

Chemistry 232-001 (Prof. Grossman's Section)

Third Examination

April 13, 2007

Name (please PRINT LEGIBLY) _____
(last) (first)

Student ID # _____

<u>Problem</u>	<u>Score</u>
1(a-f).	_____ /30
2(a-b).	_____ /30
3(a-b).	_____ /30
4(a-f).	_____ /30
Total.	_____ /120

Please observe the following.

1) Write LARGE and LEGIBLY. This will help me assign partial credit.

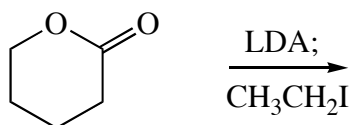
2) READ THE INSTRUCTIONS to each question CAREFULLY before answering. Many, many points are not awarded on each exam because of the failure of students to read the instructions.

1. (5 pts. each, 30 pts. total.) Draw the *major* product of each of the following reactions, including the stereochemistry, if appropriate. **Assume aqueous workup in each case, so your product should be neutral and should not contain any metals. Do not draw mechanisms!**

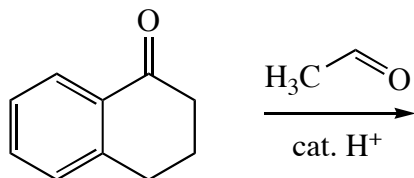
(a)



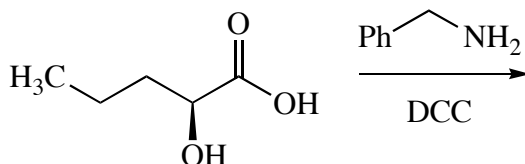
(b)



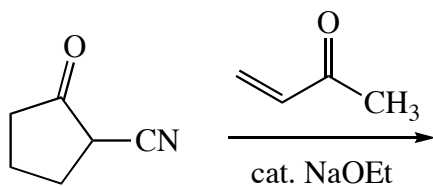
(c)



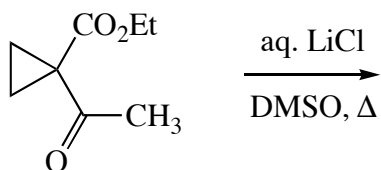
(d)



(e)

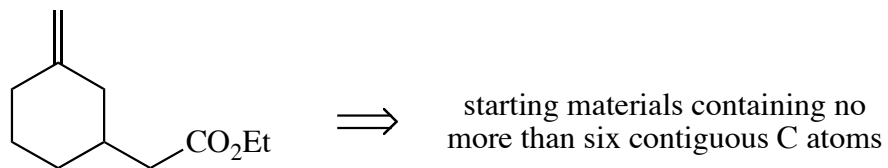


(f)

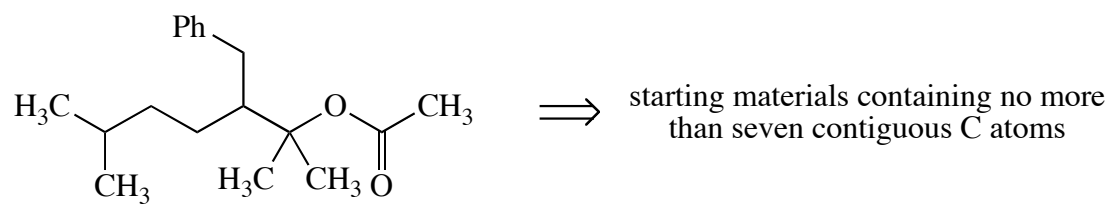


2. (15 pts. each, 30 pts. total) Design syntheses of each product from the given starting materials. Show all reagents you will need for each step. **Do not draw mechanisms!** You are strongly advised to do a retrosynthetic analysis first.

(a)

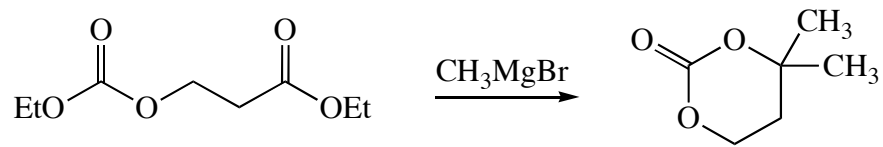


(b)

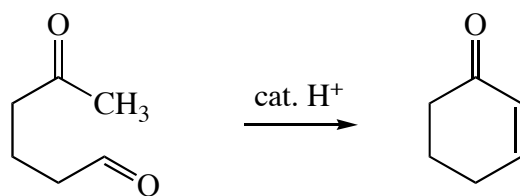


3. (15 pts. each, 30 pts. total) Draw reasonable mechanisms for each of the following reactions.

(a)



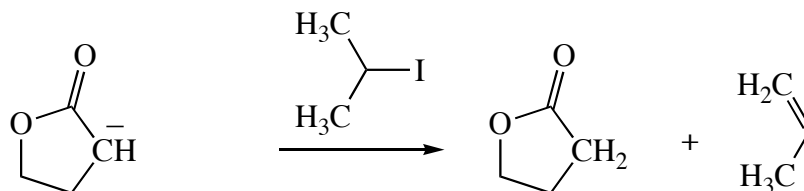
(b)



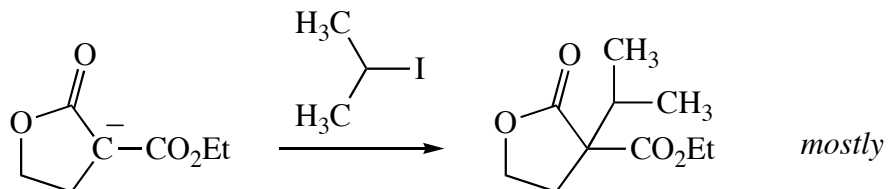
4. (5 pts. each, 30 pts. total.) Answer each of the following questions in one or two coherent, grammatically correct English sentences. Drawings to illustrate your point are encouraged.

(a) Why are higher-energy carbonyl compounds (such as acyl chlorides) *more acidic* at the α -carbon atom than lower-energy carbonyl compounds (such as esters)?

(b) Explain the difference in the courses of the two reactions below.

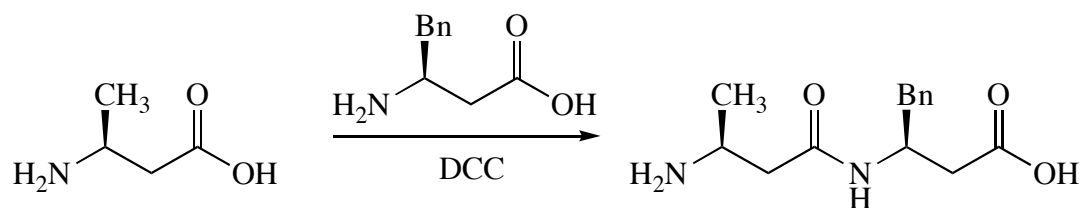


but

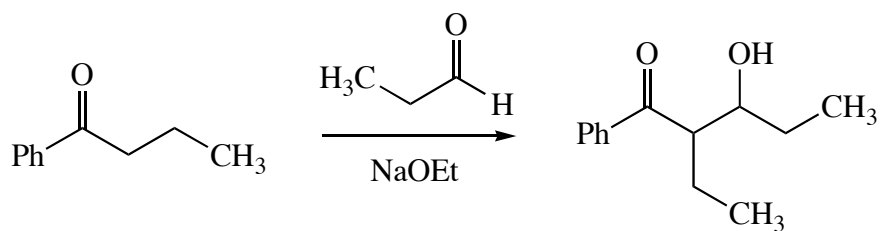


(c) Primary amines (RNH_2) react rapidly with esters at room temperature to make amides, but they do not react rapidly with carboxylic acids at room temperature to make amides, even though carboxylic acids and esters have the same energy.

(d) The following reaction does not proceed as shown. Why not, and what can be done to make it proceed as shown?



(e) The following reaction does not cleanly give the product shown. Why not, and what can be done to make it do so?



(f) Explain why the product isolated from the following reaction is the β-cyano ketone, not the α-cyano alcohol (cyanohydrin).

