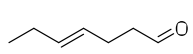
CHM 2120 – Assignment 7
ANSWERS

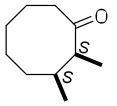
In this assignment:

- Oxidation of alcohols
- Nucleophilic addition to carbonyls
- Acetals and derivatives
- Wittig reaction
- Baeyer-Villiger reaction

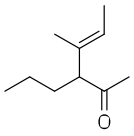
1. Provide names for the following compounds

a) 

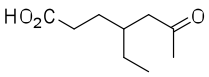
(*E*)-hept-4-enal

b) 

(2*S*,3*S*)-2,3-dimethylcyclooctan-1-one (best)
cis-2,3-dimethylcyclooctan-1-one (acceptable)

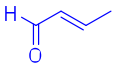
c) 

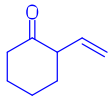
(*E*)-4-methyl-3-propylhex-4-en-2-one

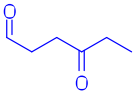
d) 

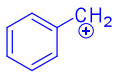
4-ethyl-6-oxoheptanoic acid

2. Draw the structure corresponding to the following names:

a. (E)-2-butenal 

b. 2-ethenylcyclohexanone 

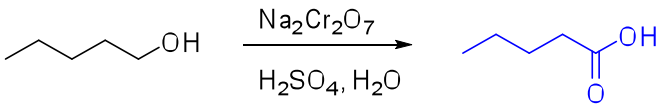
c. 4-oxohexanal 

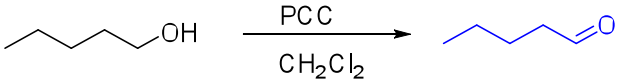
d. the benzyl carbocation 

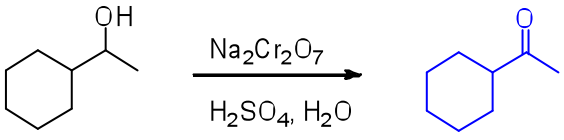
e. 1-phenylethanone (acetophenone) 

3.

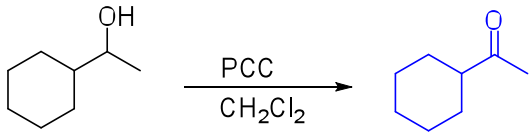
a. Give the product of the following reactions
b. Explain, using a mechanism, why the product from parts a and b are different

i. 

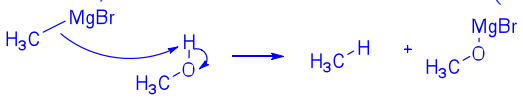
ii. 

iii. 

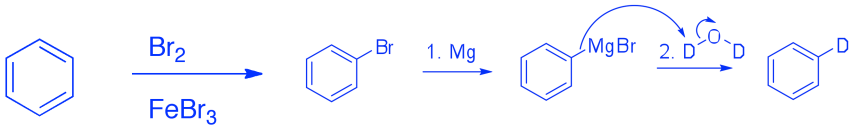
iv.



4. Can Grignard reactions be conducted in protic solvents? Explain.
NO. The Grignard reagent, such as methylmagnesium bromide would be destroyed through an acid/base reaction with the solvent (such as methanol).



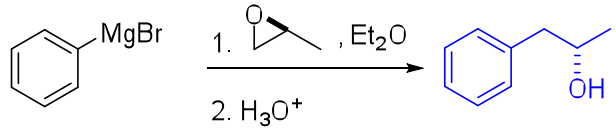
5. How could you synthesize the following deuterium-labeled compound from benzene?



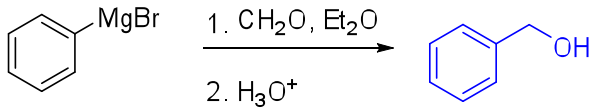
6. Give the products of the following reactions:

You should be able to draw the mechanism for each reaction.

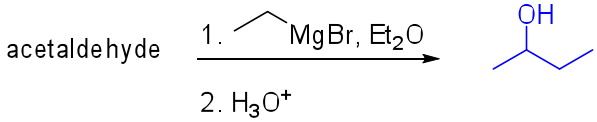
a)



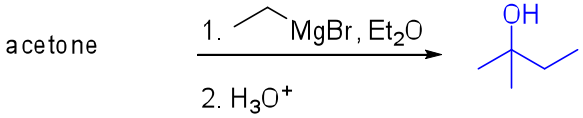
b)



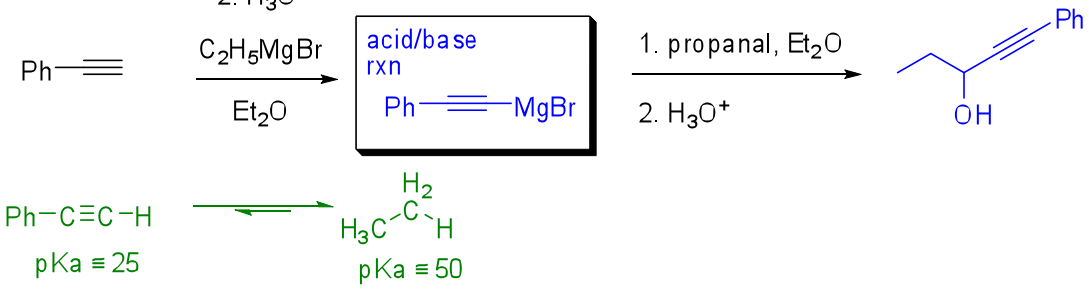
c)



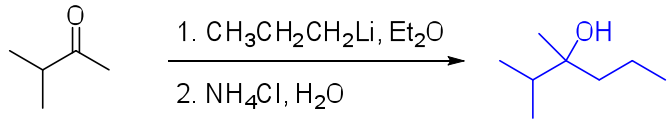
d)



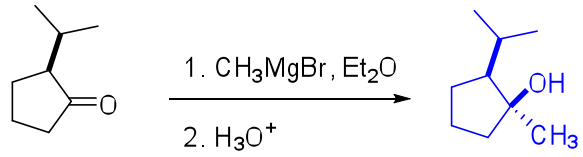
e)



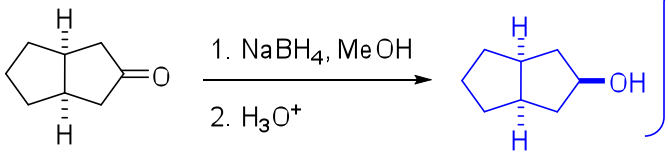
f)



g)

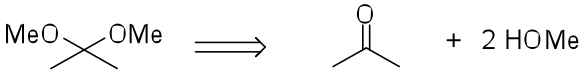


h)

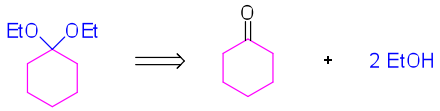


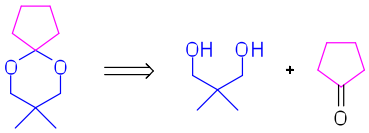
In each case, the reagent approached from the less hindered side of the molecule

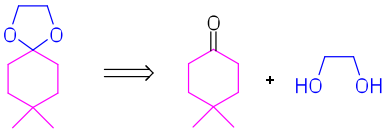
7. Which compounds were used to make the following acetals?

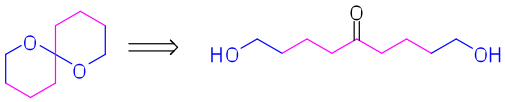
Example: 

*be sure that you can draw the mechanism for each transformation

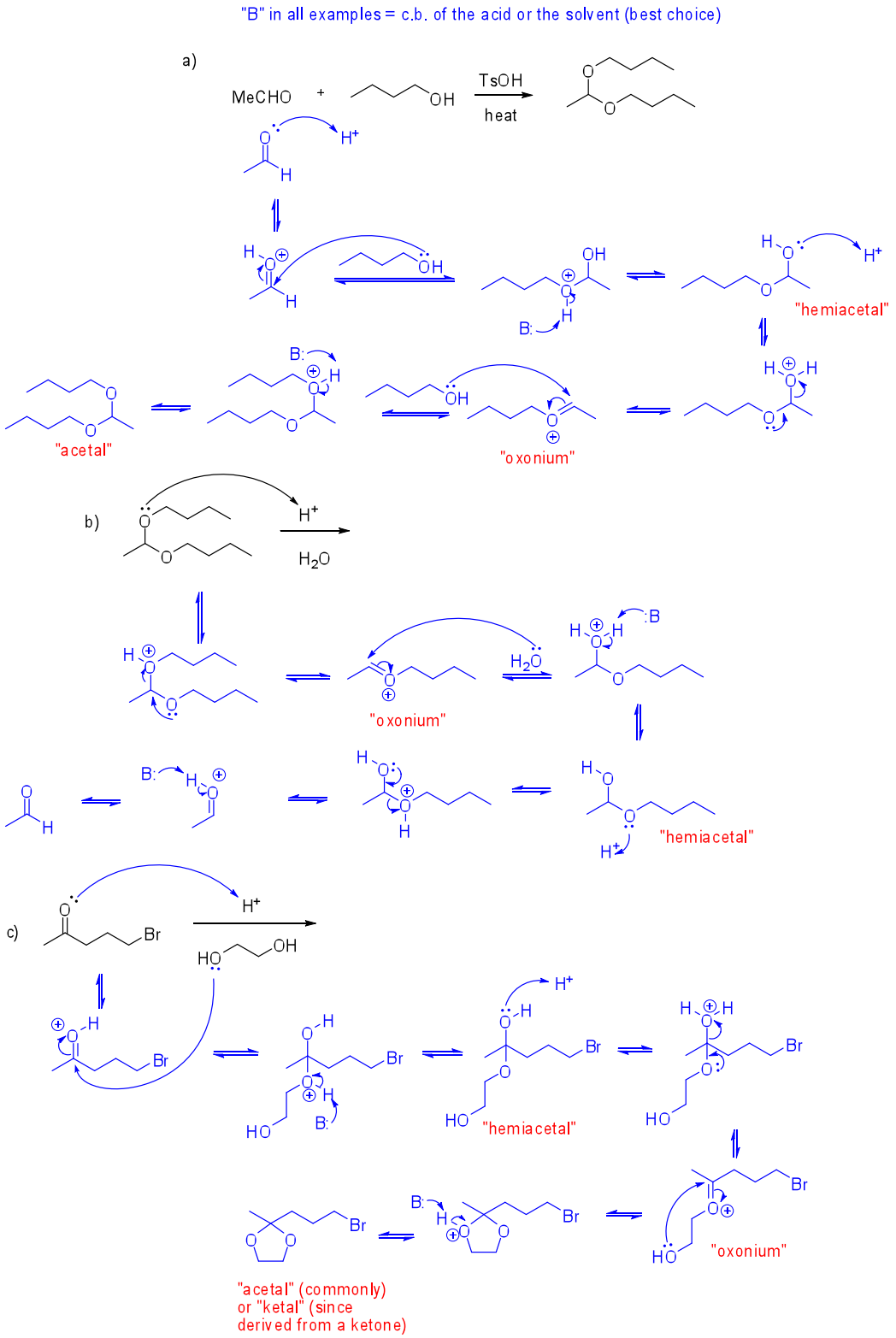
a) 

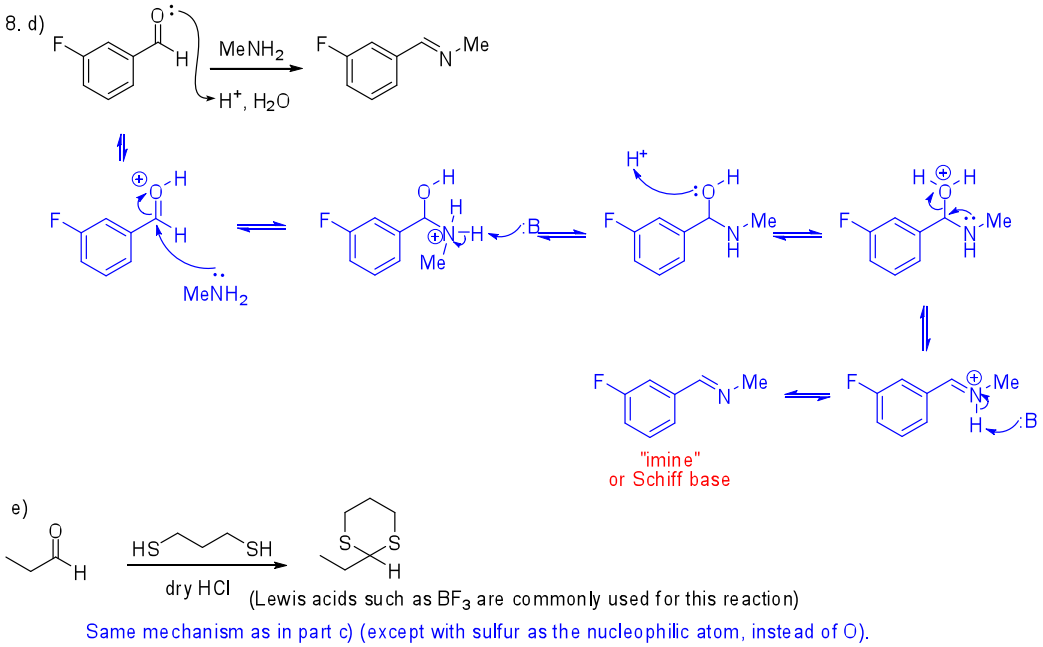
b) 

c) 

d) 

8. Draw a mechanism for the following transformations and name the key intermediates:

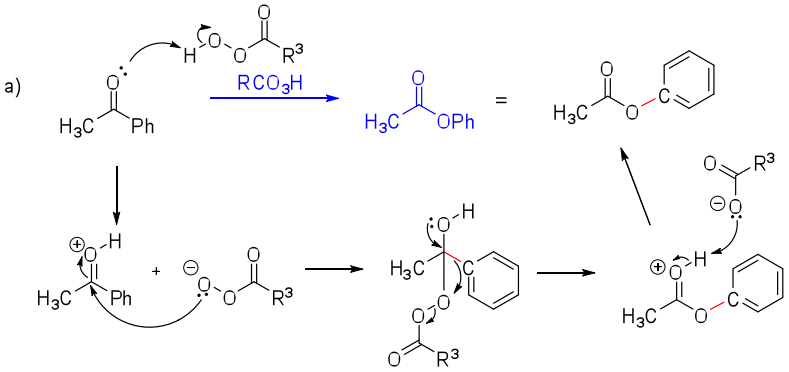




(Lewis acids such as BF_3 are commonly used for this reaction)

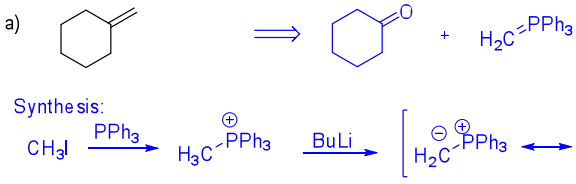
Same mechanism as in part c) (except with sulfur as the nucleophilic atom, instead of O).

9. Give the product of the following process of the reactant shown with RCO_3H (i.e. MCPBA) and give the mechanism for the reaction in part a).

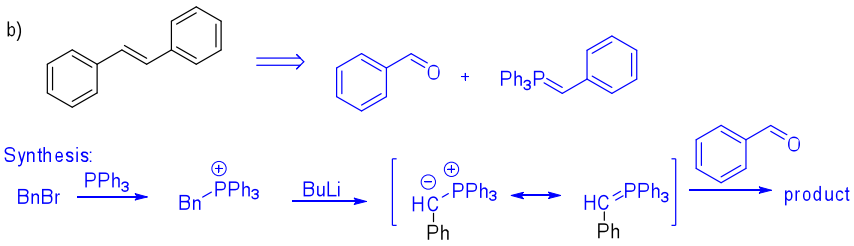


10. How would you synthesize each of the following alkenes using the Wittig reaction?

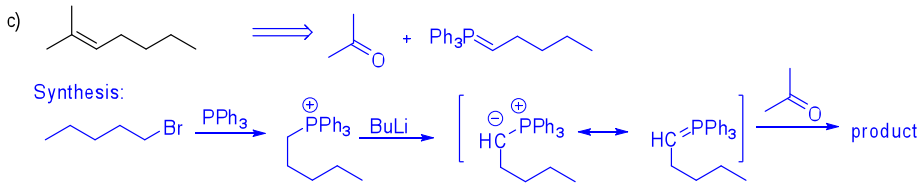
a)



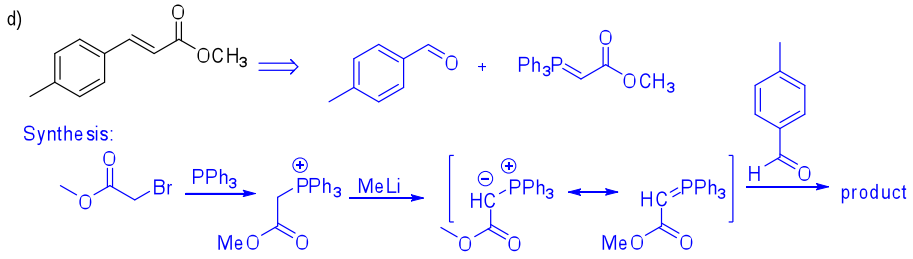
b)



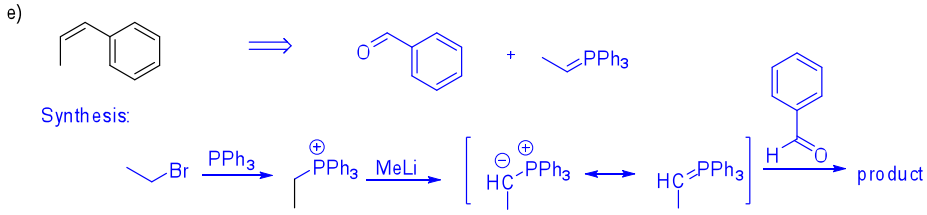
c)



d)

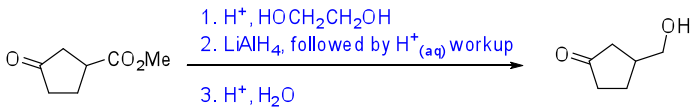


e)

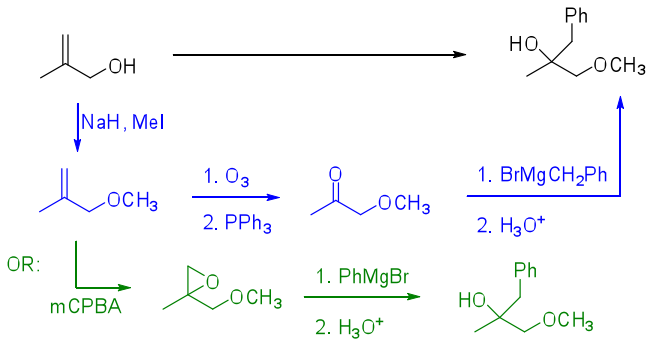


11. How could you accomplish the following transformations?

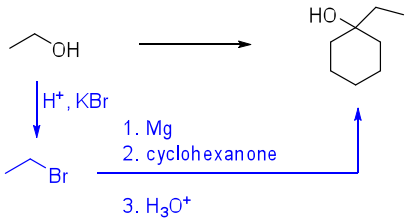
a)



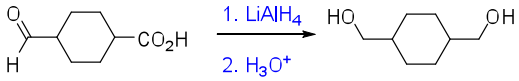
b)



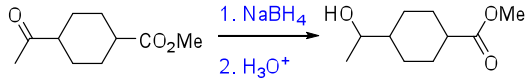
c)



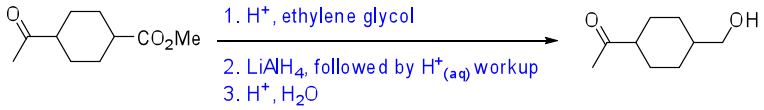
d)



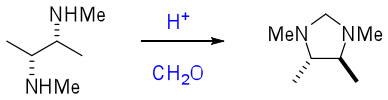
e)



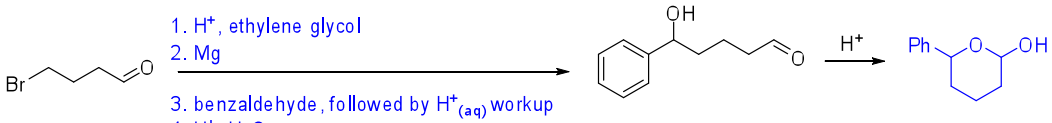
f)



g)

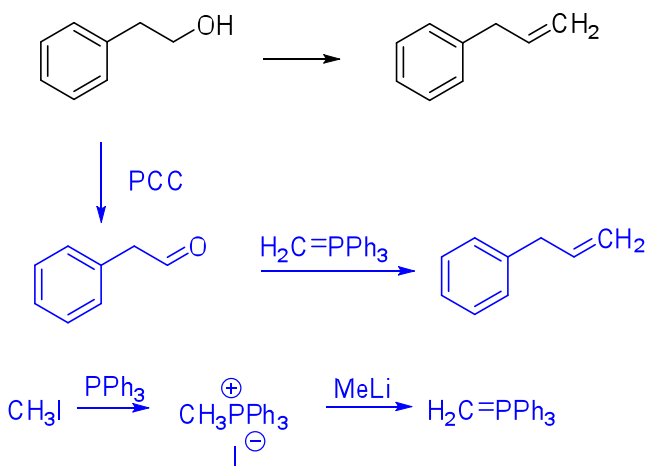


h)

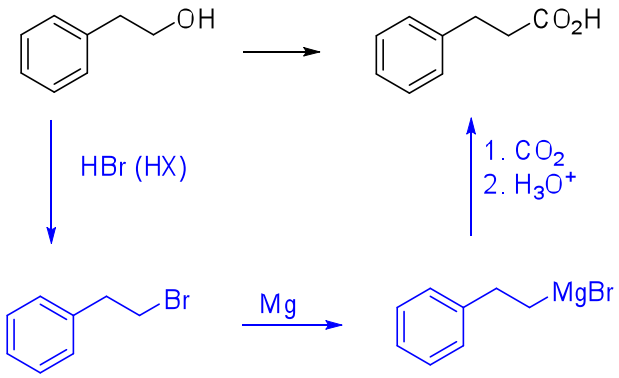


12. What reagents are required to carry out the following conversions? Multiple steps are required.

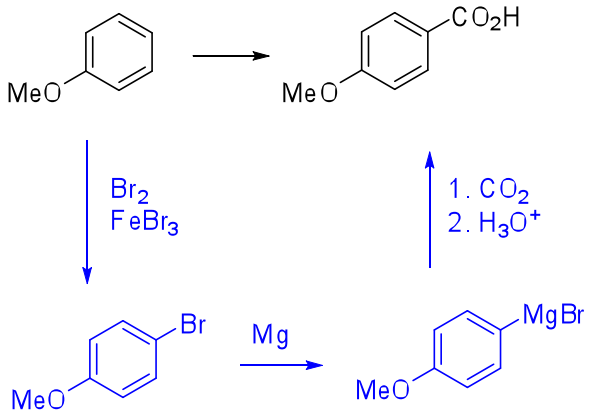
a.



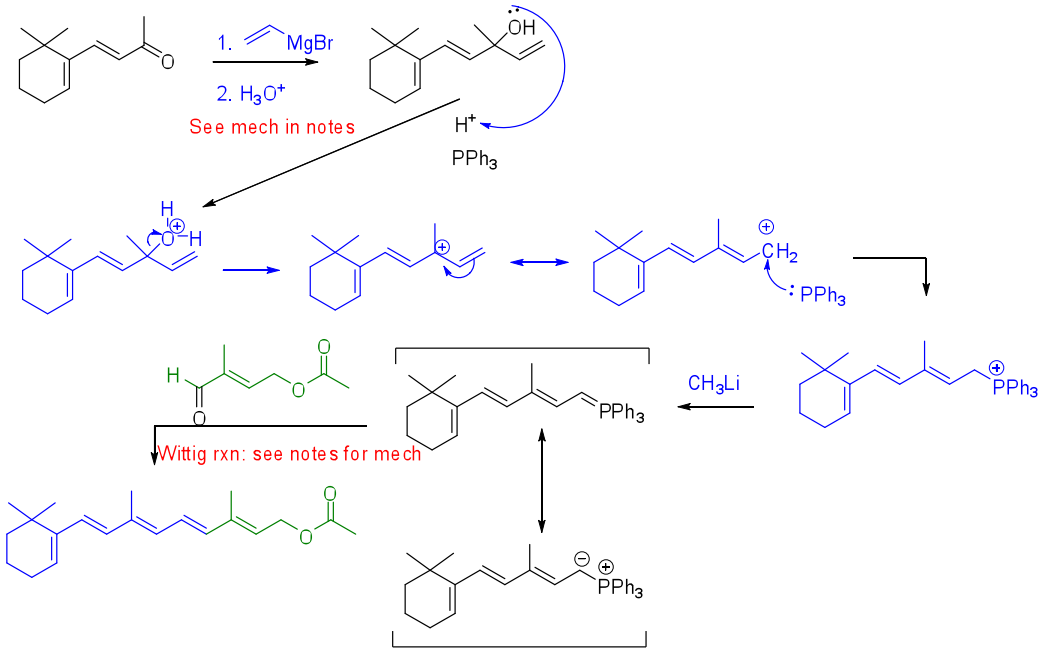
b.



c.

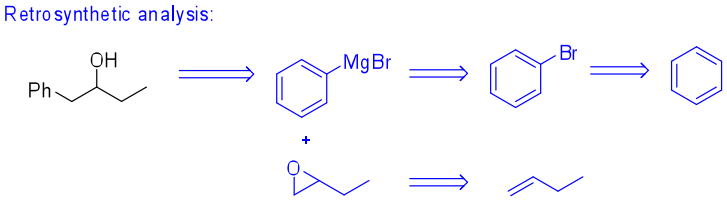


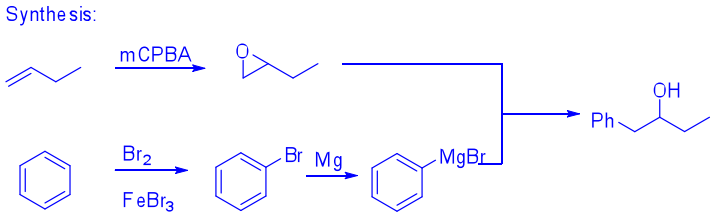
13. How could you accomplish the following transformations? Draw a mechanism for each step:



14. Outline the synthesis of the following compounds from any alkene, alkyne, or aromatic starting materials possessing 6 carbons or less.

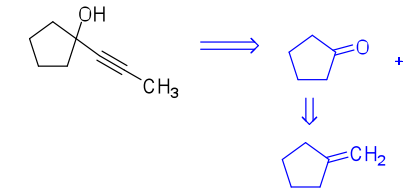
a)



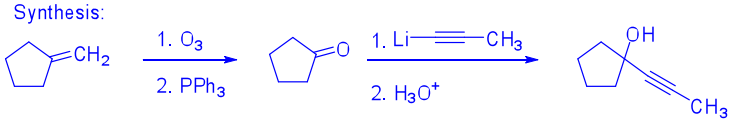


14. cont.

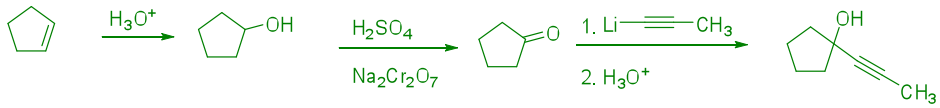
b) Retrosynthetic analysis:



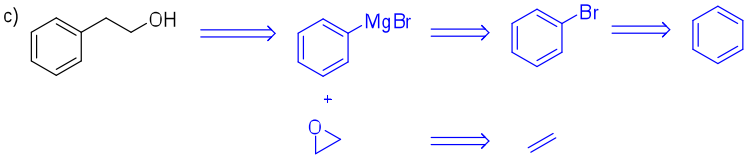
Synthesis:



Alternative synthesis:



c)



Synthesis: