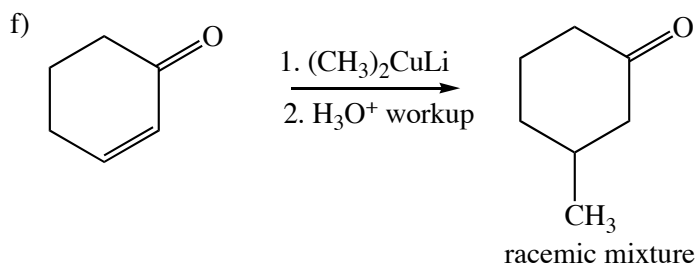
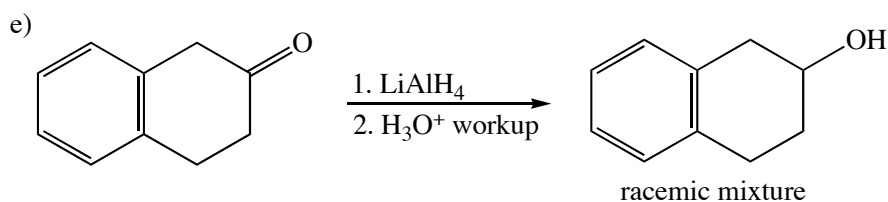
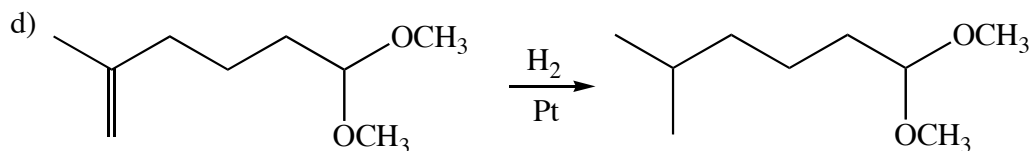
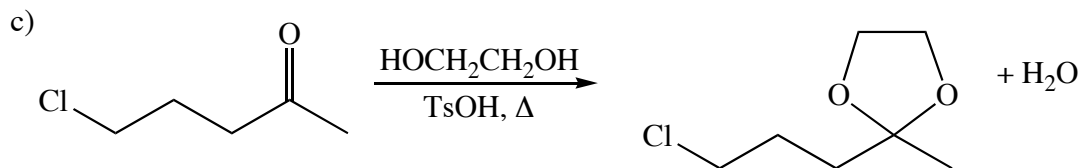
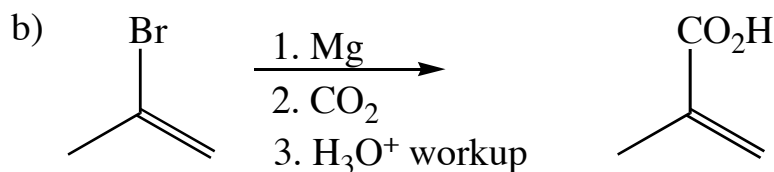
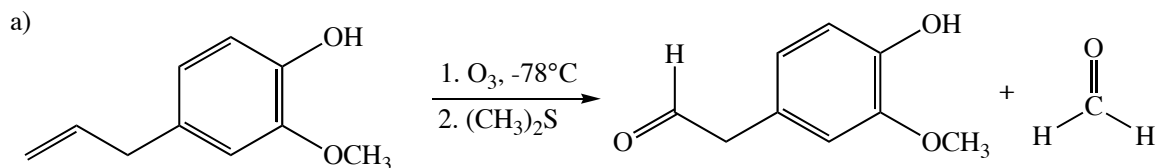


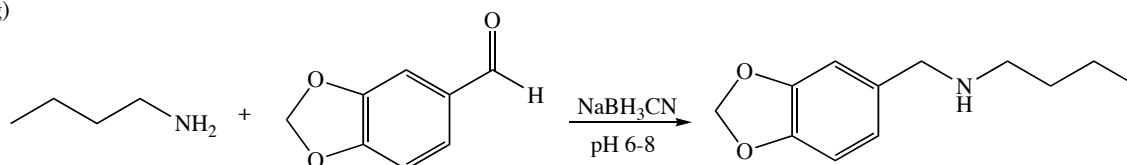
**Chemistry 250 -- Exam #4 Answer Key -- December 9, 2008**

There are 6 pages.

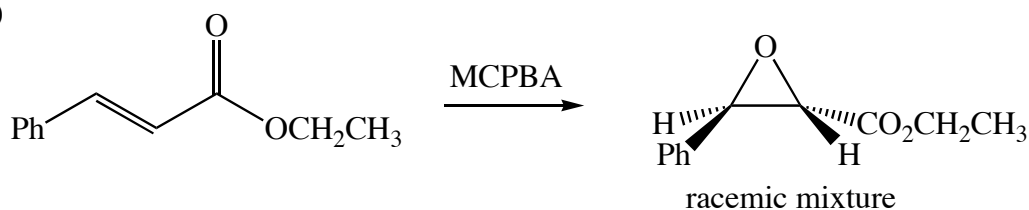
1. (24 pts) Complete the following reactions. Show the stereochemistry of the products where appropriate. Label major and minor products where appropriate. (They all react!)



g)

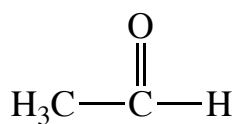


h)

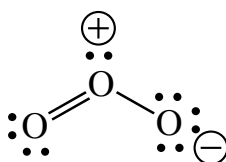


2. (6 pts) Draw structures for the following compounds:

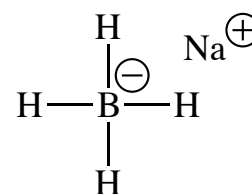
a) Acetaldehyde



b) Ozone (Full Lewis Structure)

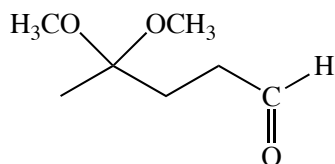


c) Sodium Borohydride

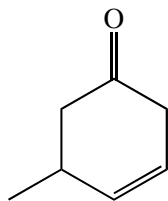


3. (10 pts) Name the following compounds:

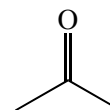
a)

**4,4-Dimethoxypentanal**

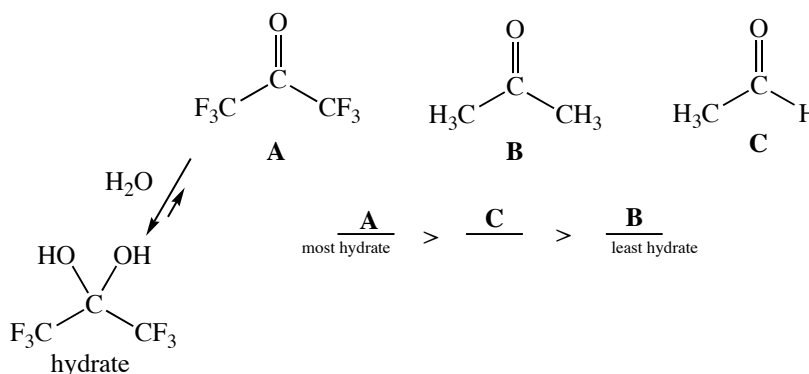
b)

**5-methyl-3-cyclohexenone**

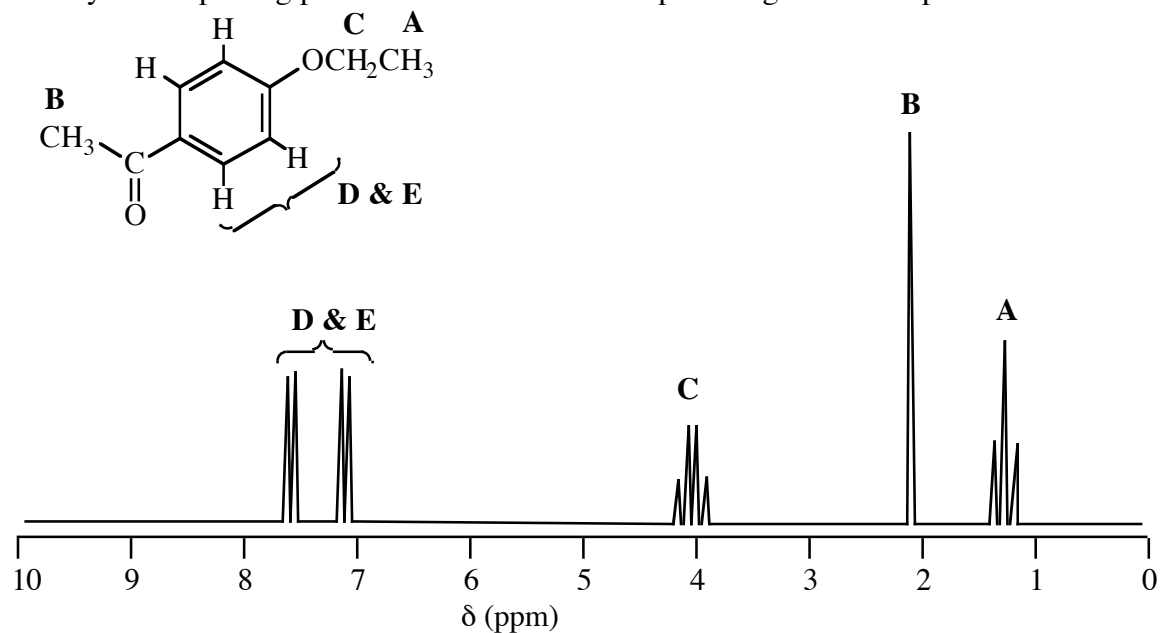
c) Give both the common and the IUPAC name for:

**Acetone or 2-Propanone**

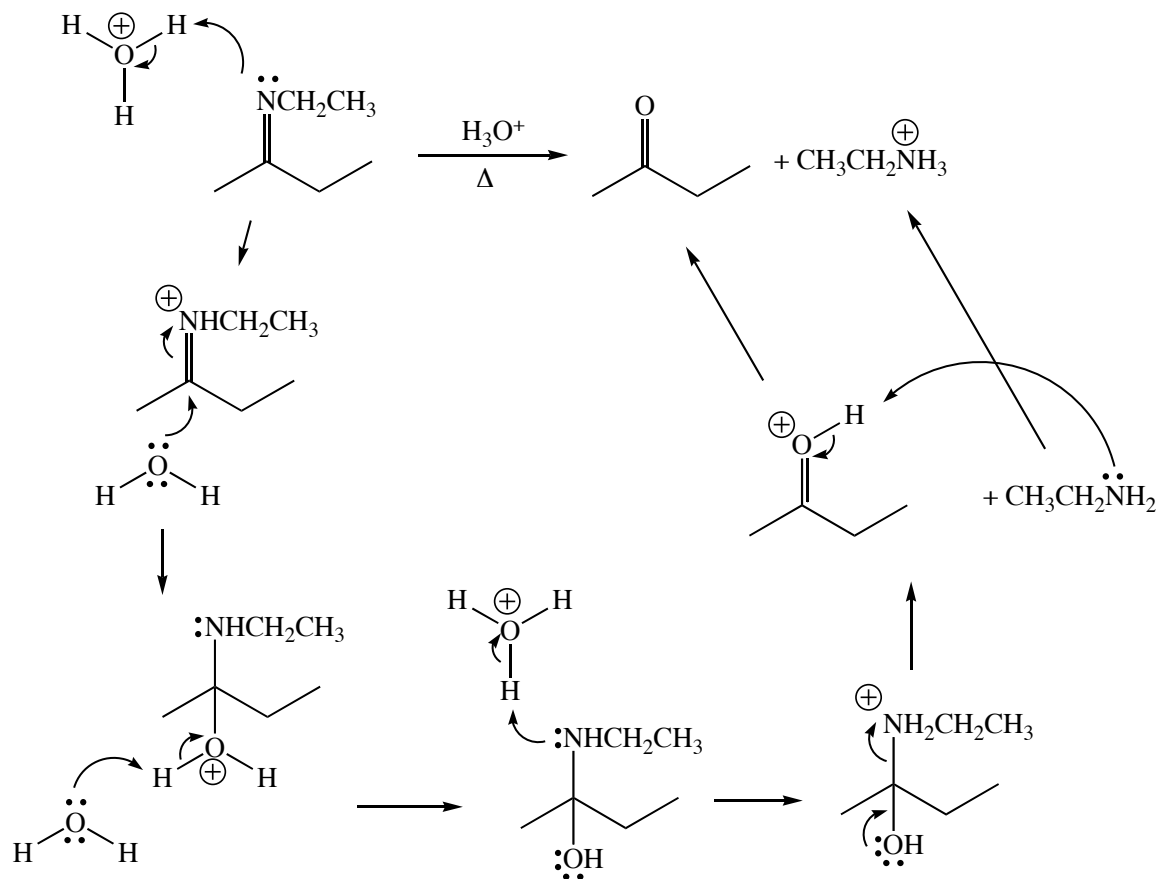
4. (5 pts) When placed in water, aldehydes and ketones can form a hydrate. For the following compounds rank them according to the percentage of hydrate at equilibrium. For one of them, **draw the structure of the hydrate**.



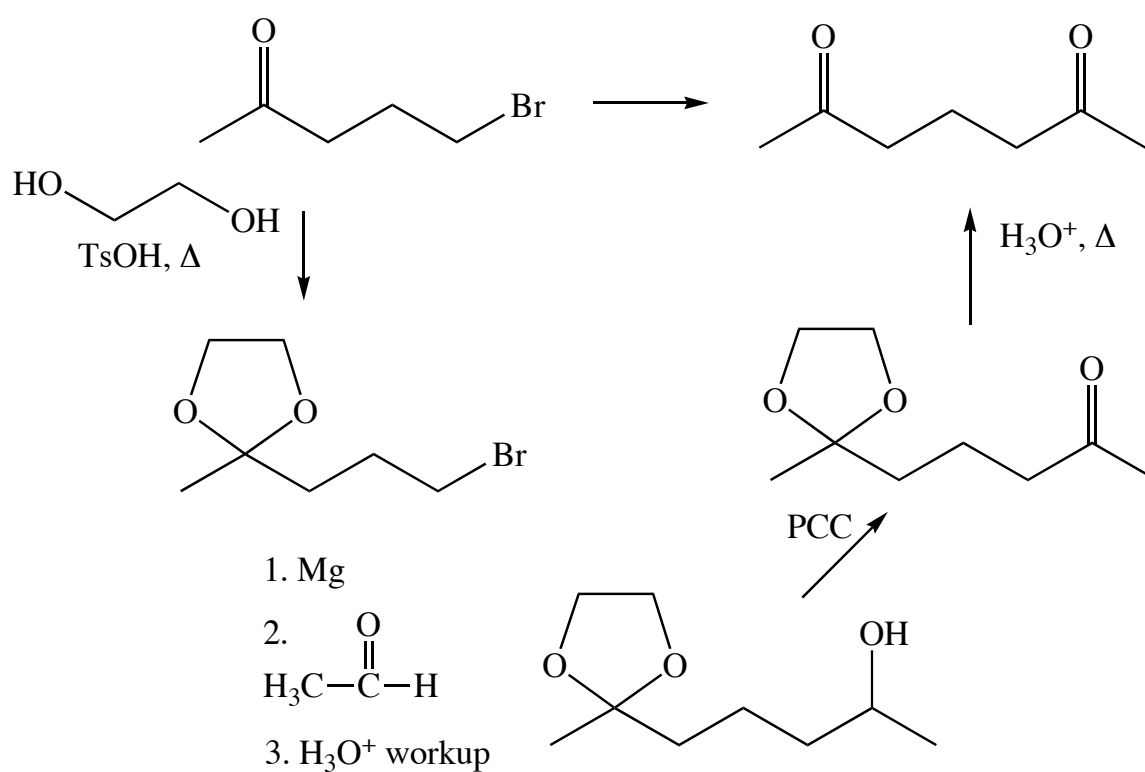
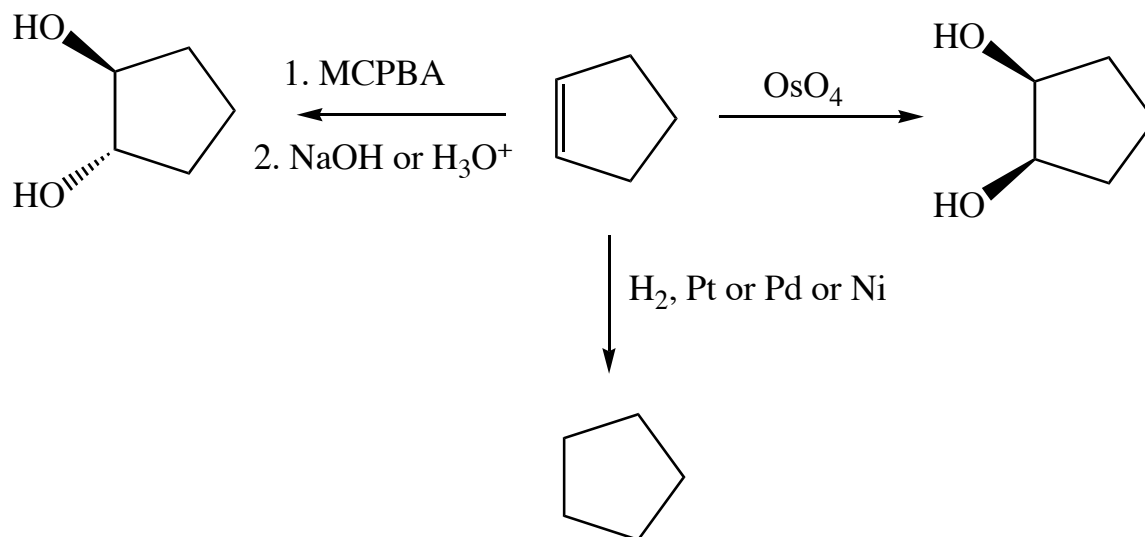
4. (9 pts) Sketch an approximate  $^1\text{H-NMR}$  spectrum for the compound shown below. Clearly show splitting patterns and indicate which protons go to which peaks in the NMR.



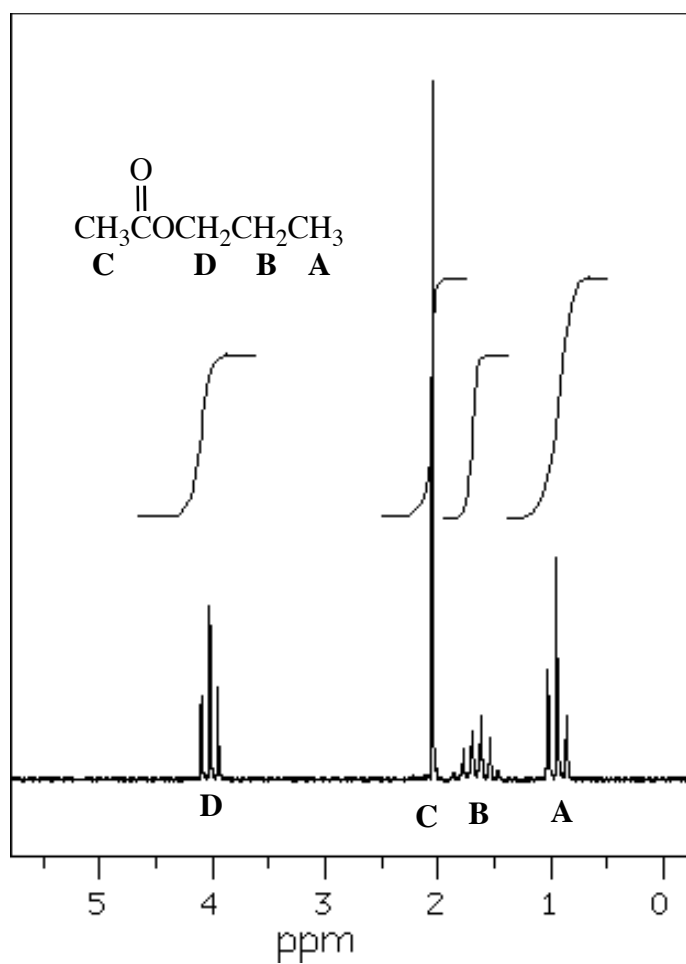
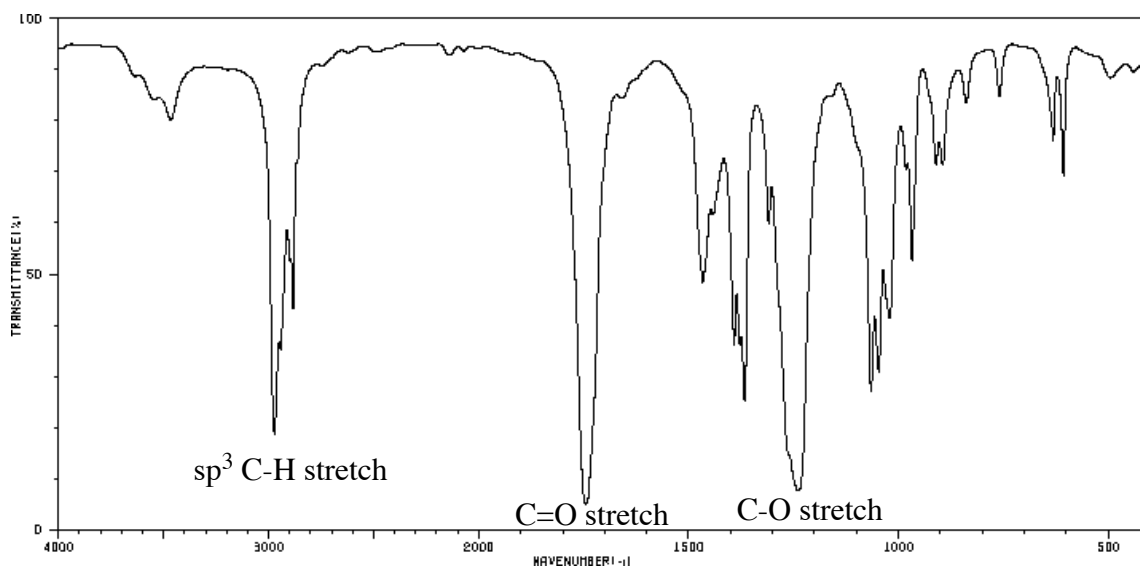
6. (10 pts) Draw a detailed mechanism (using curved arrows) for the reaction shown below.



8. (18 pts) List the reagents necessary to accomplish the following transformations. You may use any two carbon molecules as well as standard organic (or inorganic) reagents.



8. (9 pts) An unknown with the molecular formula  $C_5H_{10}O_2$  gave the following IR and  $^1H$ -NMR spectra. Determine the structure and indicate which peaks are associated with which protons in the NMR spectrum. Also identify the important IR absorptions.



9. (9 pts) Indicate which of the following compounds correspond to each of the IR spectra shown below. *To receive full credit you must indicate the characteristic absorptions in each of the spectra.*

