FIRST HOUR EXAM - CHEMISTRY 3331

September 25, 2008

NAME: Answers

Circle the Time of Your Recitation

PROBLEM 1._____

Monday 8am

Monday noon

PROBLEM 2._____

Monday 5pm

Tuesday 8 am

PROBLEM 3._____

Wednesday 8 am

PROBLEM 4._____

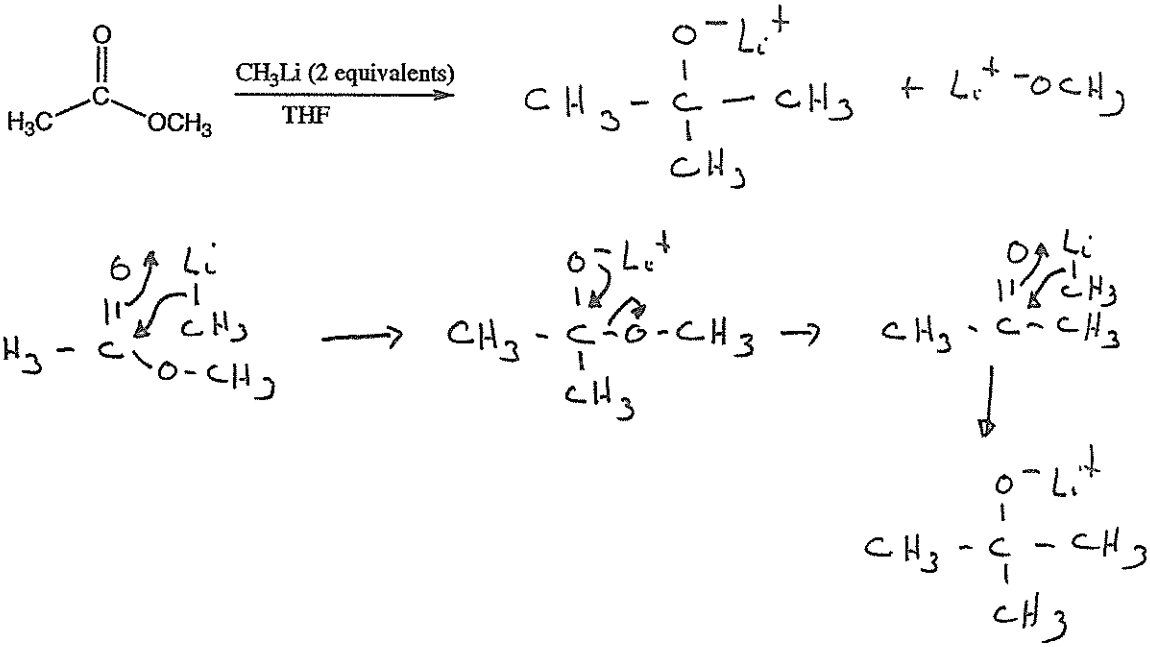
Wednesday 5pm

PROBLEM 5._____

PROBLEM 6._____

TOTAL: _____

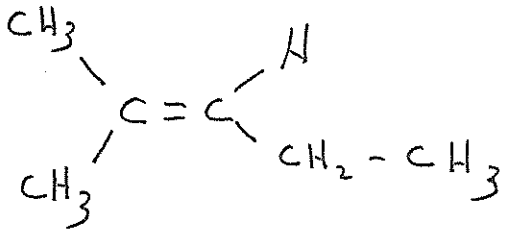
Problem 1. (10 points) Provide the product and show the mechanism for the following reaction. Be sure to show all the intermediates and the arrows for each step.

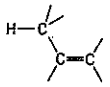
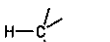
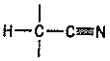
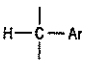
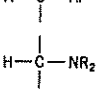
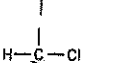
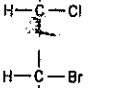
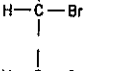
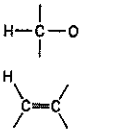


Problem 2. (10 points) Determine the structure of the compound that has the molecular formula C_6H_{12}whose NMR spectrum has the following resonances.

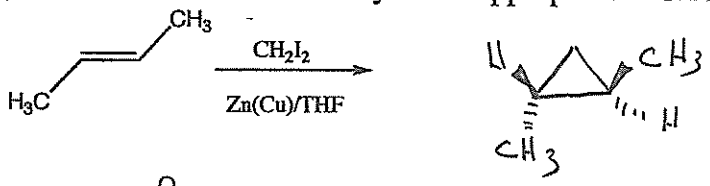
δ 0.9 (triplet, 3H) δ 1.6 (singlet, 3H) δ 1.7 (singlet, 3H)

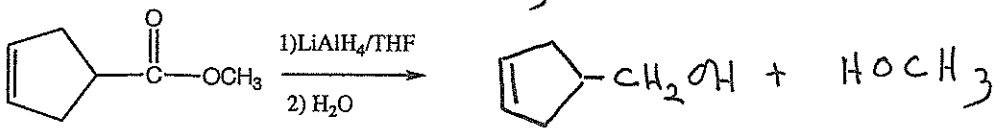
δ 2.0 (pentet, 2H) δ 5.1 (triplet, 1H)



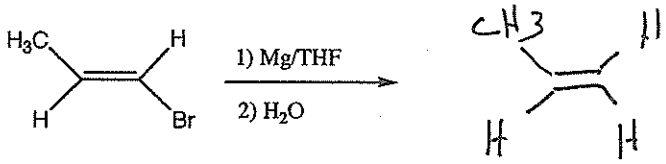
Compound class or type of proton		Chemical shift (δ),
Protons bonded to carbon		
Alkane	RCH_3, R_2CH_2, R_3CH	0.9–1.8
Allylic		1.5–2.6
Terminal alkyne		1.8–3.1
C—H adjacent to C=O		2.0–2.5
C—H adjacent to C≡N		2.1–2.3
Benzylic		2.3–2.8
Amine		2.2–2.9
Alkyl chloride		3.1–4.1
Alkyl bromide		2.7–4.1
Alcohol or ether		3.3–3.7
Vinylic		4.5–6.5
Aryl		6.5–8.5

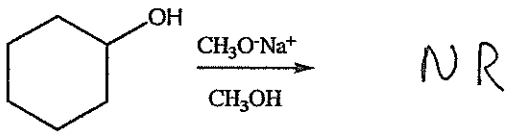
Problem 3. (30 points) Give the **final** products for the following reactions. If no reaction occurs, state so. So stereochemistry when appropriate. **Circle Your Answer**

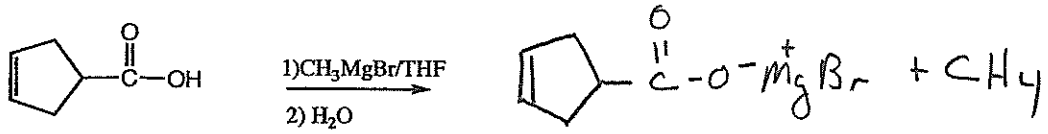
A) 

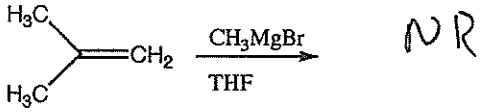
B) 

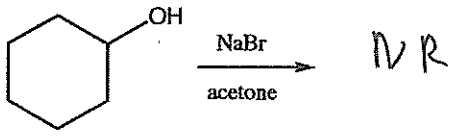
C) $(CH_3)_3COH \xrightarrow[H_2SO_4/H_2O]{K_2Cr_2O_7}$ NR

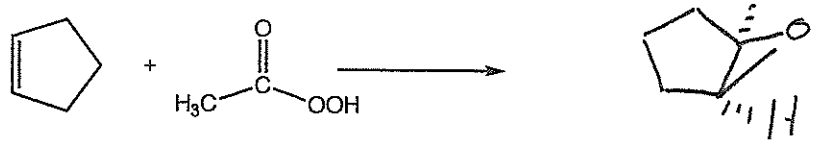
D) 

E) 

F) 

G) 

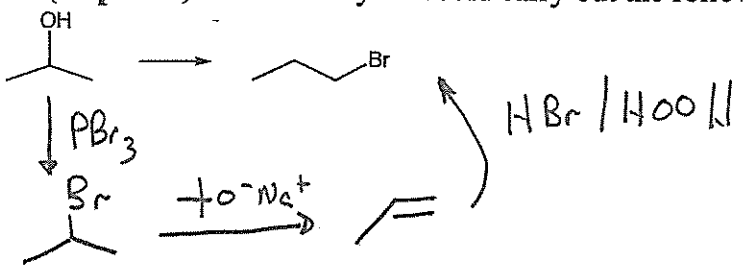
H) 

I) 

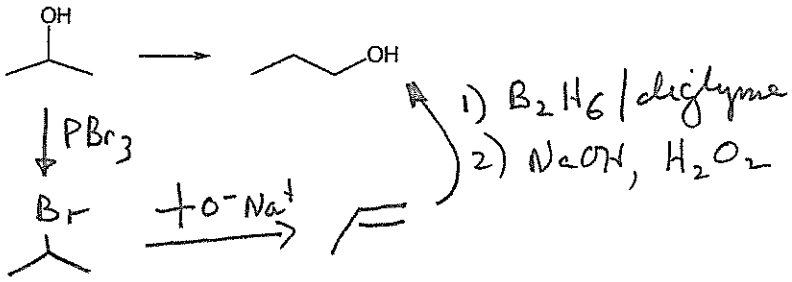
J) 

Problem 4. (20 points) Show how you would carry out the following transformations.

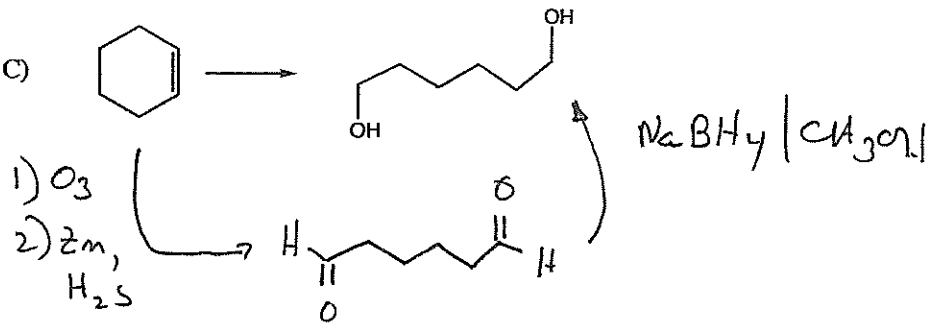
A)



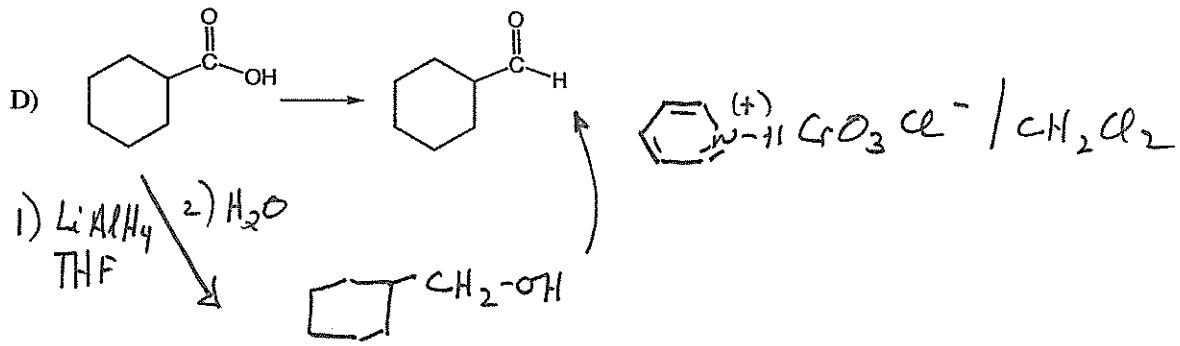
B)



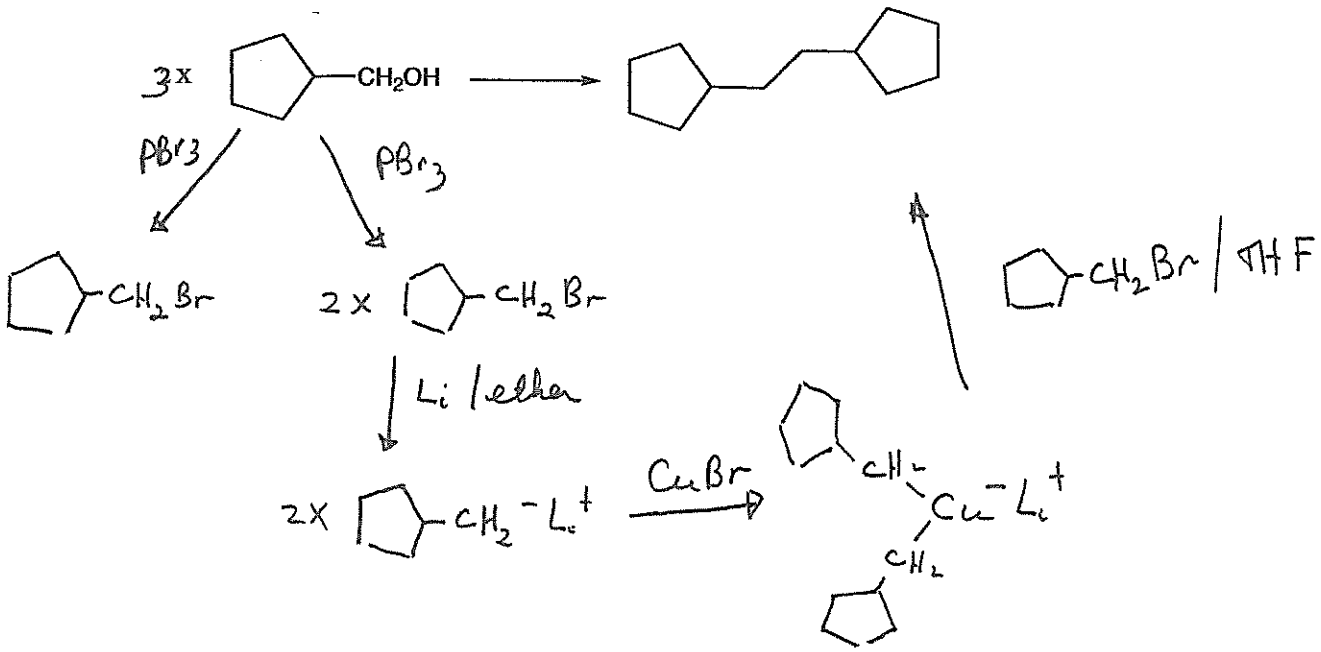
C)



D)



Problem 5. (15 points) Using **organocuprates**, how would you carry out the following transformation?



Problem 6. (15 points) Using a Grignard reagent, how would you carry out the following transformation?