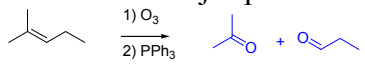
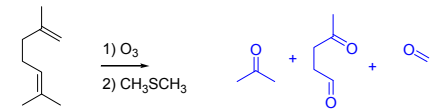
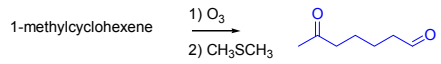
CHM 1321
Assignment 7 Answers

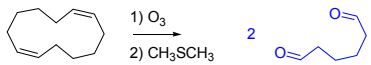
Some questions may have more than one answer. For most questions, only one possible solution is presented. If you are not sure if one of your answers is correct please check with your TA or myself.

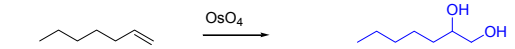
1) Predict the major product of the following reactions:

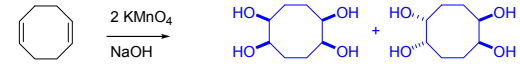
a) 

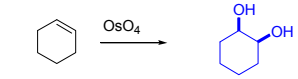
b) 

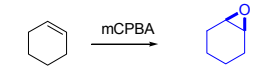
c) 

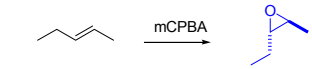
d) 

e) 

f) 

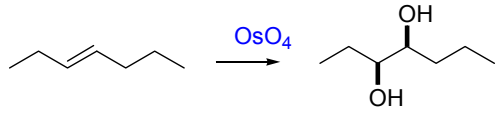
g) 

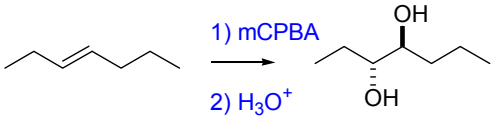
h) 

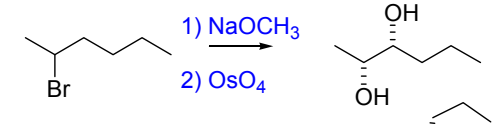
i) 

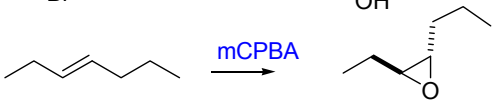
j) 

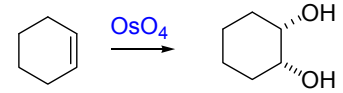
2) Propose efficient methods to achieve the following transformations (some may require more than one step):

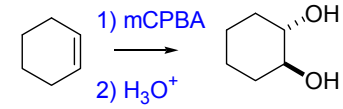
a) 

b) 

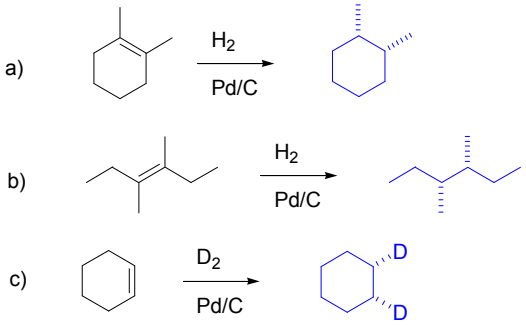
c) 

d) 

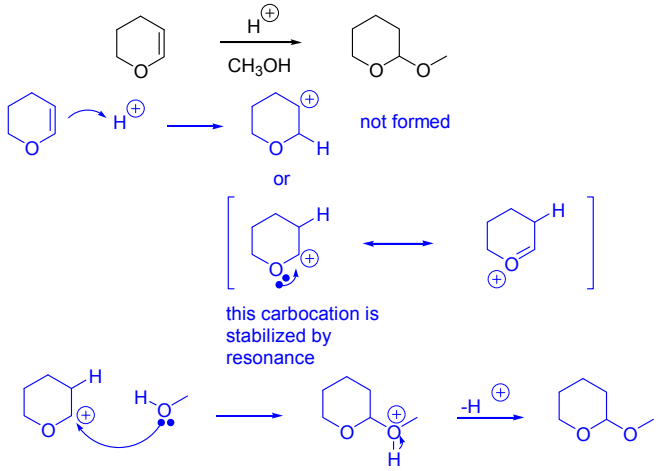
e) 

f) 

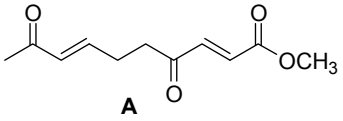
3) Predict the outcome of the following:

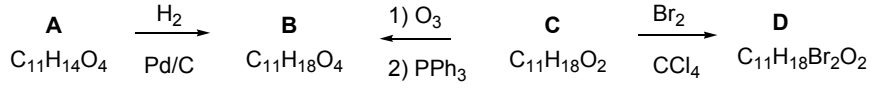


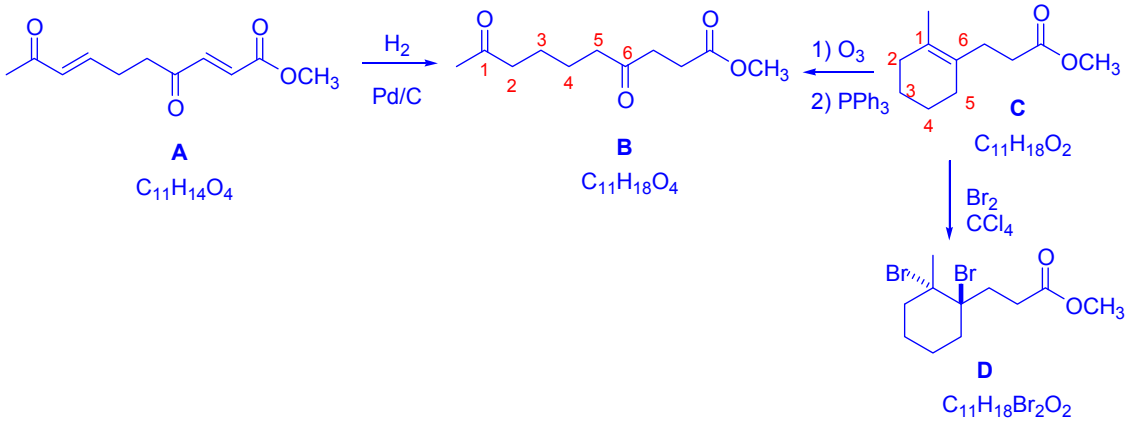
4) Account for the following observation by drawing a mechanism. What is responsible for the regioselectivity in this reaction?



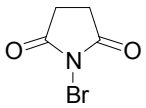
5) Compound **A** is a degradation product of the antibiotic vermiculine. The structure of **A** was confirmed by transforming **A** into **B** ($C_{11}H_{18}O_4$) which could also be prepared by the ozonolysis of **C** ($C_{11}H_{18}O_2$), a commercially available material. Compound **C** reacts with 1 equivalent of bromine to give **D** ($C_{11}H_{18}Br_2O_2$). Assign structures to compounds **B**, **C** and **D**.



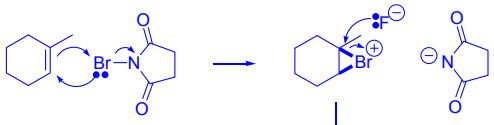




6) N-Bromosuccinimide (shown below) is a source of electrophilic bromine (Br+). When 1-methylcyclohexene reacts with N-Bromosuccinimide in the presence of fluoride ions, an addition reaction occurs.



a) Draw a mechanism for the reaction and predict the regiochemistry of the addition.
b) Draw one of the enantiomers of the product in the chair conformation.
c) Draw the same enantiomer in the other possible chair conformation.
d) What are the configurations of the stereocentres in the product shown in parts b and c?

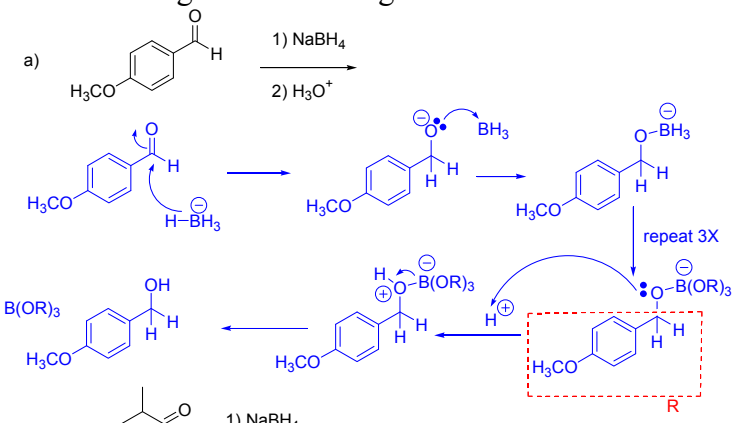
a)


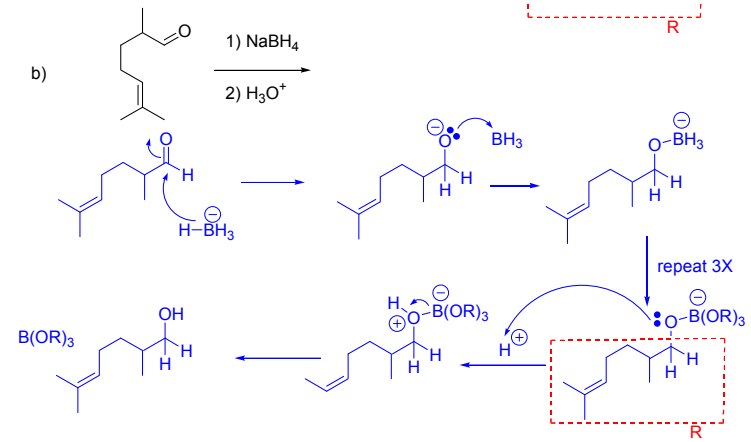
b)


c)

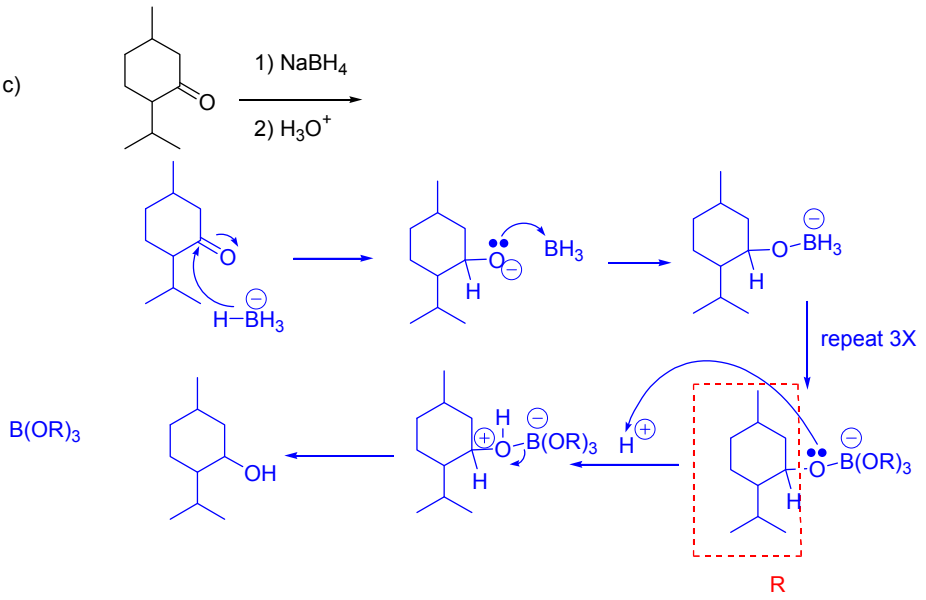

d)


7) Give the products of the following reactions and give mechanisms to show how they are formed:

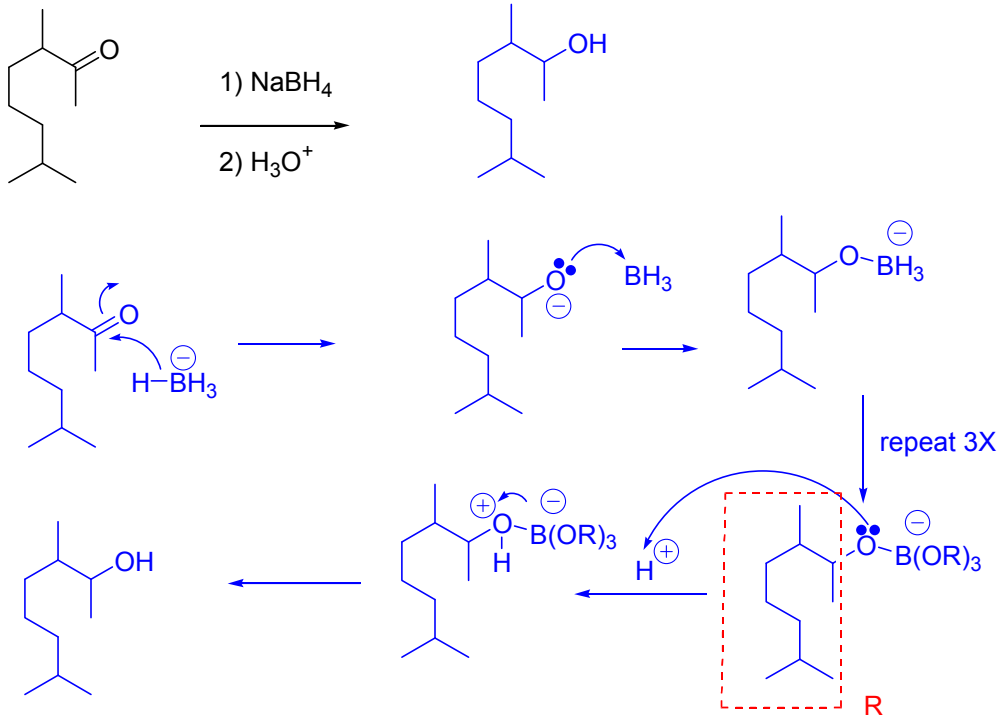
a)


b)


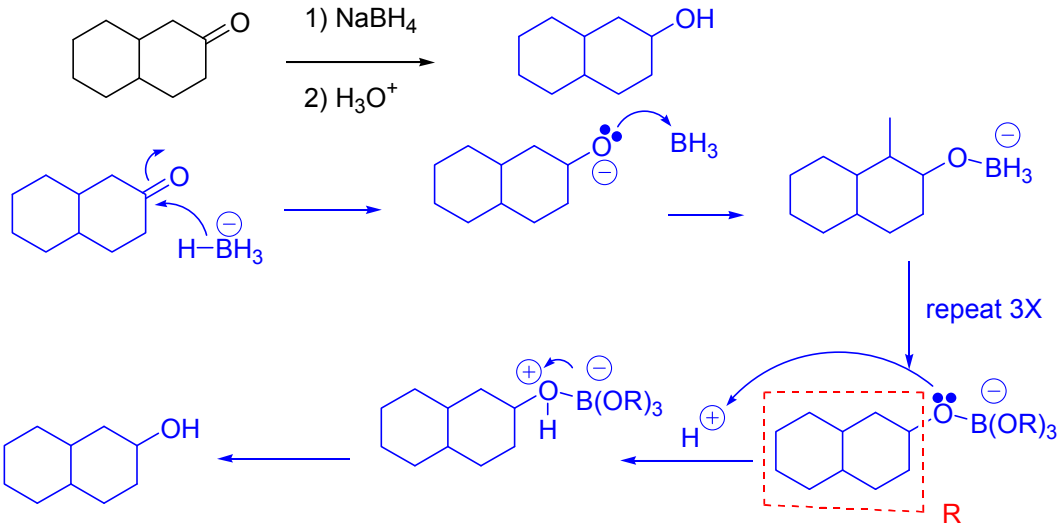
c)


1) NaBH4
2) H3O+
BH3
repeat 3X
B(OR)3
OH
R

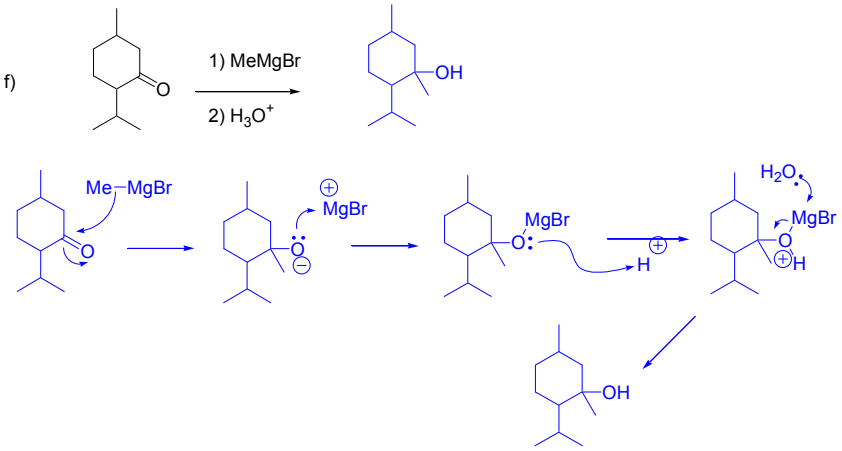
d)


1) NaBH4
2) H3O+
OH
BH3
repeat 3X
B(OR)3
R

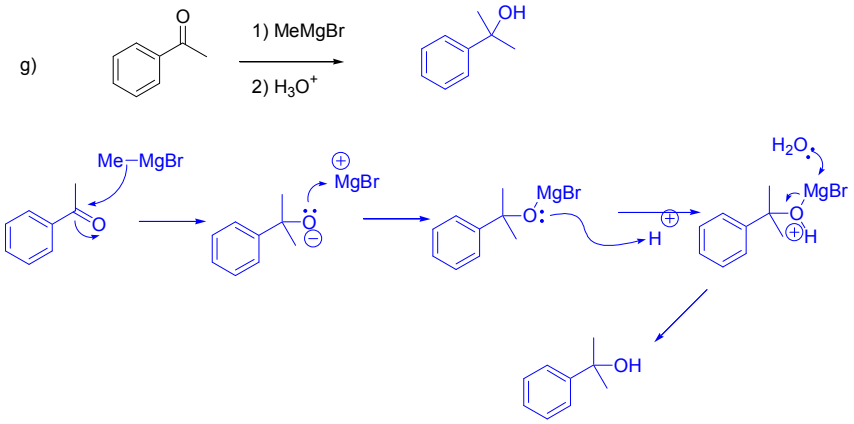
e)


1) NaBH4
2) H3O+
OH
BH3
repeat 3X
B(OR)3
R

f)

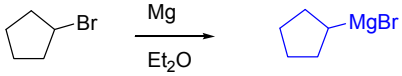


g)

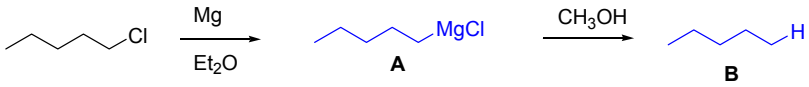


8) Predict the major products of the following reactions.

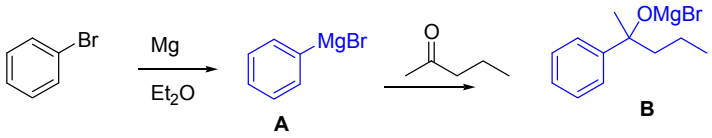
a)



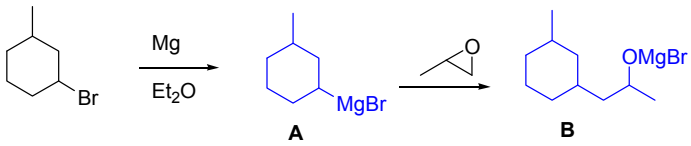
b)



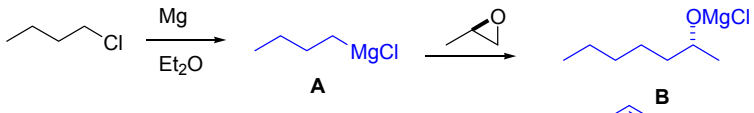
c)



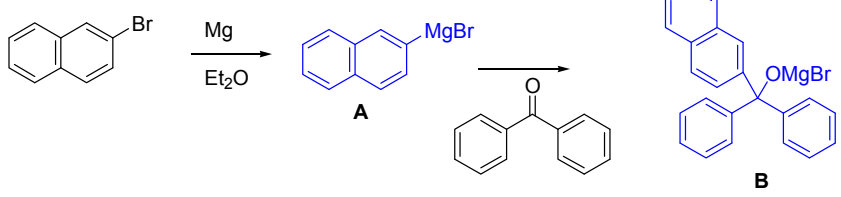
d)



e)



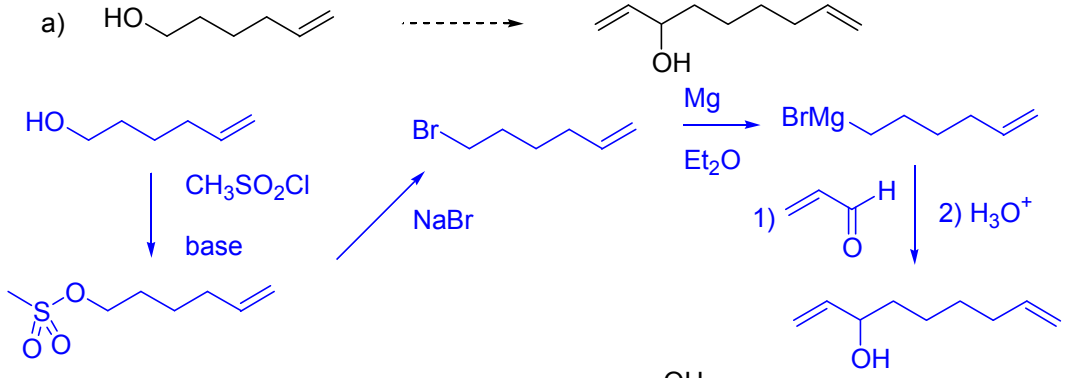
f)



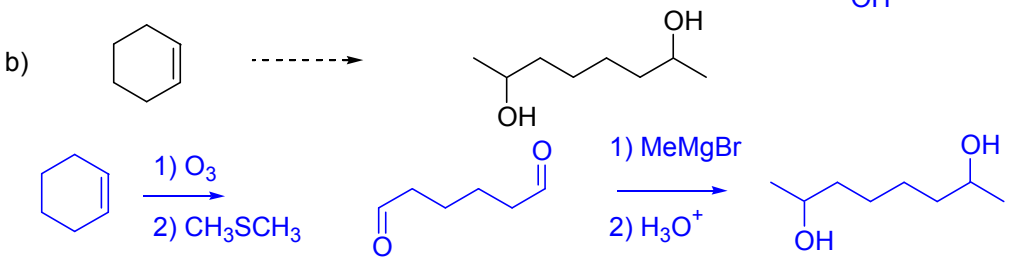
9) Propose methods to accomplish the following transformations (most require >1 step):

Note: for many of these questions there is more than one solution

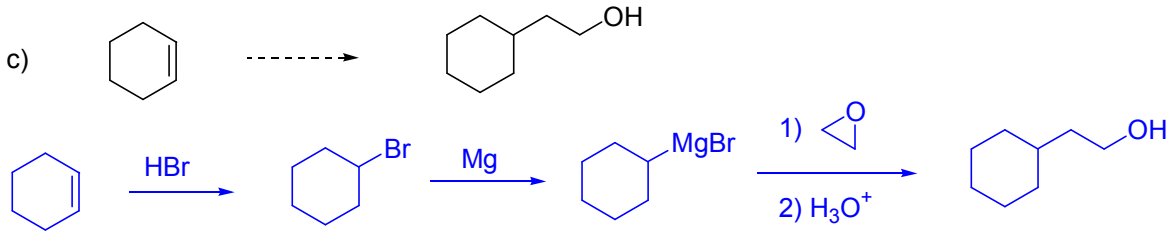
a)



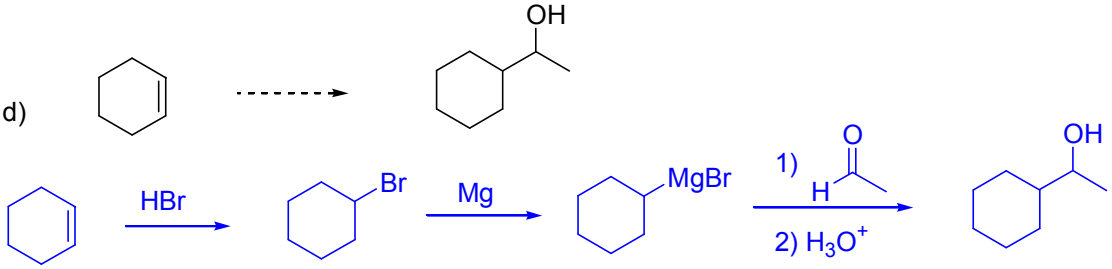
b)



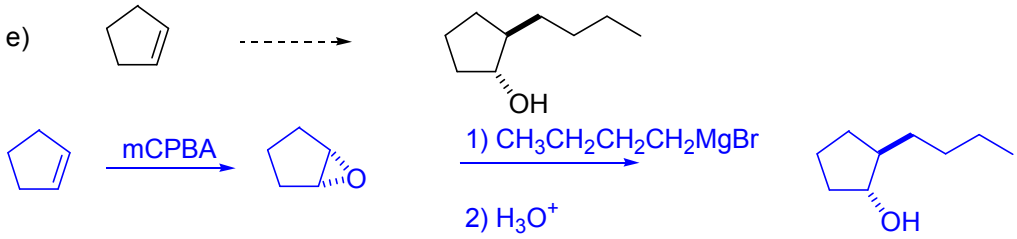
c)



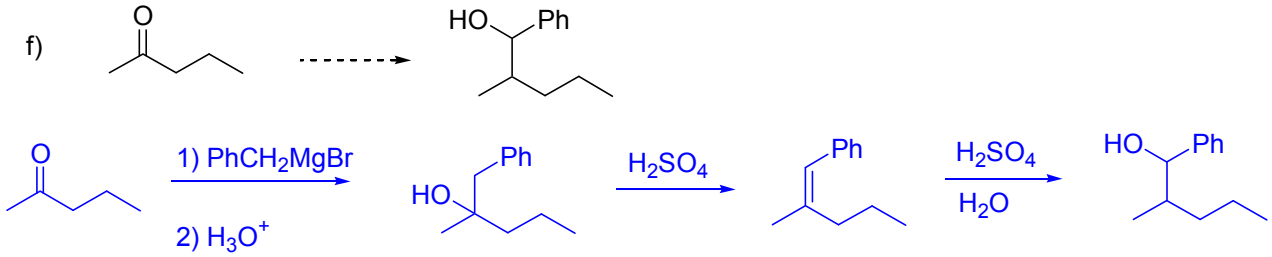
d)



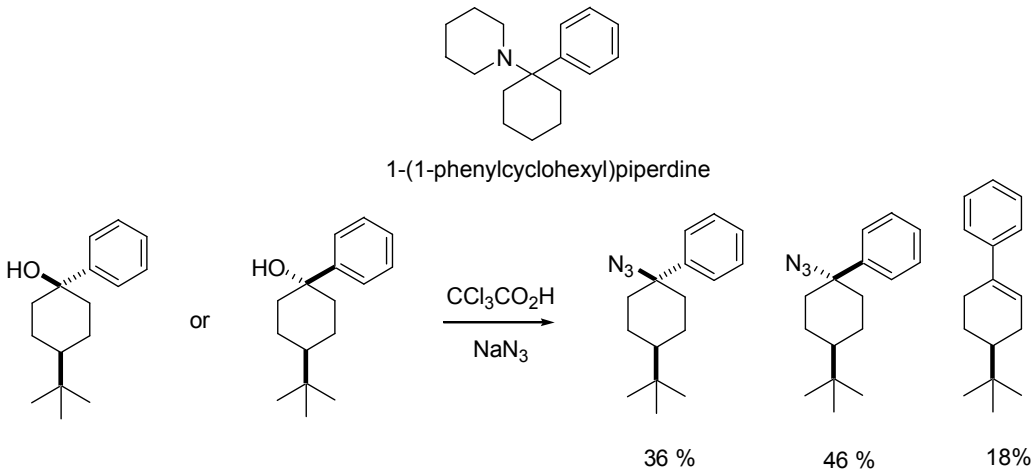
e)



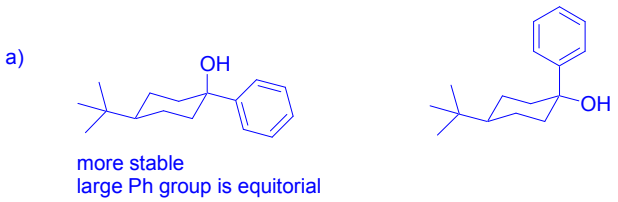
f)



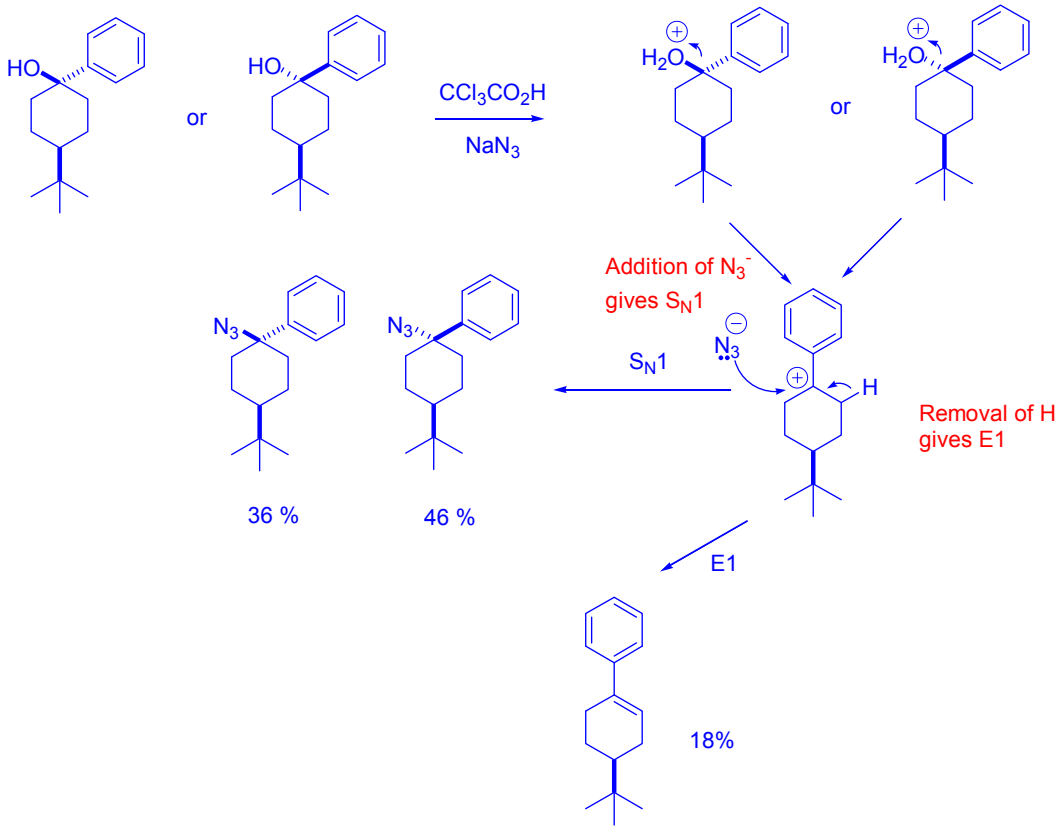
10) 1-(1-Phenylcyclohexyl)piperdine is a Veterenary anesthetic that is sold illegally as PCP. A researcher was studying the phychotropic side-effects of the drug by preparing and testing analogs. She performed the following reactions and noted the observations shown below.



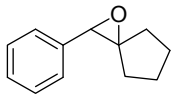
a) Draw the two starting materials in the chair conformation in which the tert-butyl group is located in the equatorial position. Which is more stable and why?



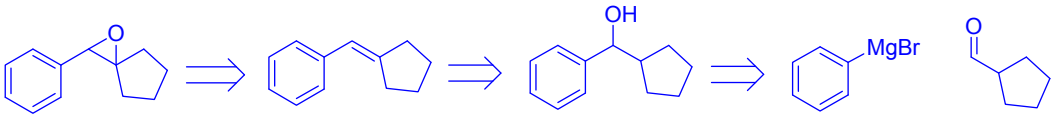
b) Draw a mechanism to explain her observation that the two starting materials gave the same products in the same amounts.



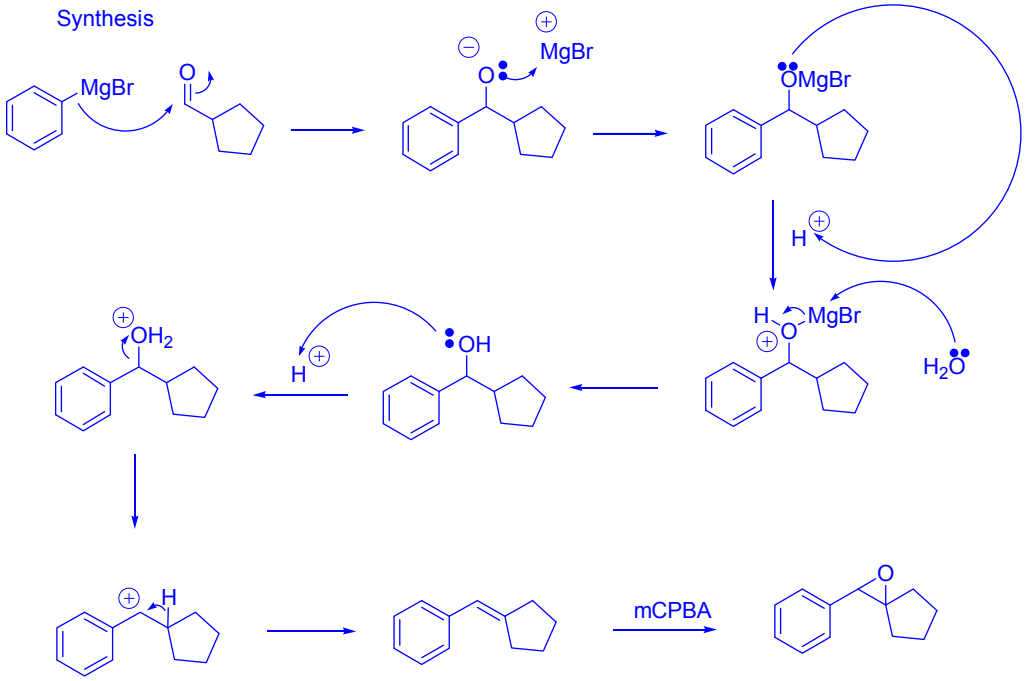
11) Propose a synthesis of the following using any starting materials containing no more than 6 carbons.



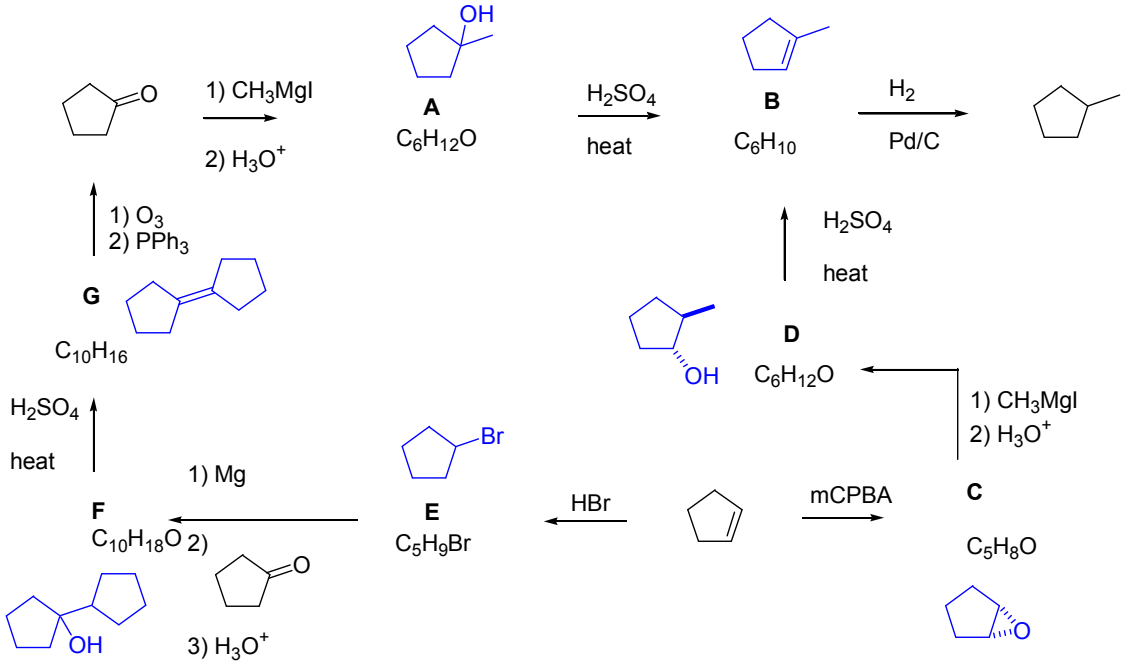
Retrosynthesis



Synthesis

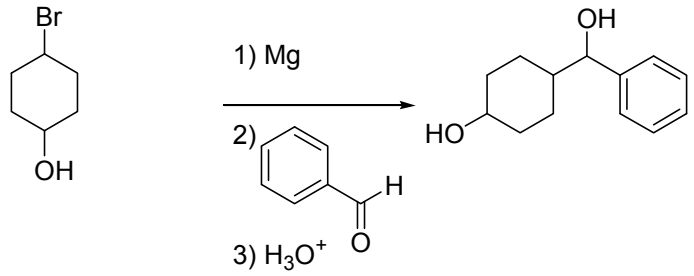


12) Determine the structures of compounds **A** through **G**.



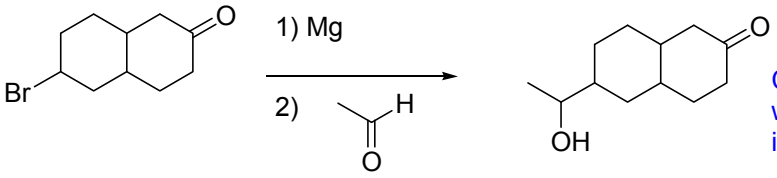
13) Point out all of the flaws in the following incorrect Grignard reactions.

a)



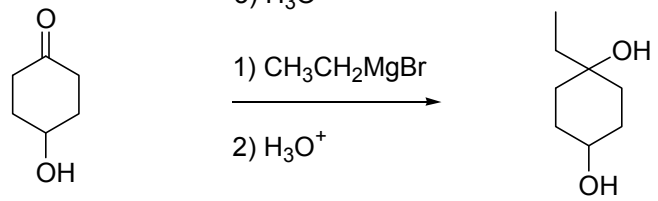
OH group in original material will give acid/base reaction with the Grignard

b)



C=O group in original material will react with the Grignard as it is formed

c)



OH group in original material will give acid/base reaction with the Grignard. This reaction will happen faster than the desired displacement process