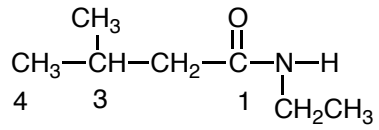
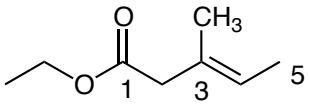
Long Island University, Department of Chemistry

Chem. 122, Sect 009, Exam 3, 100 pts, Spring, 2012

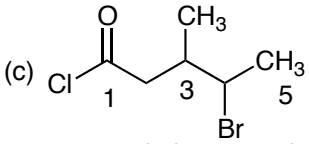
1. Name the following compounds. (15 pts)

(a) 

N-ethyl 3-methylbutanamide

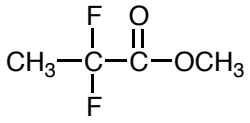
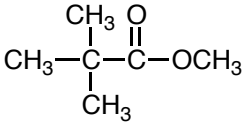
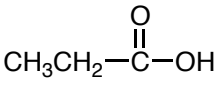
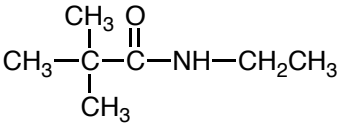
(b) 

ethyl 3-methyl-3-pentenoate

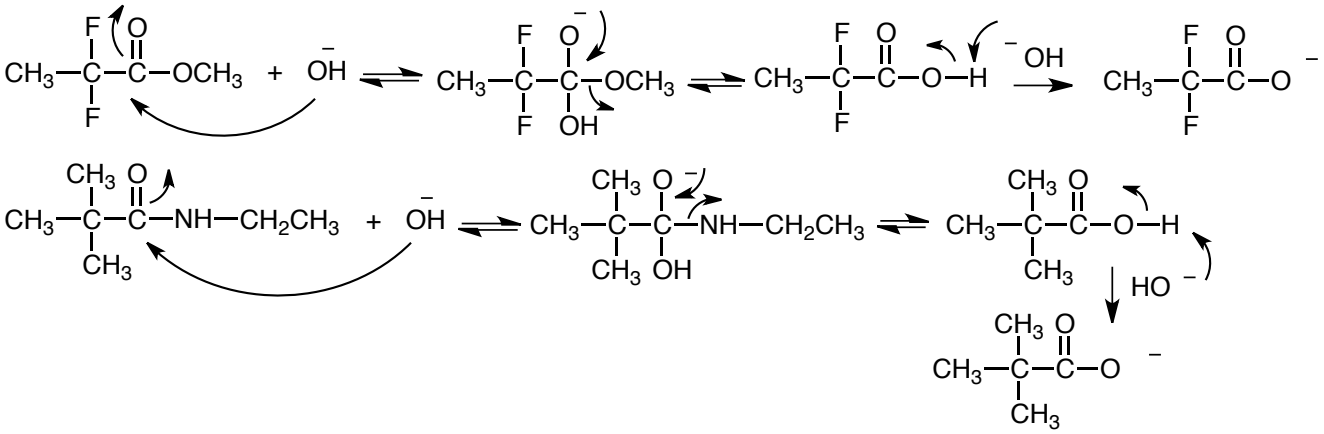
(c) 

4-bromo-3-methylpentanoyl chloride

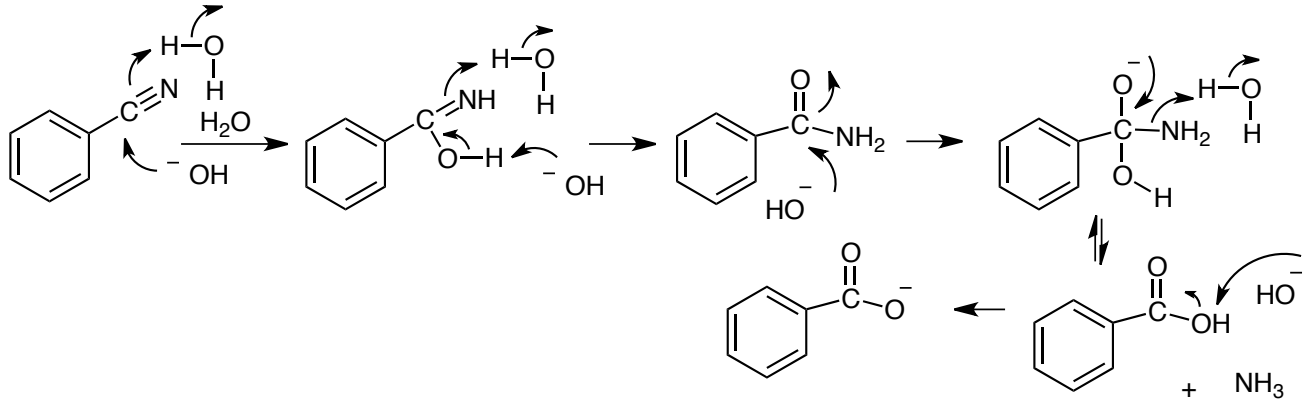
2. Which molecule would be (a) **MOST** (b) **LEAST** reactive to basic hydrolysis in $NaOH/H_2O$? In each case explain your answer and show the complete reaction and reaction mechanism for each molecule you choose. (15 pts)

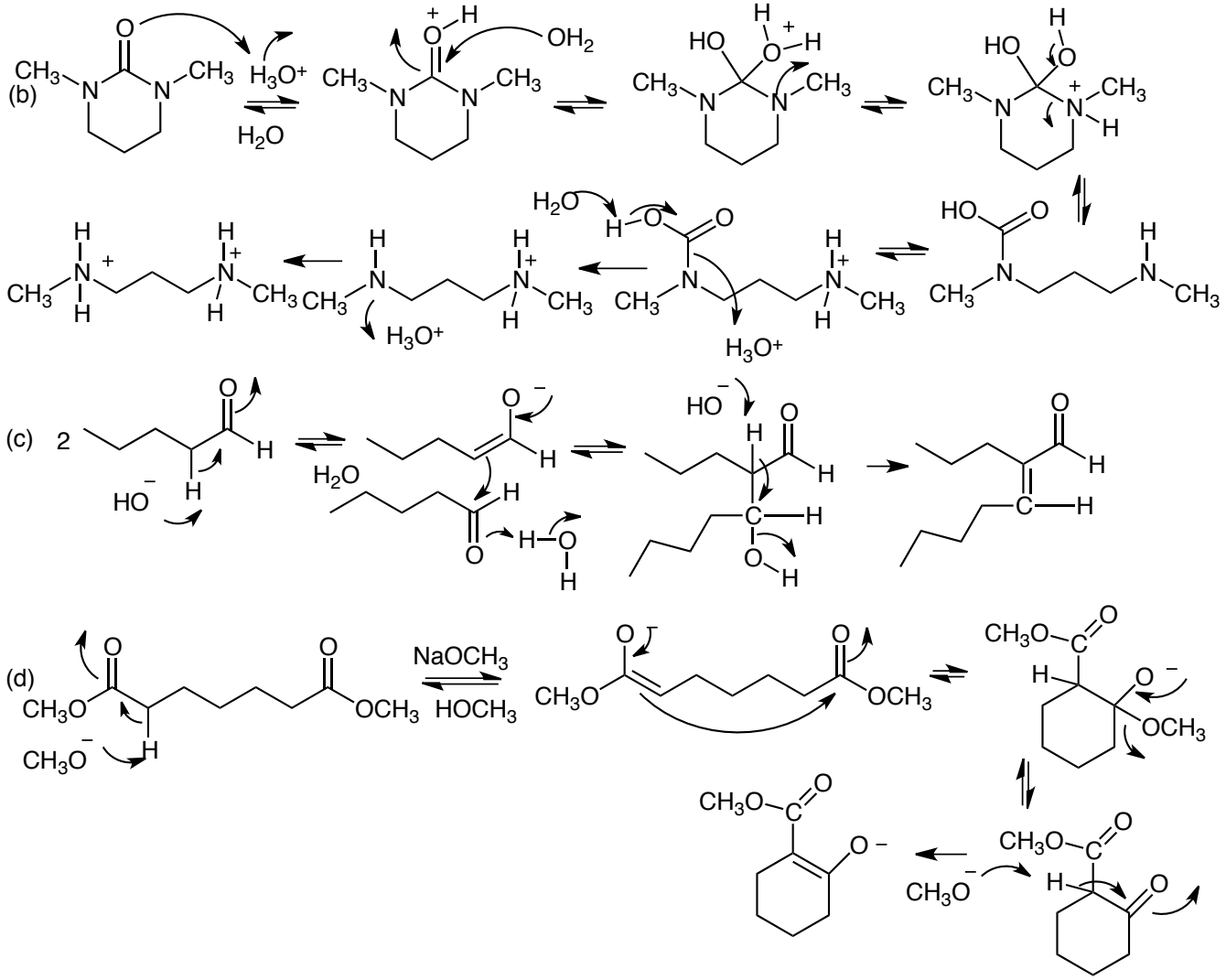
A  **B**  **C**  **D** 

A is most reactive to basic hydrolysis due to the two strongly electron withdrawing fluorines. **A** is also less hindered than **B.** **C** cannot undergo hydrolysis. The least reactive derivative is **D** which is an amide and therefore the carbonyl carbon is less electron deficient fue to the strong lone piar donation by the nitrogen. **D** is also quite hinderd due to the t-butyl group next to the carbonyl.

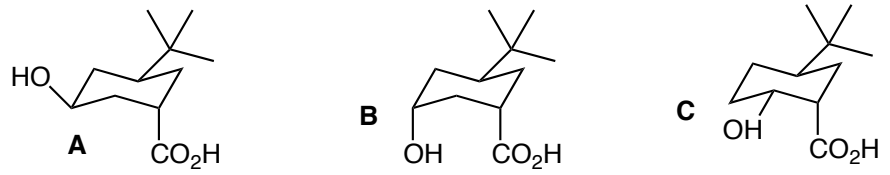


3. Give the product of the following reactions and in each case show the complete reaction mechanism by which it is formed. (40 pts)

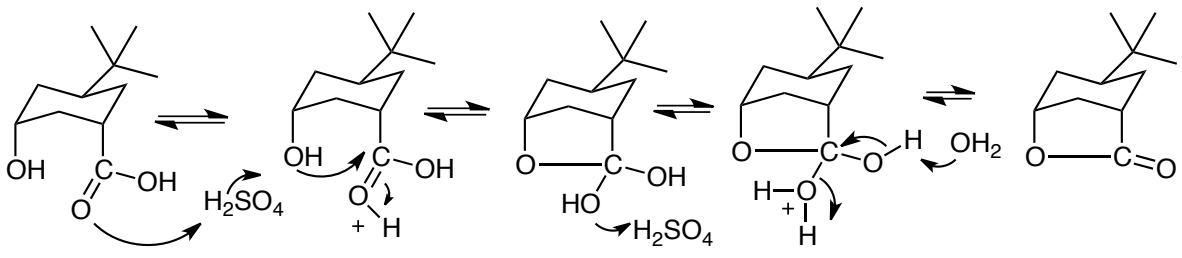
(a) 



4. One of the following molecules can undergo an intramolecular lactonization (ester formation) when treated with a catalytic amount of H_2SO_4. Indicate which molecule and show the reaction that occurs, giving the full reaction mechanism. (10 pts)



Only **B** can react to form an intramolecular ester. For **C**, the ester would be a 4-membered ring which is way too strained to be stable and in **A** the OH is too far away to reach the carbonyl.



5. Synthesize **TWO** of the molecules shown on the right from the starting materials given on the left. Do all three for extra credit. (20 pts).