

CHE 232-001 Organic Chemistry
Exam 3
April 3, 1996

Name _____

Student ID No. _____

Before you begin this exam: **First:** You are allowed to have a calculator and a simple model set at your seat. Please put away all other materials. **Second:** Place your student identification on your desk. A proctor will come around to check every one's ID. **Third:** Read through the entire exam. Your goal, as always, is to score as many points as possible. Do not waste time on problems that you can't do if there are others that look easy. **Fourth:** It is critically important that your answers be written in a clear, unambiguous manner. *Answers in which your intentions are unclear will not receive credit.* **Fifth:** READ EACH QUESTION CAREFULLY.

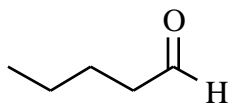
Problem Number	Points possible	Score
1.	6	_____
2.	8	_____
3.	6	_____
4.	20	_____
5.	20	_____
6.	20	_____
7.	10	_____
8.	10	_____
Total	100	_____

You are expected to pick up your graded exam at my office during the week following the exam. Be sure to check to see that the score from each problem was recorded correctly on this cover page and that the scores were added up correctly.

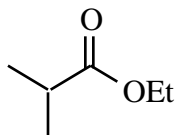
My records show that your scores on the first two exams were _____ and _____
If this is incorrect, see me immediately.

1. (6 points) Provide viable names for each of the following structures.

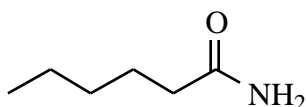
a)



b)

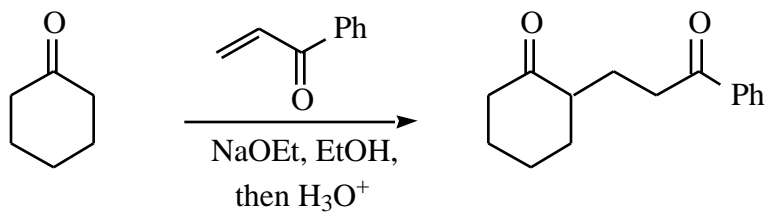


c)

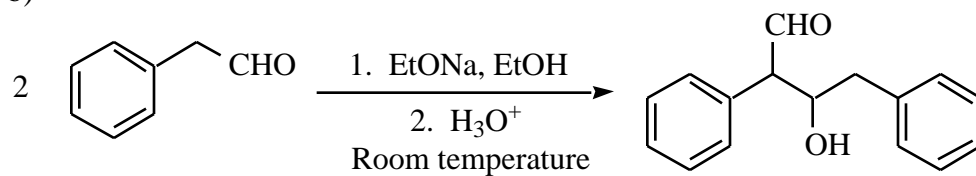


2. (8 points) Classify each of the following reactions as either an Aldol condensation, a Claisen condensation, Dieckmann condensation, or a Michael reaction.

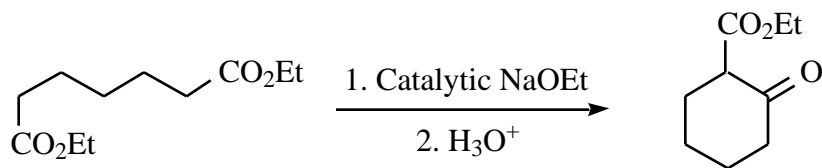
a)



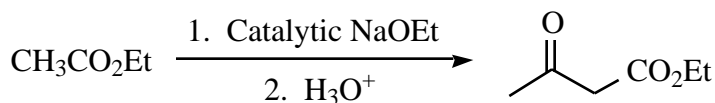
b)



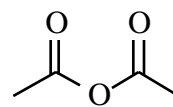
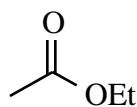
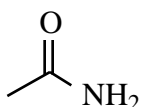
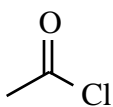
c)



d)

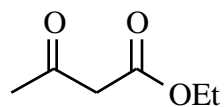


3. (6 points) Of the carboxylic acid derivatives shown below, circle and label the ***MOST*** reactive acylating agent, and circle and label the ***LEAST*** reactive acylating agent.



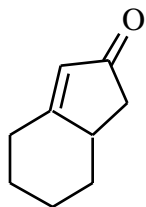
4. (20 points) Each of the following compounds can be prepared by a carbonyl condensation. For each, show the precursor or precursors that could condense (react) to produce the given compound.

EXAMPLE

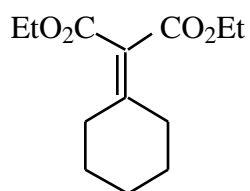


Problem 4

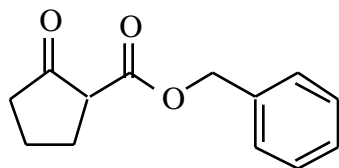
a)



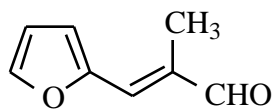
b)



c)



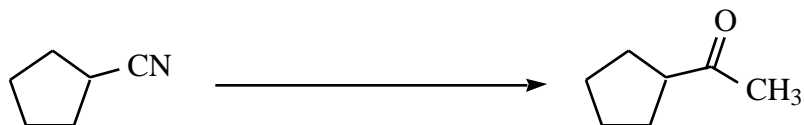
d)



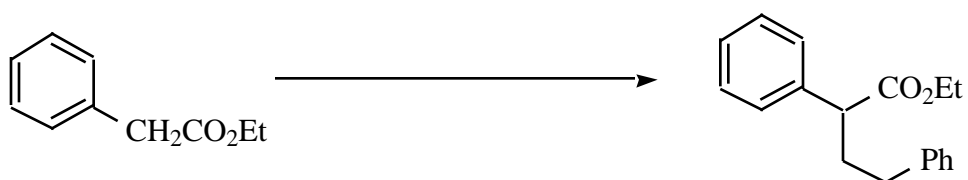
(a mixture of *E* and *Z* isomers)

5. (20 points) Provide suitable reagents for each of the following transformations. More than one step may be required in some cases.

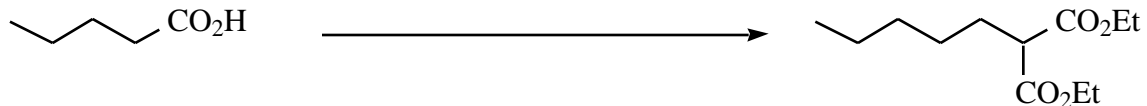
a)



b)



c)

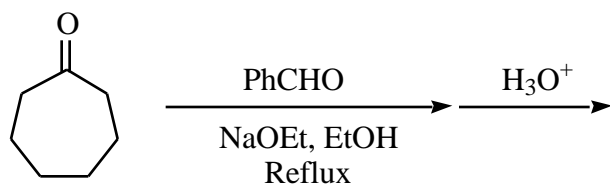


d)

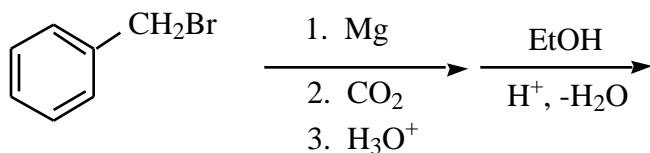


6. (20 points) Provide the expected organic product from each of the following reactions. If you believe that there will be no reaction, write "no reaction."

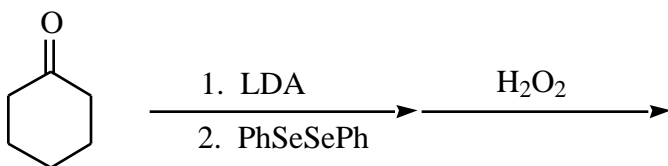
a)



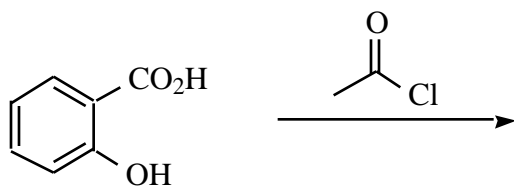
b)



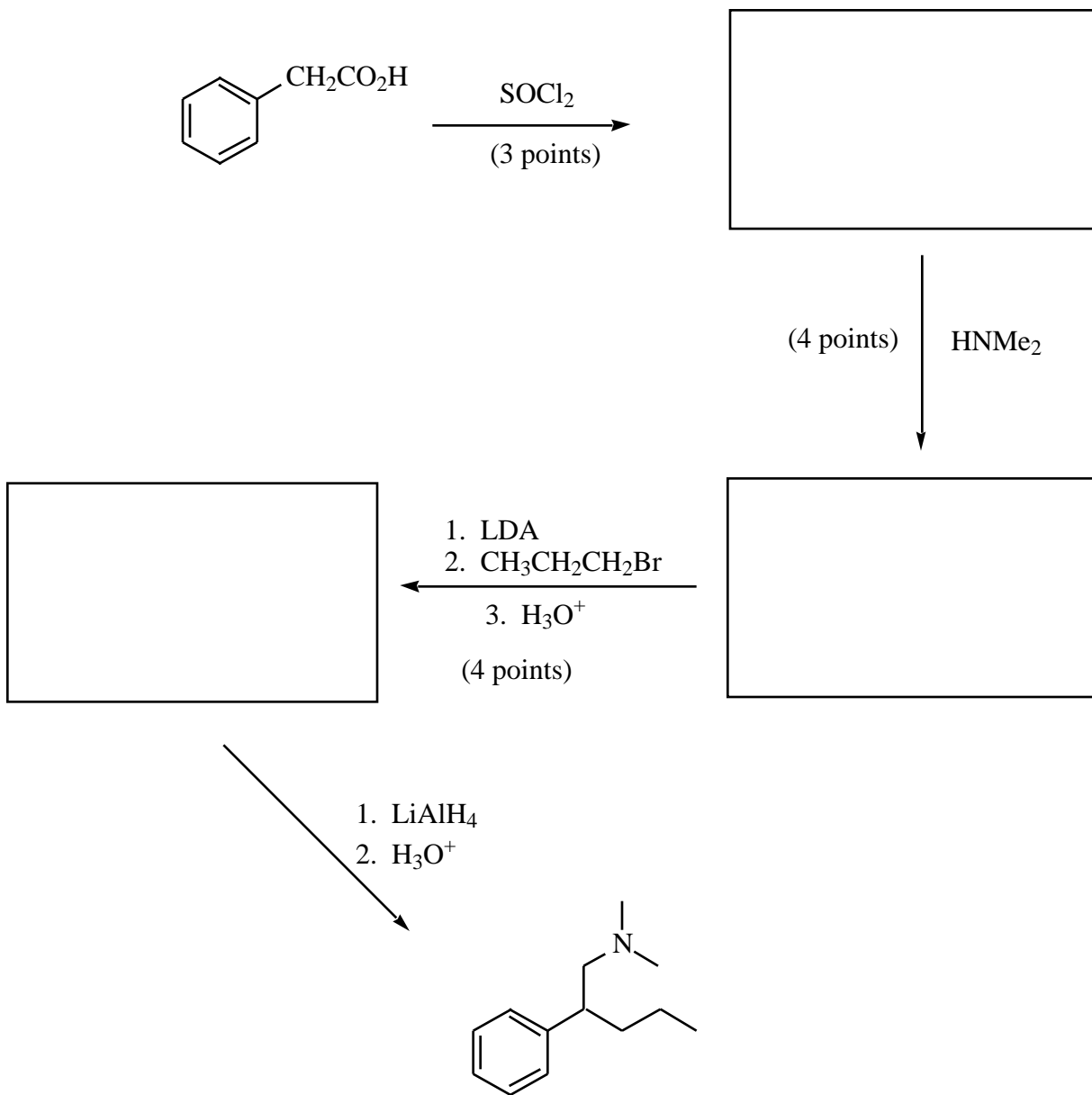
c)



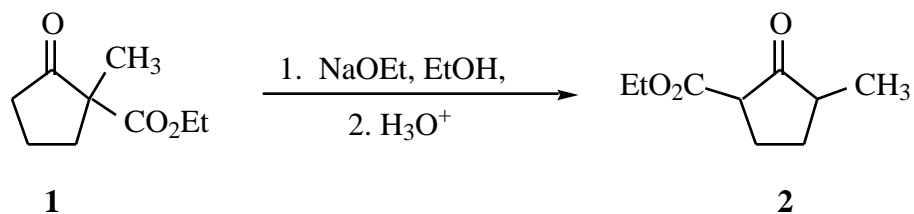
d)



7. (10 points) Provide the compounds that belong in the boxes. The last compound in the series is given, so if you get stuck, try working backwards from the last compound.



8. (10 points) Treatment of α -keto ester **1** with base (followed by a mild acid workup) produces the β -keto ester **2**. Draw a viable mechanism for this transformation. Note: Four membered rings are very highly strained and unlikely to form. Remember: The reversibility of chemical equilibria is a wonderful thing.



END OF EXAM