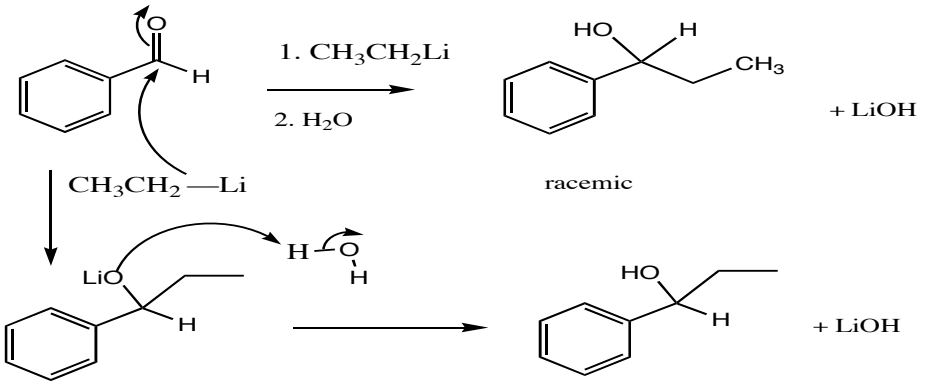
Additional Problems for practice:

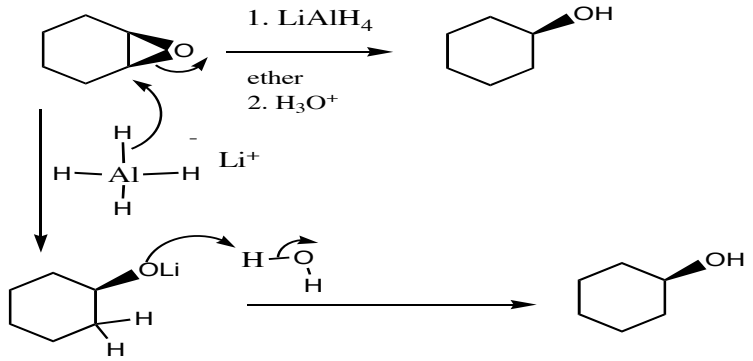
1. Draw a mechanism for the following transformations, using the curved arrow notation to indicate the reorganization of electron density. Show all intermediates, unshared electrons, formal charges and countercharges where appropriate. Explain why a racemic mixture is formed in (a):

(a)

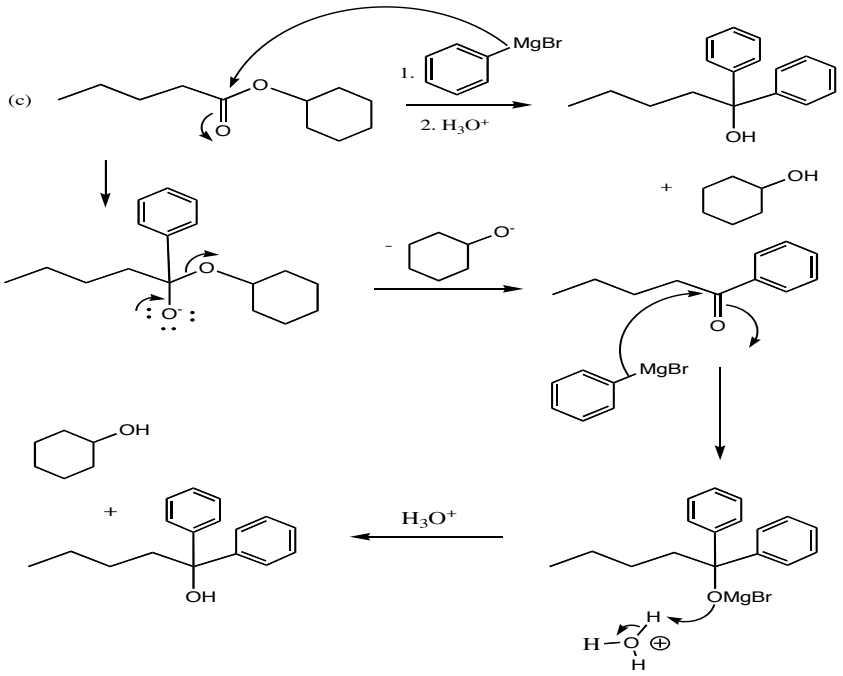


a racemic mixture is formed because ethyllithium can attack from either face of the aldehyde carbonyl

(b)

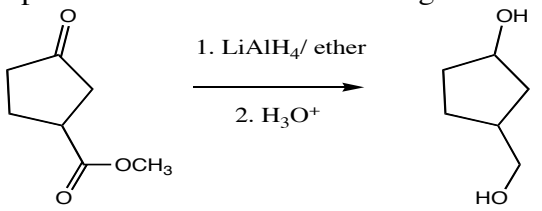


(c)

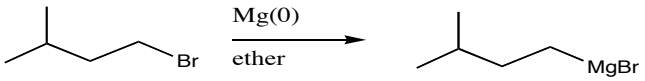


2. Write the major product of each of the following reactions:

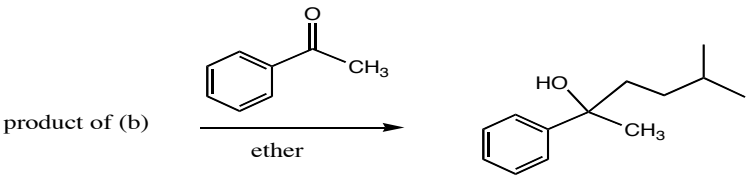
(a)



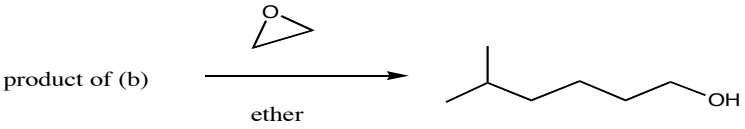
(b)



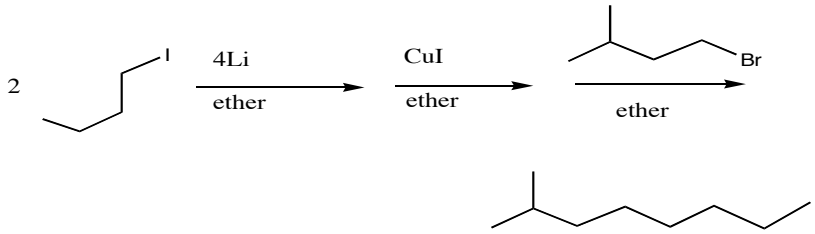
(c)



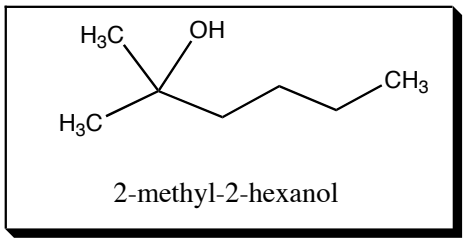
(d)



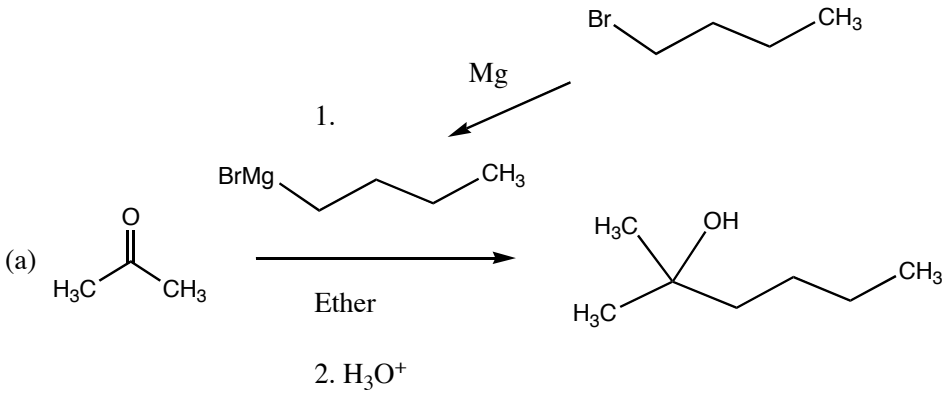
(e)

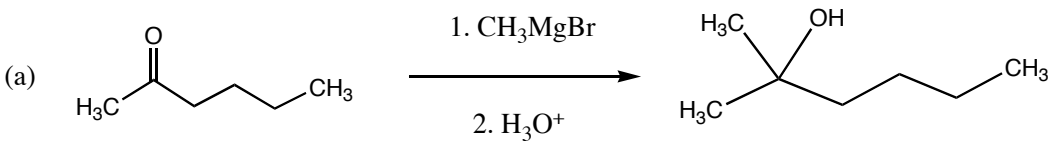


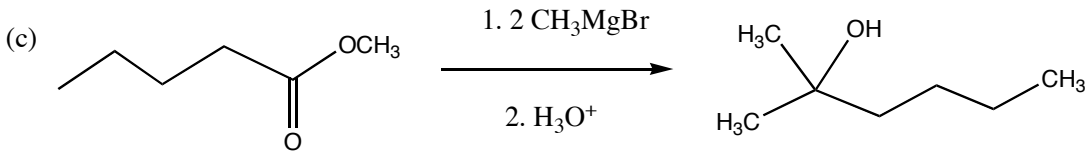
3. Devise four different syntheses of 2-methyl-2-hexanol starting with each of the following compounds:

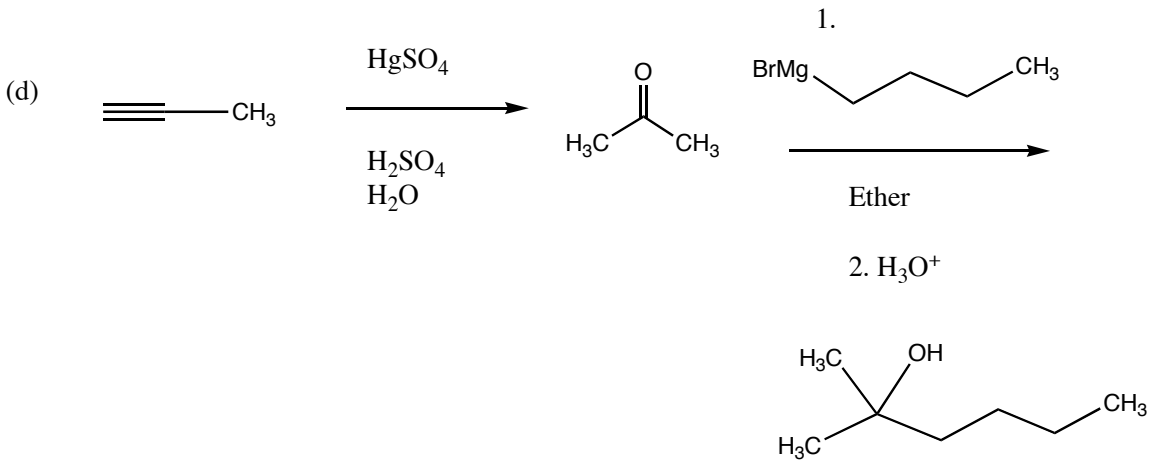


2-methyl-2-hexanol





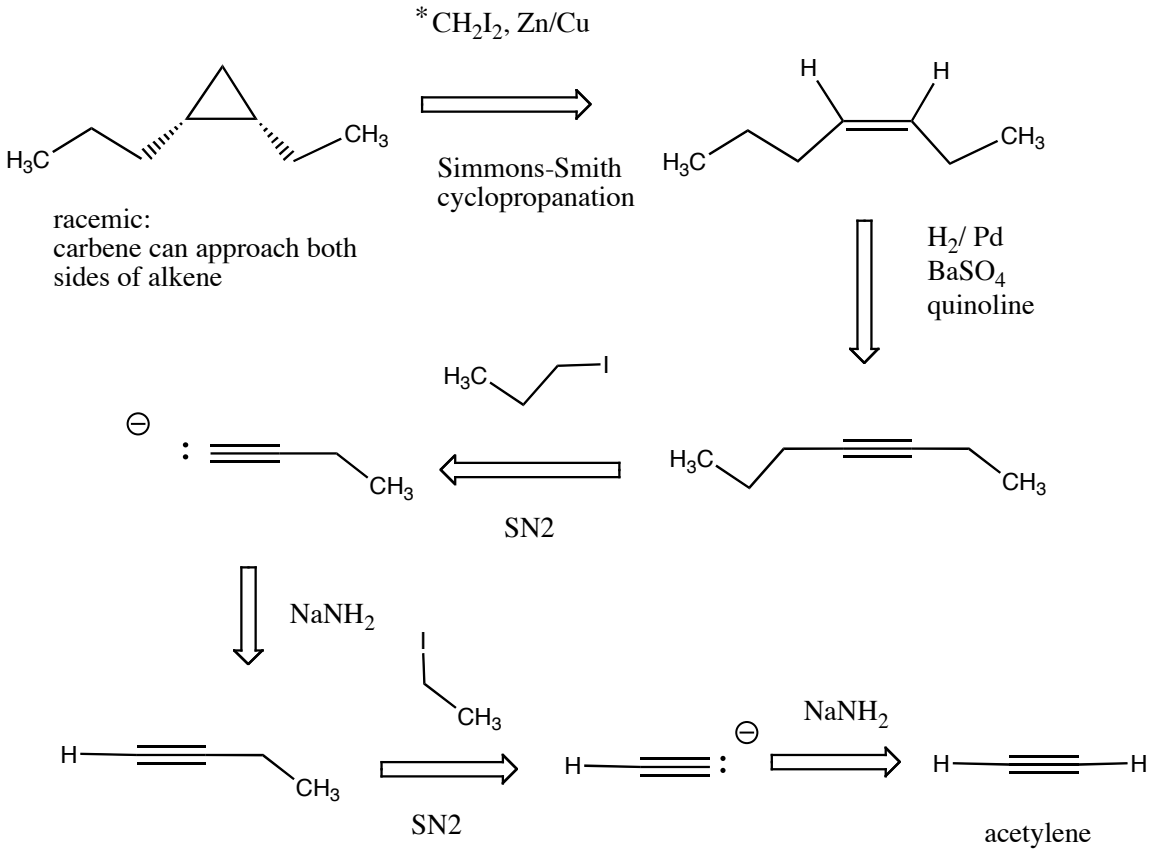




Additional Problems for practice:

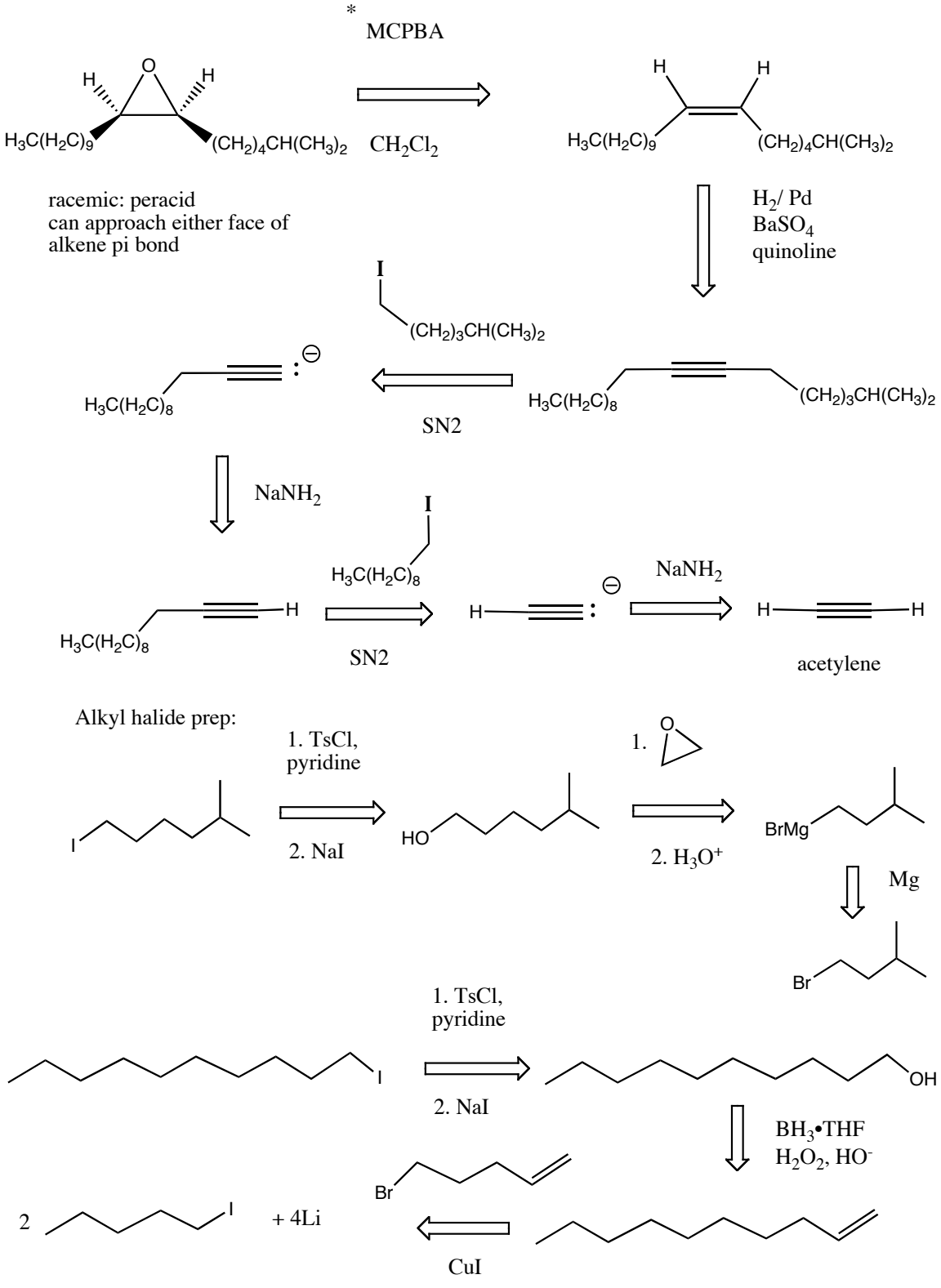
1. Design a synthesis of the following racemic cyclopropane starting from acetylene, organic compounds containing three or fewer carbons, and any inorganic reagents necessary. Note with a star each step that creates a chiral product, explain why each starred step affords a racemic mixture.

Retrosynthetically:

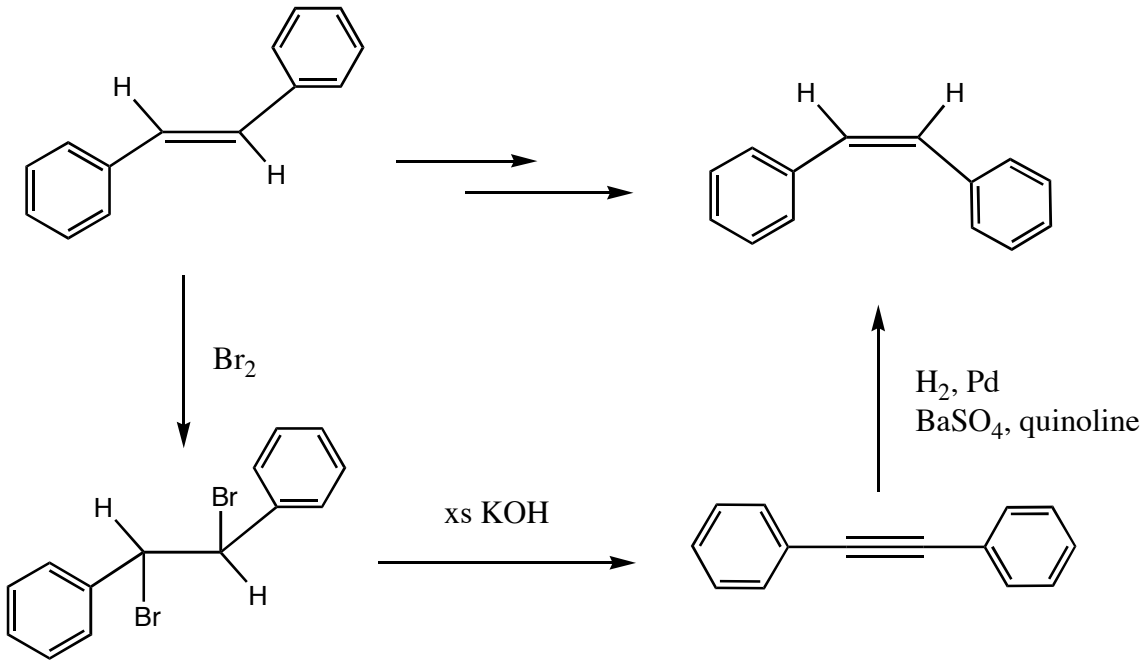


2. Outline a preparation of racemic disparlure from acetylene and any other compound containing not more than five carbon atoms. Note with a star each step that creates a chiral product, explain why each starred step affords a racemic mixture

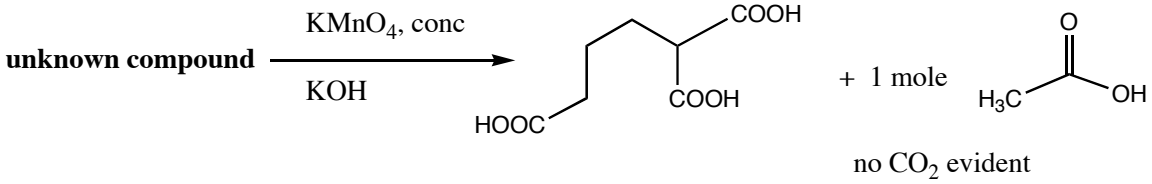
Retrosynthetically:



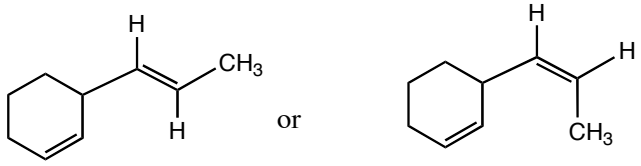
3. Explain how you could accomplish the following isomerization in a three-step sequence:



4. Propose a structure for the unknown compound given the following data:



No CO_2 means no terminal alkene present; since there is only 1 mole of acetic acid given off but we have three carboxylic acids, there must be a ring in the original molecule

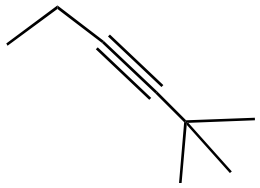


Additional Problems for practice:

Additional Problems for practice:

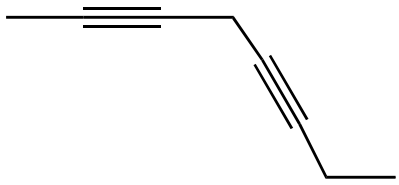
1. Provide proper IUPAC names for the following:

(a)



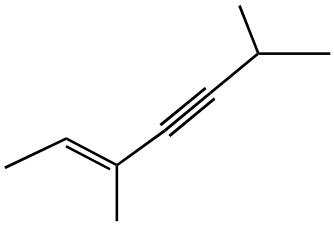
2,2-dimethylhex-3-yne

(b)



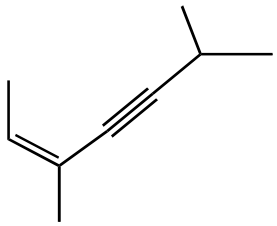
octa-2,5-diyne

(c)



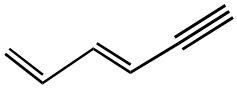
(*E*)-3,6-dimethylhept-2-en-4-yne

or



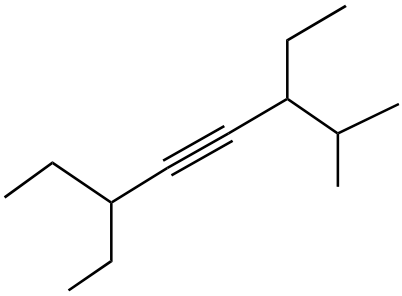
(*Z*)-3,6-dimethylhept-2-en-4-yne

(d)



(*E*)-hexa-1,3-dien-5-yne

(e)

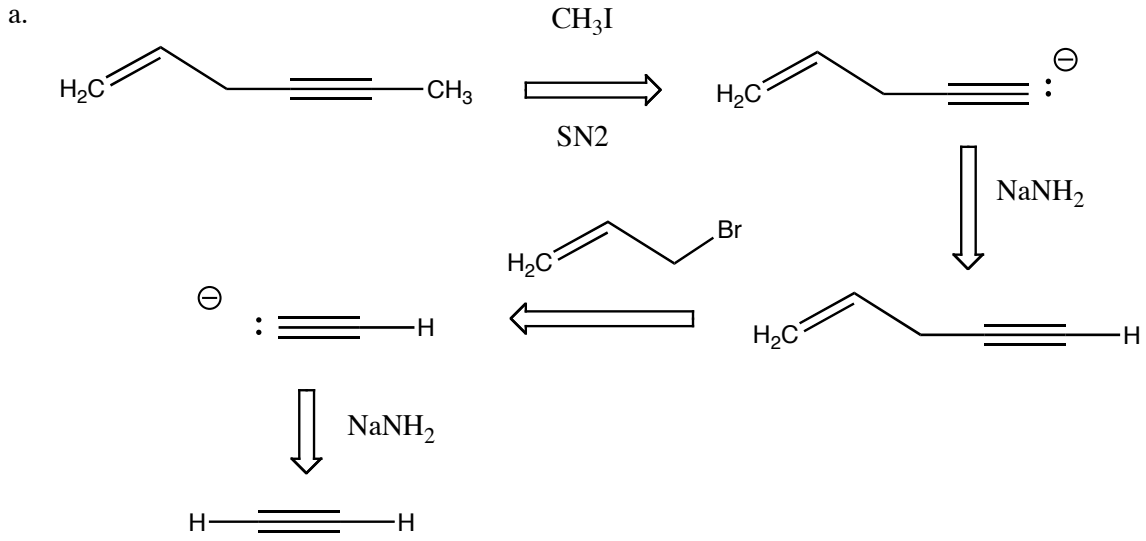


3-ethyl-6-isopropyloct-4-yne

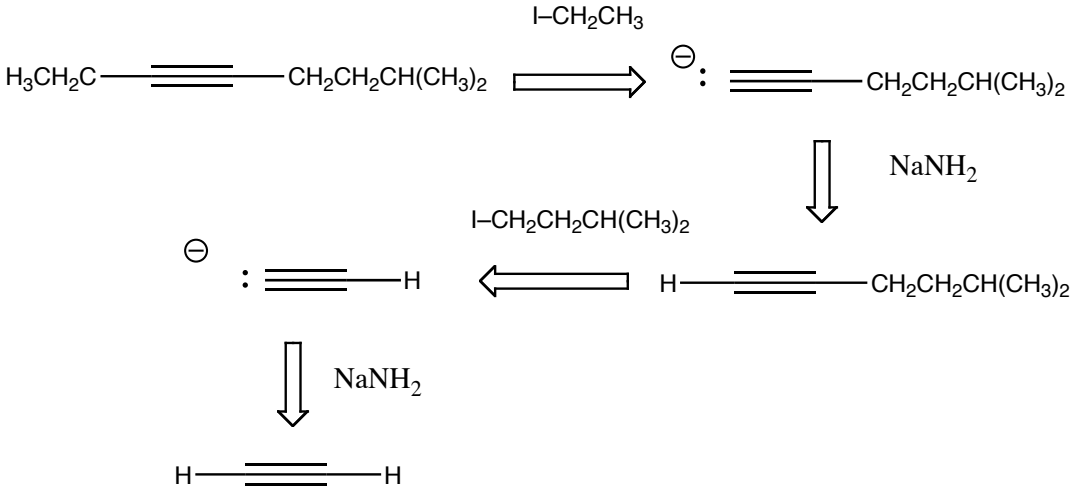
4. How might you prepare the following compounds from acetylene and any needed alkyl halide?

Retrosynthetically:

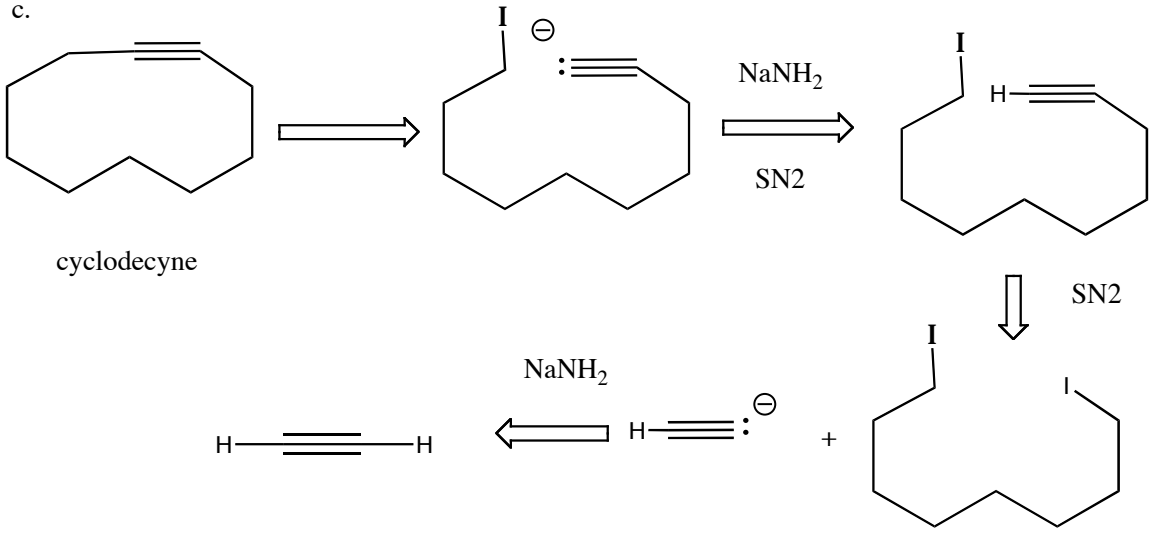
a.



b.

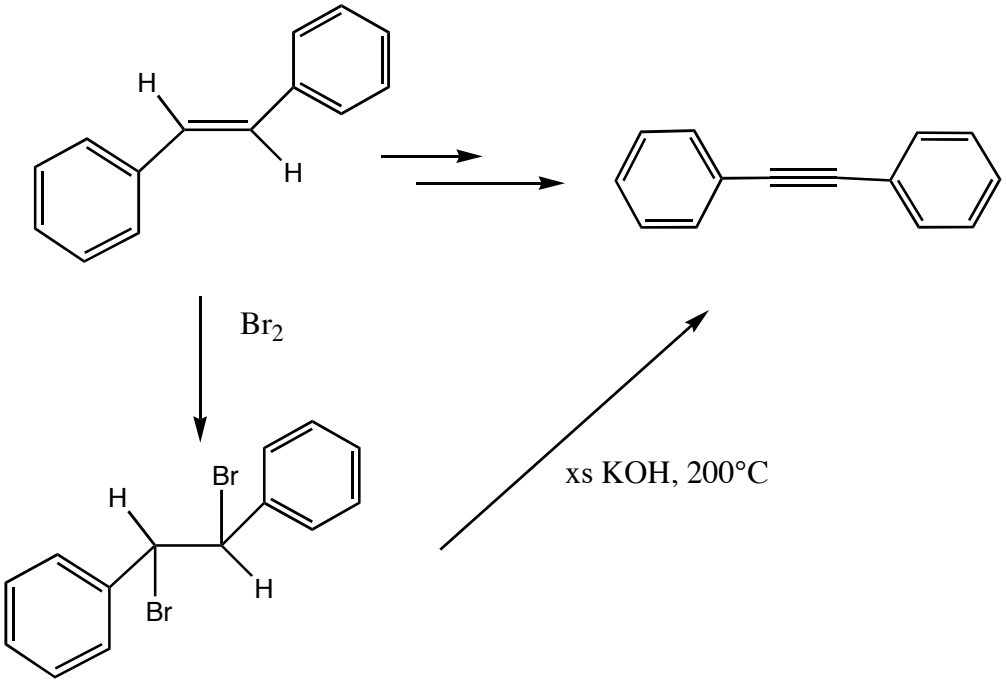


c.

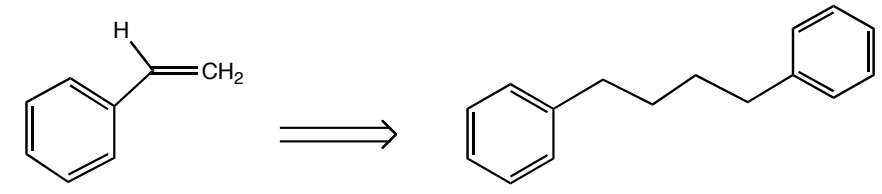


cyclodecyne

3. How would you accomplish the following conversion (2 steps):



4. Assuming that H_2/Pd can reduce alkynes to alkanes, how would you synthesize the following compound starting with styrene, and using only the reagents Br_2, HBr/peroxides, $NaNH_2$, and H_2/Pd? More than one step is needed.



styrene

HBr
ROOR
heat