

Second Exam

Name (PRINT) Key, Answer  
Last, First

Chemistry 3332

Signature \_\_\_\_\_

March 16, 2007

ID# \_\_\_\_\_

**Please circle class time.**

**Dr. Bean's 10:00 AM**

**Dr. Bean's 1:00 PM**

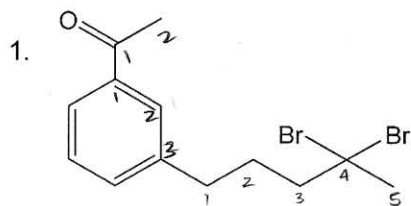
Page #	Score	
1. 12 pts.		
2. 14 pts.		
3. 18 pts.		
4. 18 pts.		
5. 13 pts.		
6. 13 pts.		
7. 12 pts.		

TOTAL \_\_\_\_\_

**Note: Present your student ID when you return the exam booklet**

**A. Nomenclature:** (12 points)

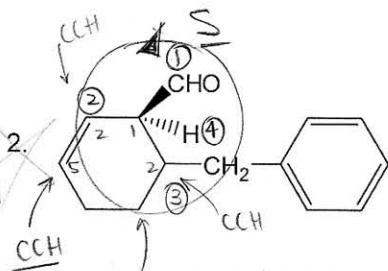
Give an acceptable IUPAC name for each of the following compounds. Be sure to indicate the stereochemistry where appropriate.



1-(3-(4,4-dibromopentyl)phenyl)ethan-1-one

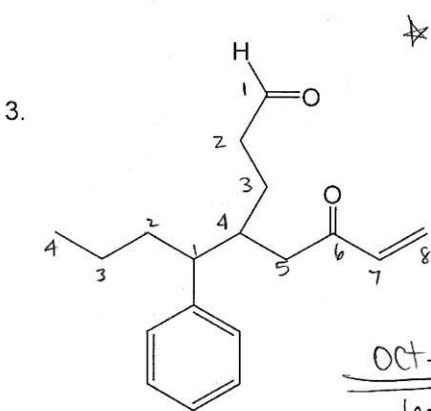
ethan-1-one  
~~1-phenyl~~  
~~2-(4,4-dibromopentyl)~~

→ 1-(2-(4,4-dibromopentyl)phenyl)



(1S)-2-benzylcyclohex-5-ene-1-carbaldehyde

cyclohex-5-ene-1-carbaldehyde  
 (1S)  
 2-benzyl



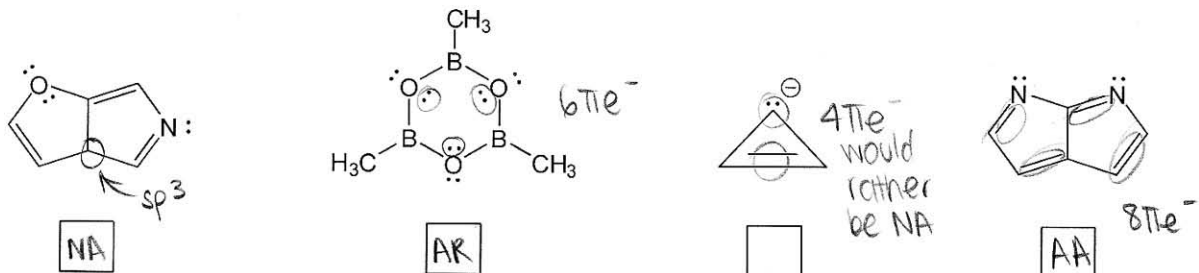
✦ in determining what the parent name will be aldehydes have higher priority than ketones + double bonds. After figuring out which functional group dictates the parent name, it's back to alphabetical!

6-oxo-4-(1-phenylbutyl)oct-7-enal

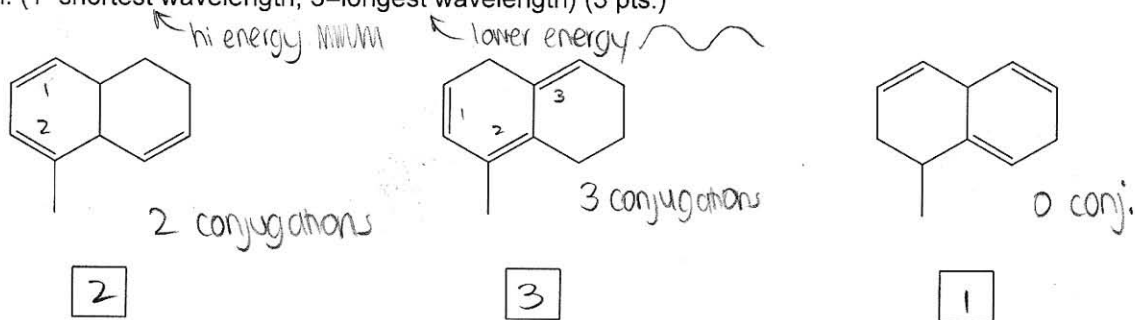
oct-7-enal  
 6-oxo  
 4-(1-phenylbutyl)

**B. Facts:** (14 points total)

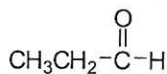
1. Label the molecules below as aromatic (**AR**), antiaromatic (**AA**), or nonaromatic (**NA**). You may assume all are planar. (8 pts.)



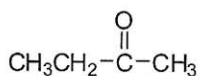
2. Place the compounds in increasing order of  $\lambda_{\max}$  (wavelength) for the  $\pi$  to  $\pi^*$  transition in the UV spectrum. (1=shortest wavelength, 3=longest wavelength) (3 pts.)



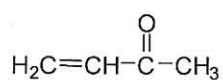
3. Consider the reaction of the compounds below with water. Place them in order of increasing amount of hydrate present at equilibrium. (1=least hydrate at EQ, 3=most hydrate at EQ) (3 pts.)



**3**



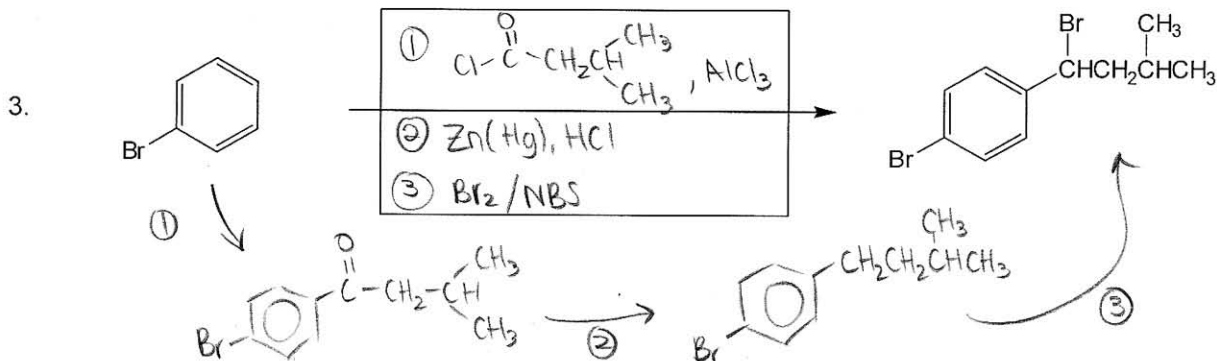
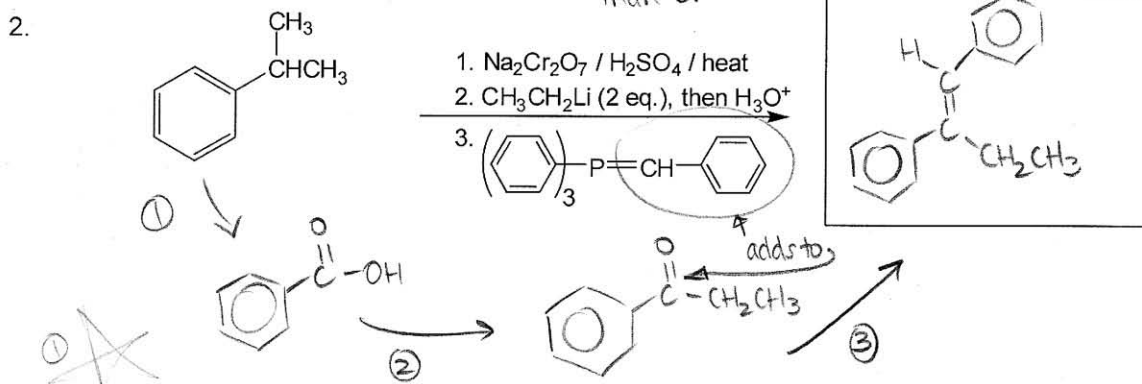
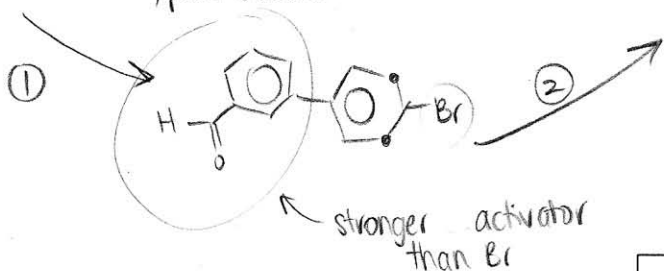
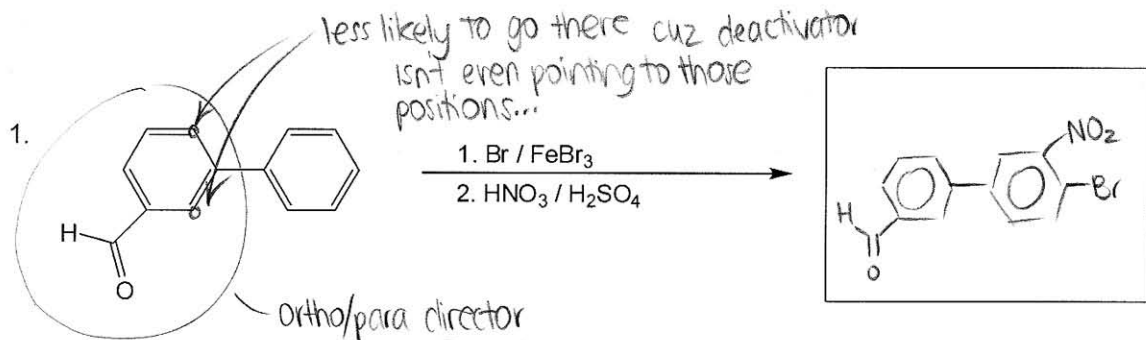
**2**



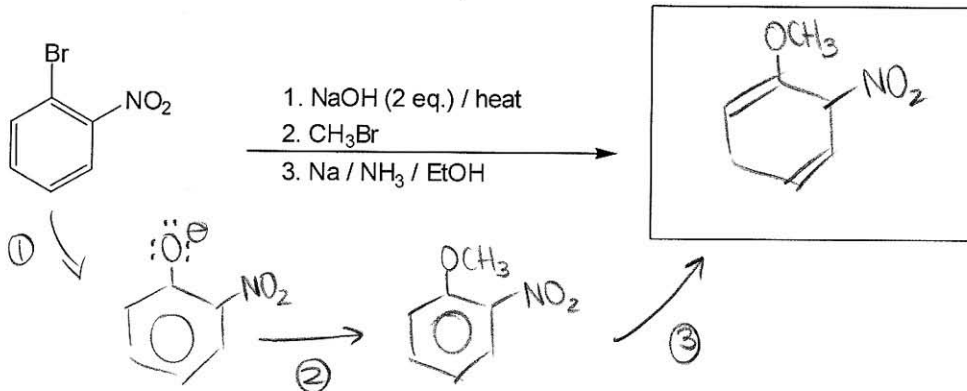
**1**

**C. Reactions:** Total = 36 points, 6 points each

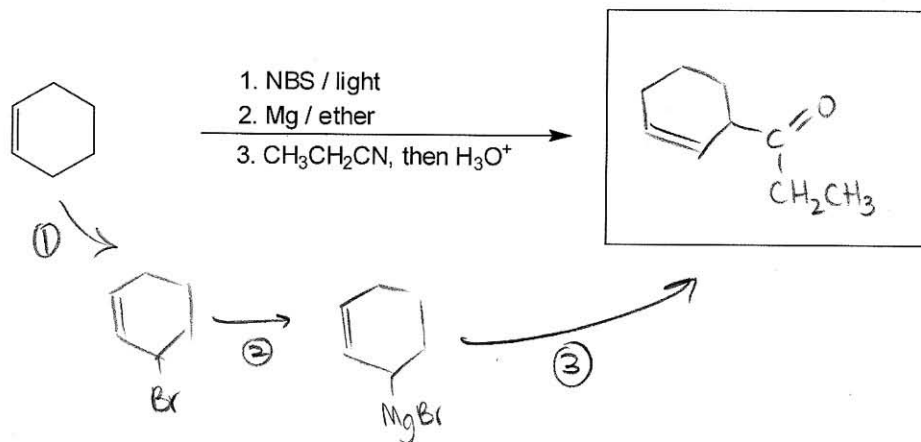
Please provide the reagents or the major product in the answer box. Indicate **stereochemistry** if applicable. Partial credit is awarded only when intermediate products in a multi-step reaction are shown below the reaction.



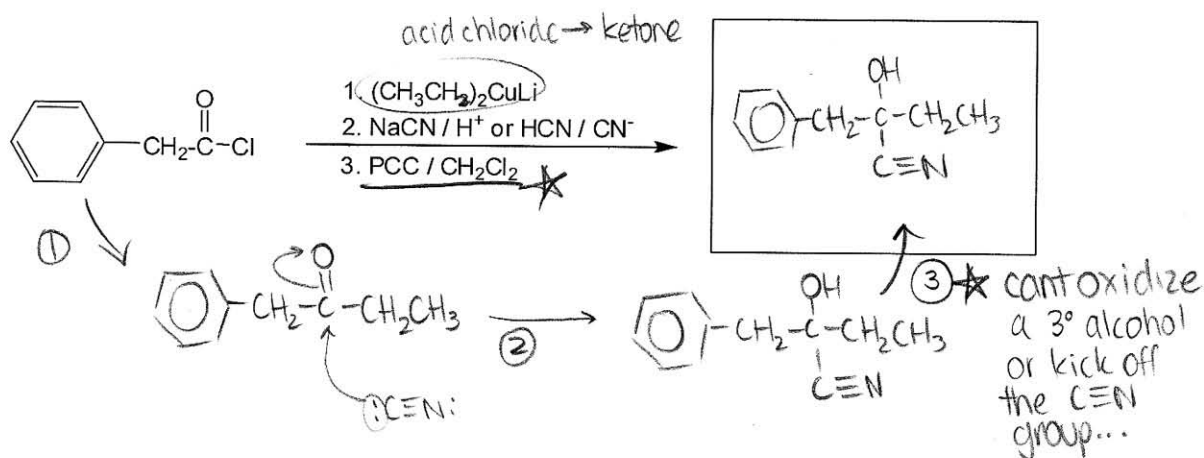
4.



5.

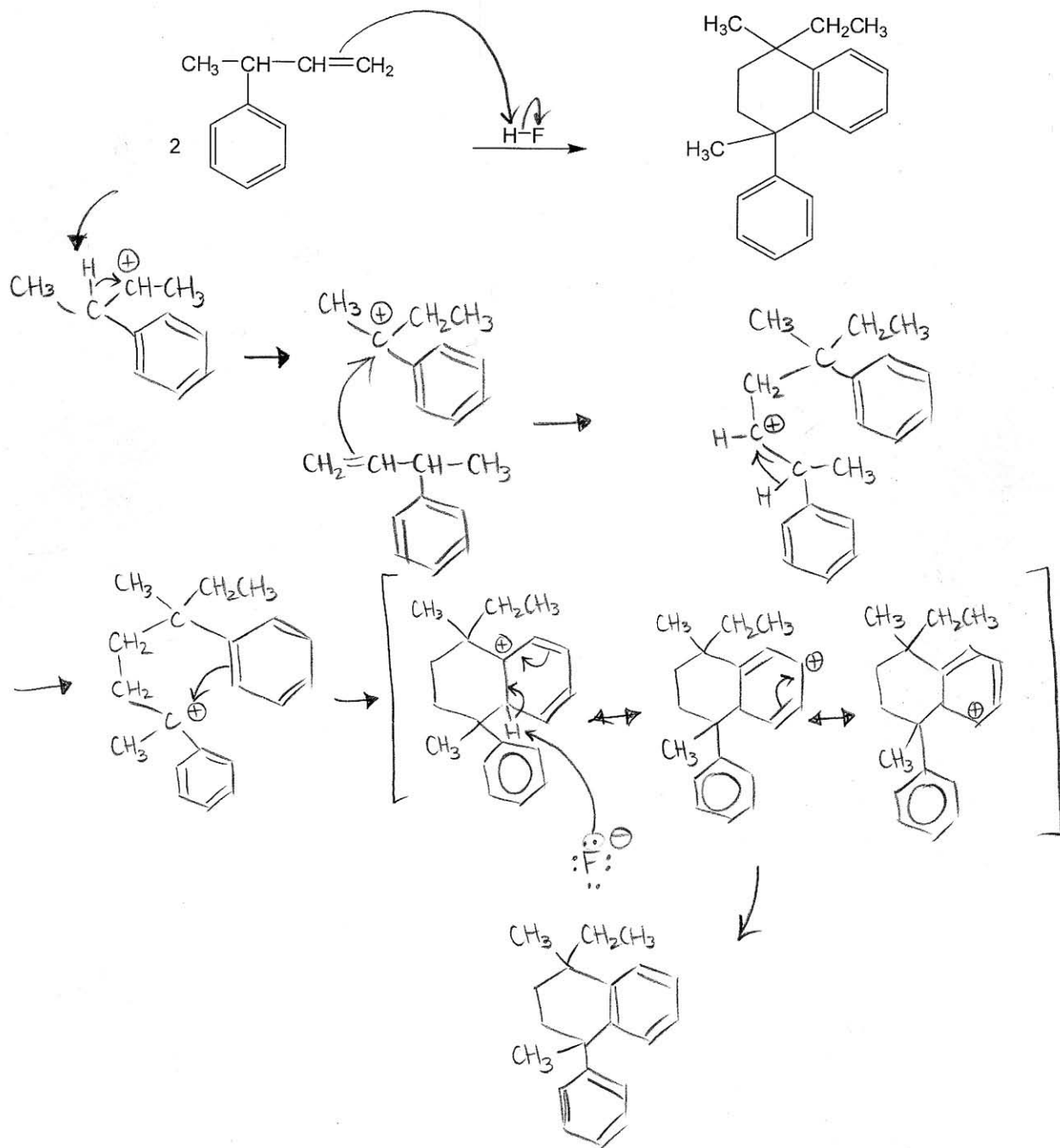


6.



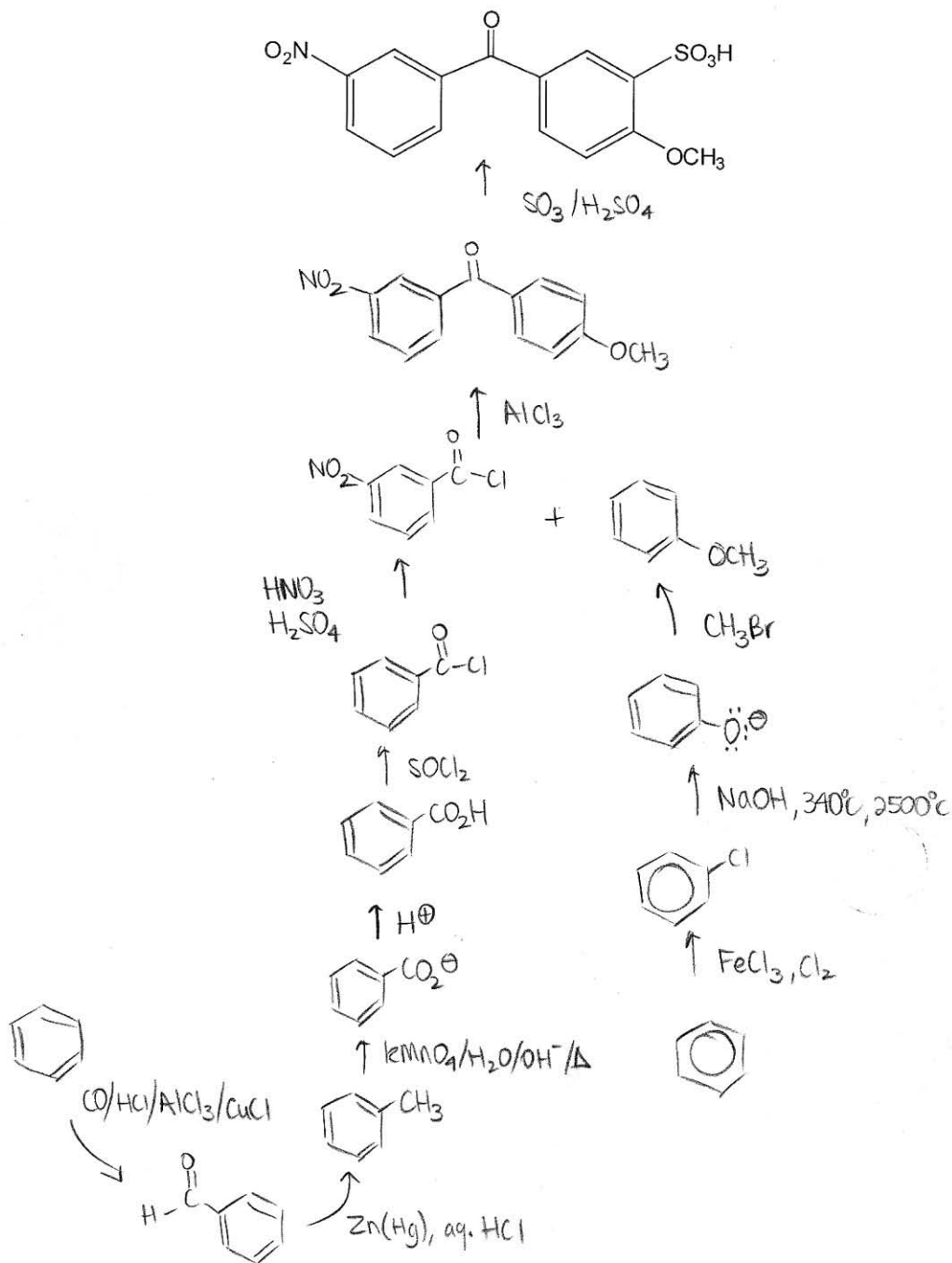
D. Mechanisms: (13 points)

Provide a clear mechanism to explain the formation of the product. Use curved arrows to indicate "electron flow". Remember to show only one step at a time. Show all intermediates and all formal charges. When more than one resonance contributor may be drawn, be sure to draw the most stable contributor.



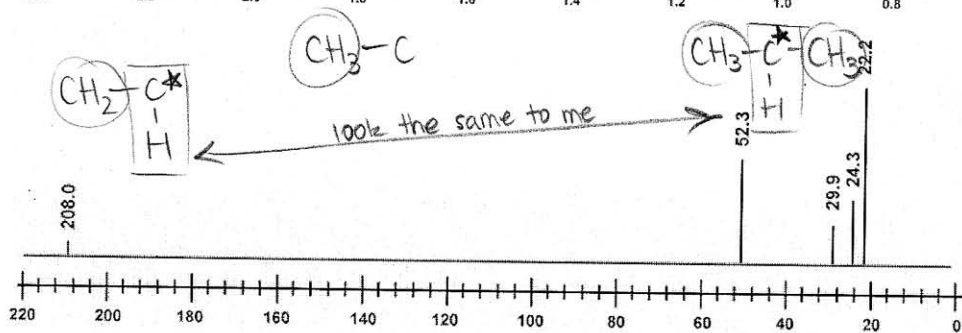
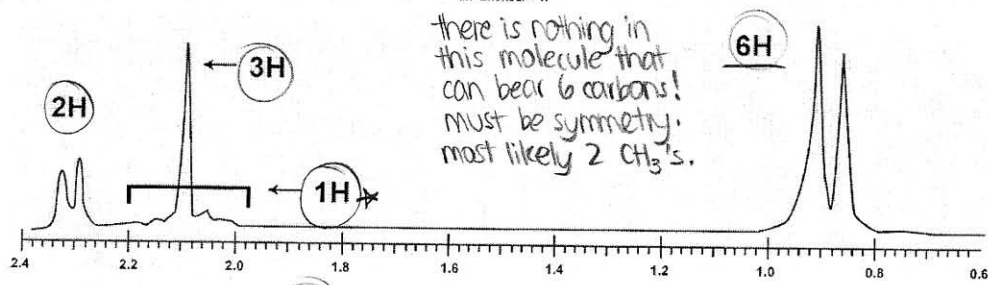
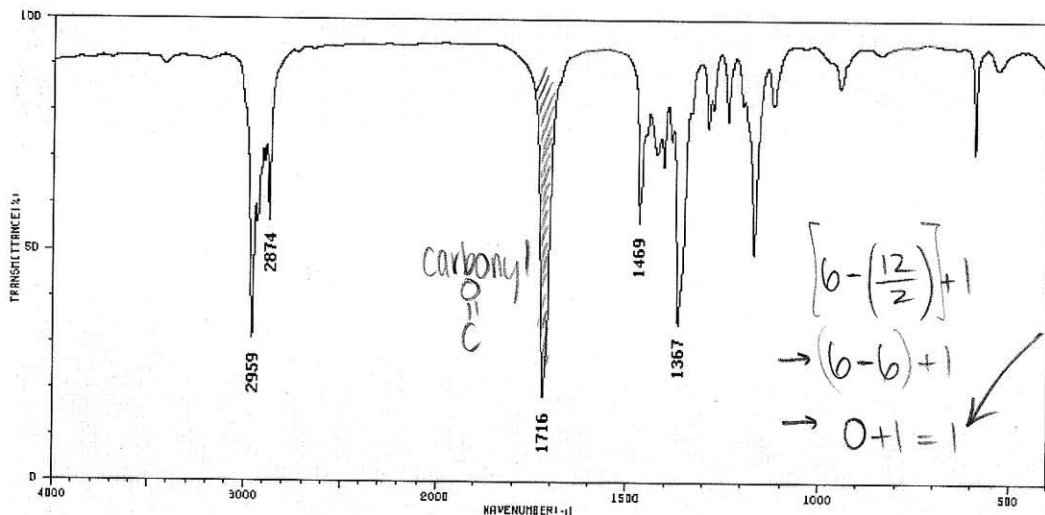
**E. Synthesis: 13 Points**

Synthesize the molecule below using any of the following reagents: benzene, any **stable, one carbon** molecule, any inorganic reagents, any oxidizing or reducing agents, and any peroxyacids.



**F. Spectroscopy: 12 Points**

A compound with the formula  $C_6H_{12}O$  exhibits the IR,  $^1H$  NMR and proton decoupled  $^{13}C$  NMR spectra shown below. Please identify this compound and draw the structure in the box provided below. (Note: The peak at 2.02 – 2.24 ppm represents two overlapped signals.)



either double bond or carbonyl...  
 formula has "0" in it and 1716  $cm^{-1}$  looks like carbonyl!  
 its not an aldehyde cuz no 2 peaks @ 2700 + 2820

