

Chemistry 117 Sec. A (7:50-8:50)
Exam No. 2
“Spectroscopy and Nucleophilic Acyl Substitution”
March 4, 2005

Instructions: You have until 8:50 a.m. to complete the exam. At that time, I will request that all remaining test takers cease writing, turn their exams over, and pass them to their rightmost isle. If you finish before 8:50 a.m. you may turn in the exam at the front of the room prior to leaving. If you finish within the final 5 min. of class, please turn your exam over and remain seated until I call for the remaining exams to be turned in. *In fairness to all, anyone still working on the exam after “time” is called will receive a grade of zero!*

Be sure to read the instructions for each question. It may be helpful to skim the entire exam and solve the easier questions first.

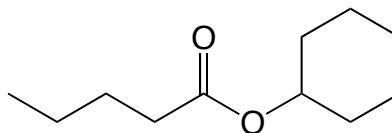
Exam Agreement: I, _____, have read and agree
(Please print)
to abide by the instructions above. On my honor, I have neither given nor accepted any help during this exam.

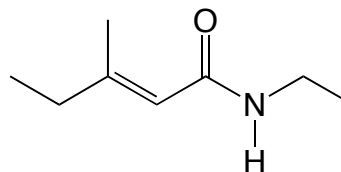
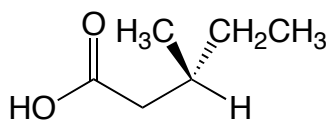
Signature: _____

College: _____

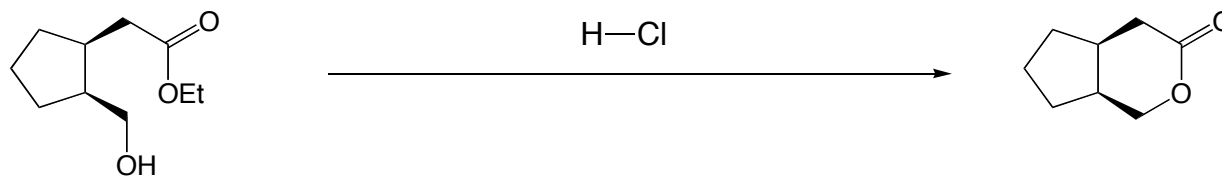
**DO NOT OPEN THIS EXAM UNTIL
INSTRUCTED TO DO SO**

1. Provide an unambiguous name (IUPAC or common) for each of the following molecules. (15 points)

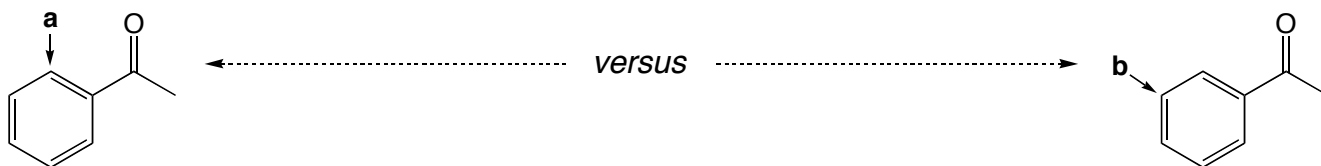
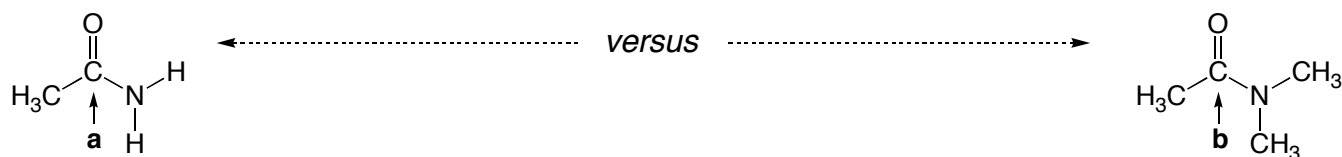
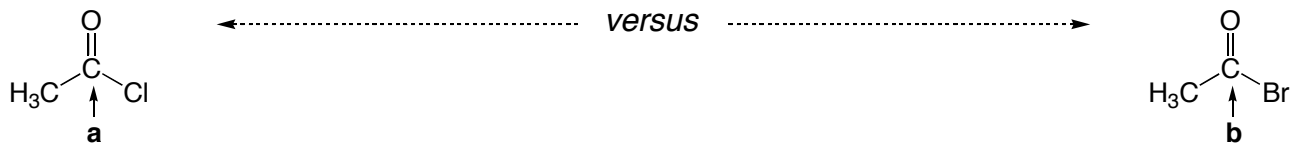




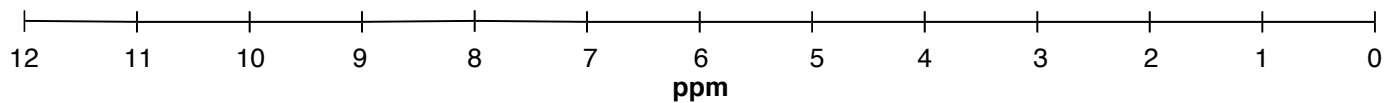
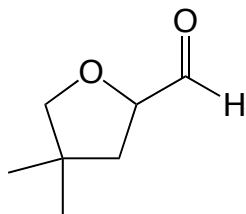
2. Provide a mechanism for the following reaction. You must show the products of each step and all formal charges for full credit. (13 points)



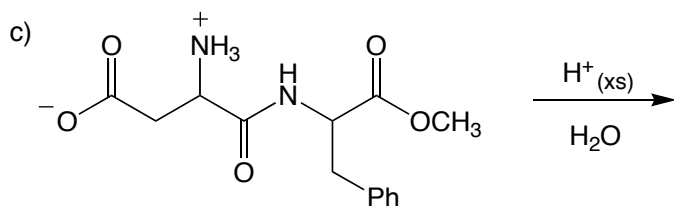
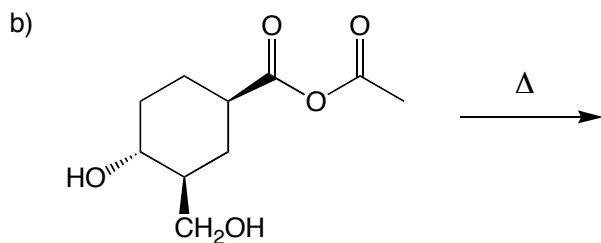
3. For each pair of compounds, decide which of the indicated carbons (**a** versus **b**) would resonate further downfield in a ^{13}C NMR spectrum (**circle** the one that would show up more downfield). Provide an explanation for your choice that uses both pictures and words. (15 points)



4. Predict the ^1H NMR spectrum of the following molecule, taking care to approximate chemical shift values and to show splitting patterns (do not show integration). For full credit, you must assign your peaks (label w/ letters) *and* consider the relative heights in all peaks that show splitting. (12 points)



5. Predict the *major* organic product of each of the following reactions. You may draw other products for partial credit, however if you do, you must *circle* the major product for full credit. (18 pts)



6. Propose a synthesis for the following transformation. Provide the products of each step for full credit. (13 pts)



7. A compound with the molecular formula $C_7H_{14}O_2$ gives the following spectra. Provide a structure for this compound. For full credit, you must assign peaks in each of the 3 spectra! *Circle your answer.* (14 points)

