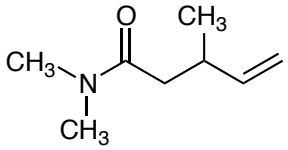
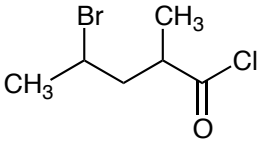
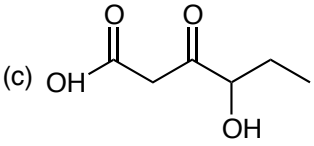
L.I.U.

Chem. 122, Final, Sections 007 + 008 250 pts, Spring, 2011

1. Name the following molecules. (15 pts)

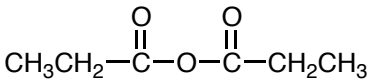
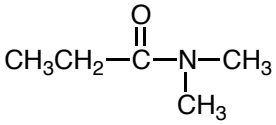
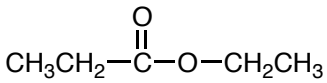
(a) 

(b) 

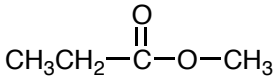
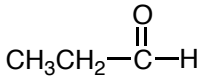
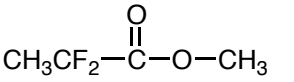
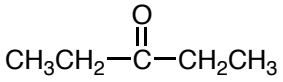
(c) 

2. Find the structure of the following molecule. Formula: $C_7H_{11}O_2Cl$. IR: 1743 and 795 cm^{-1}. ^1H NMR: δ 0.9, triplet, 3H; 2.3, singlet, 3H; 3.6, singlet, 2H; 3.8, quartet, 2H; 5.4, singlet, 1H. ^{13}C: 23, 32, 48, 55, 112, 125, 173. (15 pts)

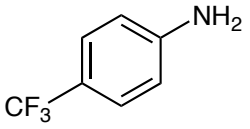
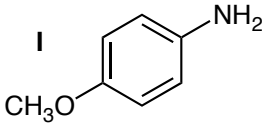
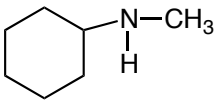
3. Which molecule would be (a) the most reactive (b) the least reactive to hydrolysis in <u>acidic conditions</u> (H_3O^+, H_2O)? Briefly explain your reasoning and show the reaction that occurs for each of the molecules you choose. (10 pts)

A  **B**  **C** 

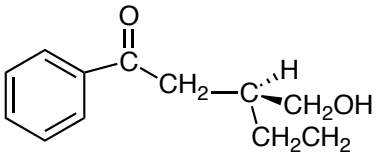
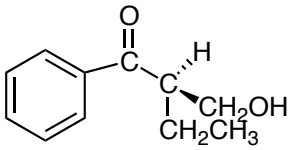
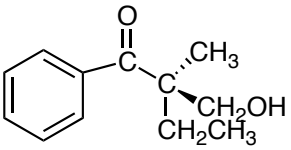
4. Which molecule would be (a) most easily reduced (b) least easily reduced by sodium borohydride? Briefly explain your answer in and in each case show the reaction that occurs. (10 pts)

D  **E**  **F**  **G** 

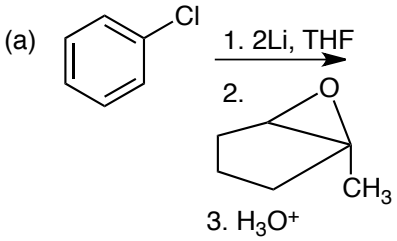
5. Which molecule is (a) the strongest base (b) the weakest base. Briefly explain your choices. (10 pts)

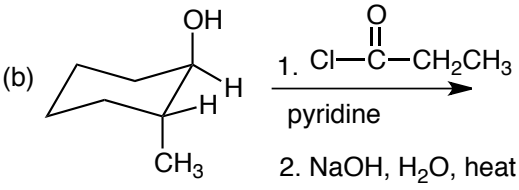
H  **I**  **J** 

6. One of the following molecules will undergo racemization when treated with aqueous acid (H_3O^+, H_2O). Which one? Briefly explain your choice and show how the racemization occurs. (10 pts)

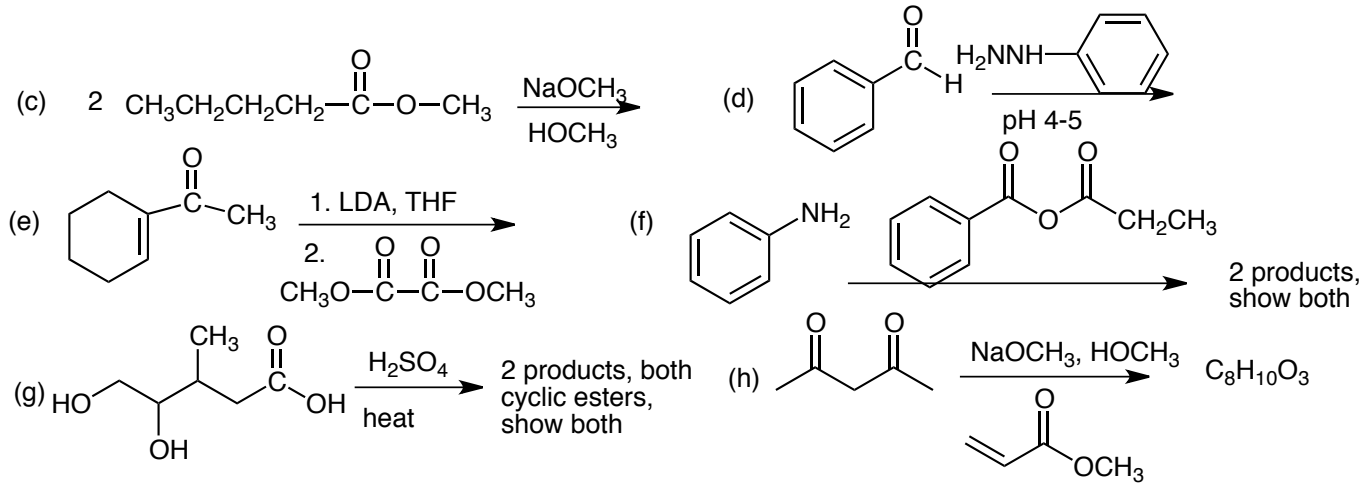
K  **L**  **M** 

7. For the following reactions give the product and **SHOW THE COMPLETE REACTION MECHANISM**, showing all the steps. (15 pts each, 120 pts)

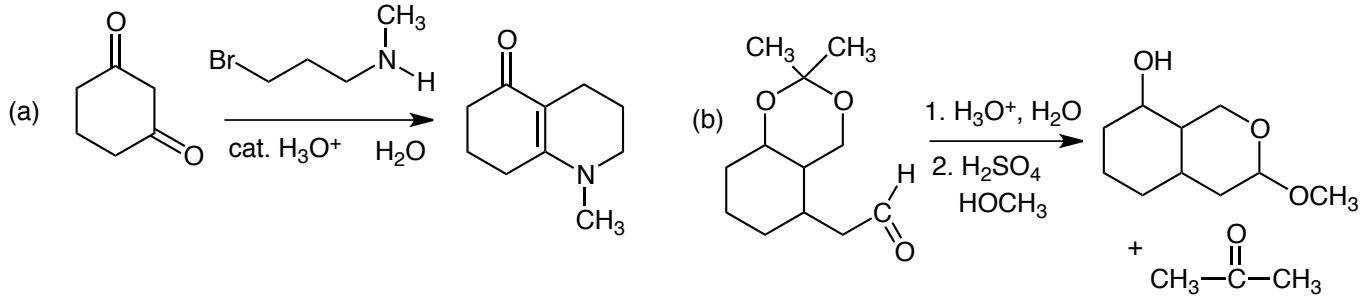
(a) 

(b) 

Turn Over the Page



8. Show how the following transformations occur, showing all the steps of the reaction. No other reagents are needed except those given. (15 pts each, 30 pts)



9. Synthesize **three** of the following **four** molecules from the starting materials given on the left. Do all **four** for extra credit. (10 pts each)