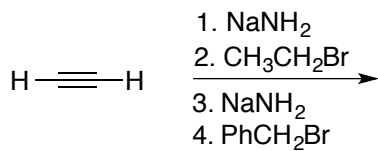
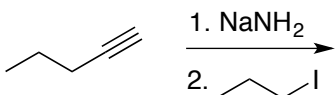
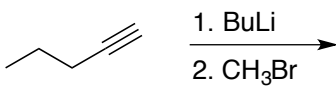
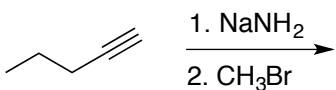
19) Determine the necessary reagents to carry out each of the interconversions shown below.



20) Predict the products for the alkyne reduction reactions shown below.

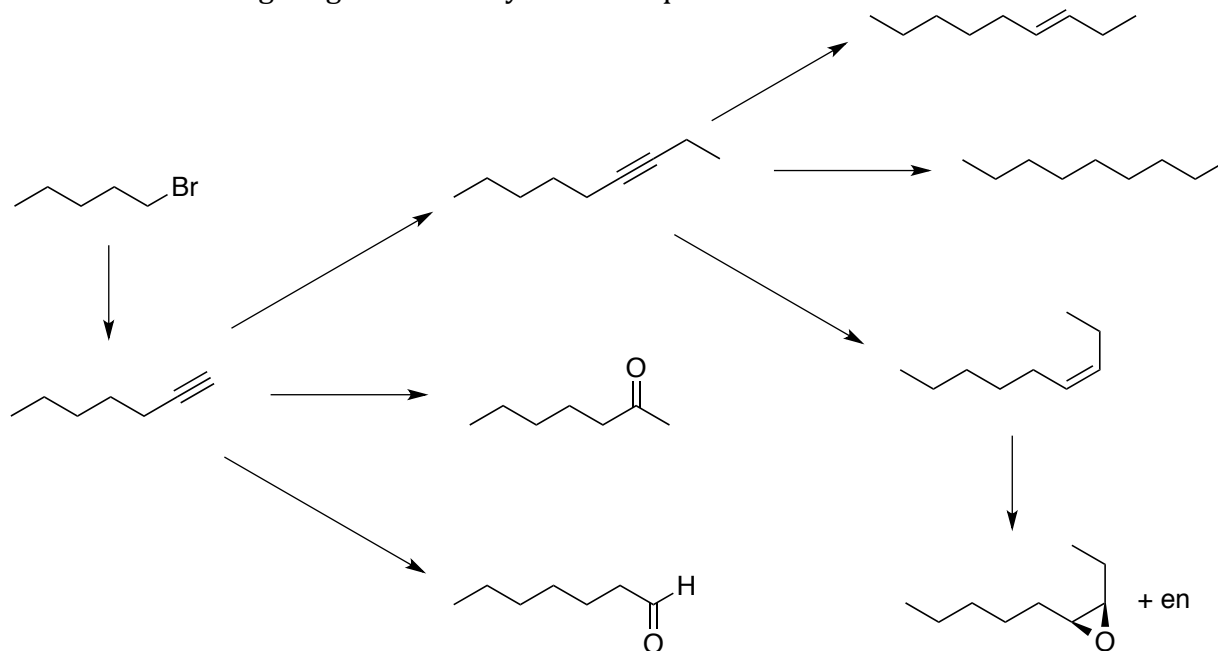


21) Predict the product for each alkylation reaction below.



Synthesis

22) Provide the missing reagents in the synthetic sequence shown below.



23) Provide a reasonable synthesis for each of the following compounds using the provided starting material.

