

CHEM 330

Midterm Exam
October 22, 2010

ANSWERS

Your name: _____

This a closed-notes, closed-book exam

The use of molecular models is allowed

Time: 60 min

this document contains 5 pages

1. _____ / 10

2. _____ / 12

3. _____ / 18

4. _____ / 20

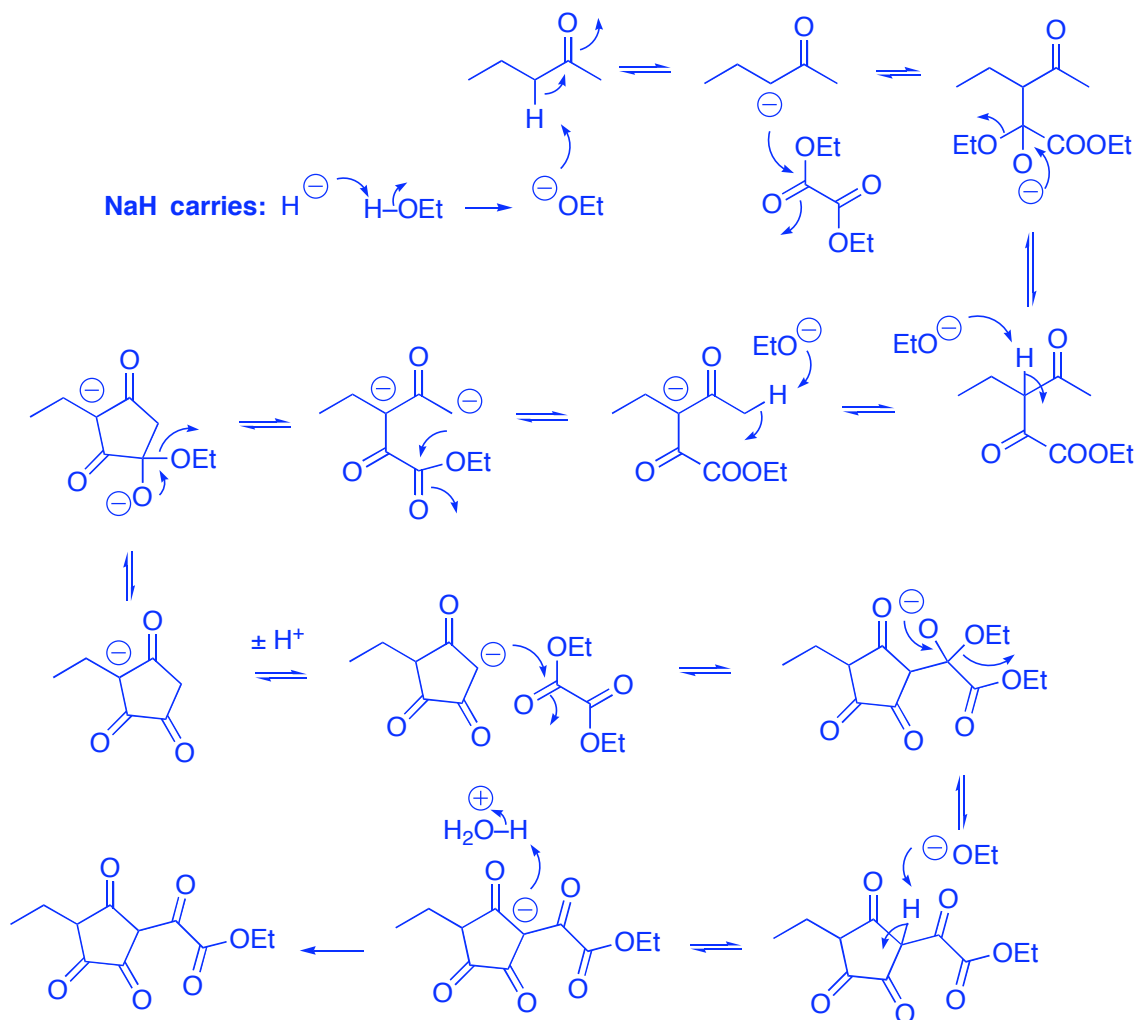
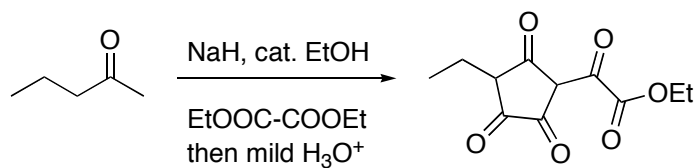
5. _____ / 20

6. _____ / 20

TOTAL _____ /100

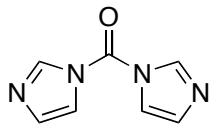
This exam counts for 25% of your CHEM 330 final grade

1. (10 pts.) Write an accurate mechanism for the following known reaction:

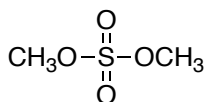
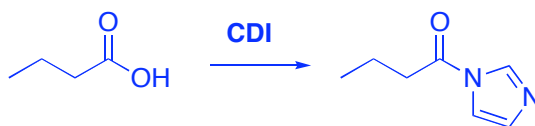


(slightly different mechanisms may also be acceptable)

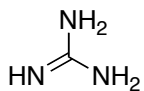
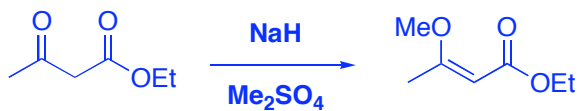
2. (12 pts) Write a chemical equation to illustrate the use of each of the reagents shown below in one of the reactions discussed in class:



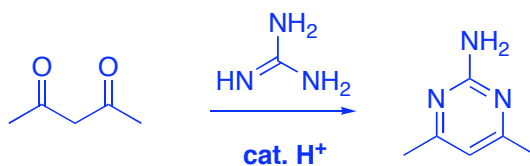
(carbonyl diimidazole, CDI)



(dimethyl sulfate)

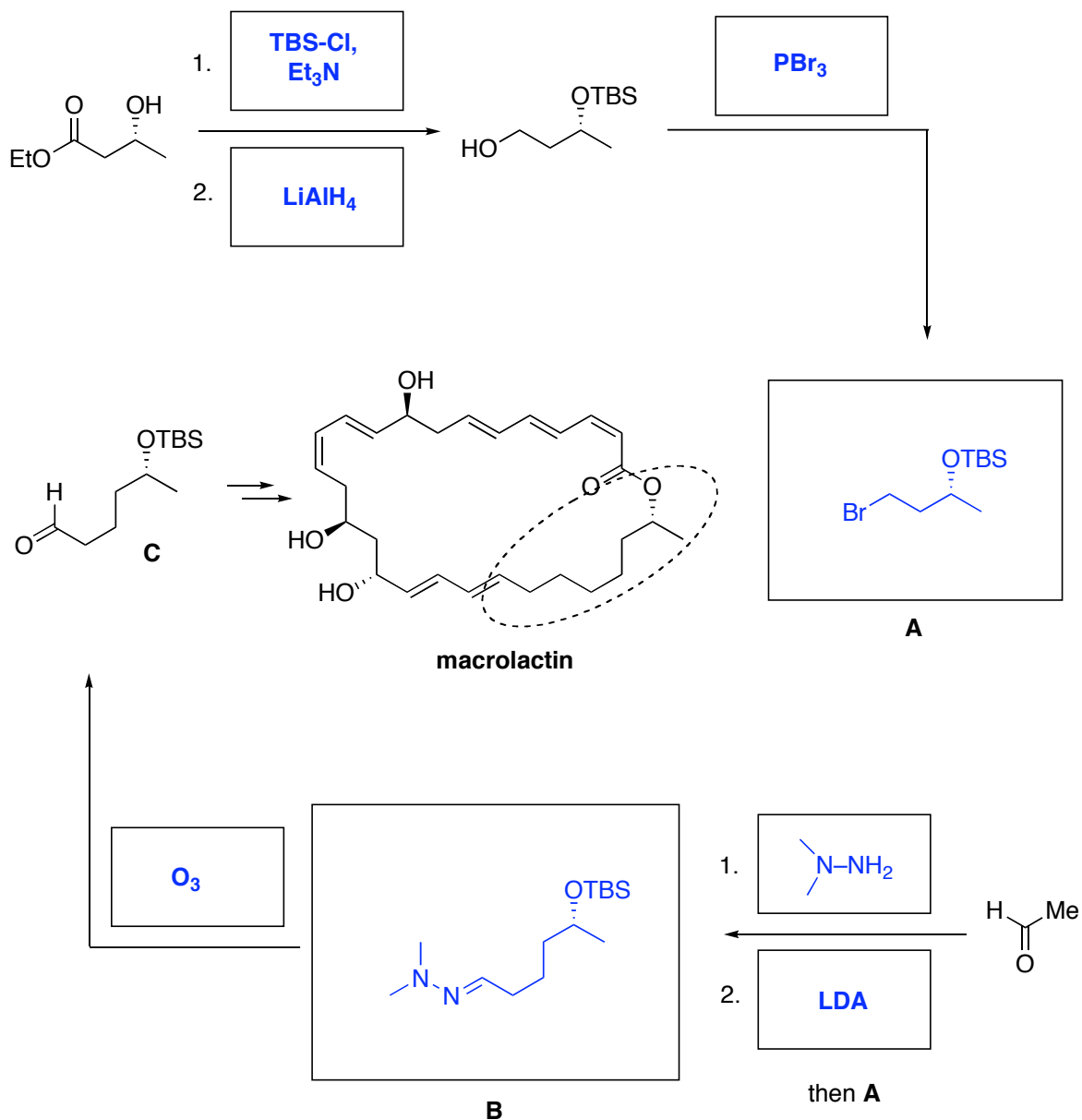


(guanidine)



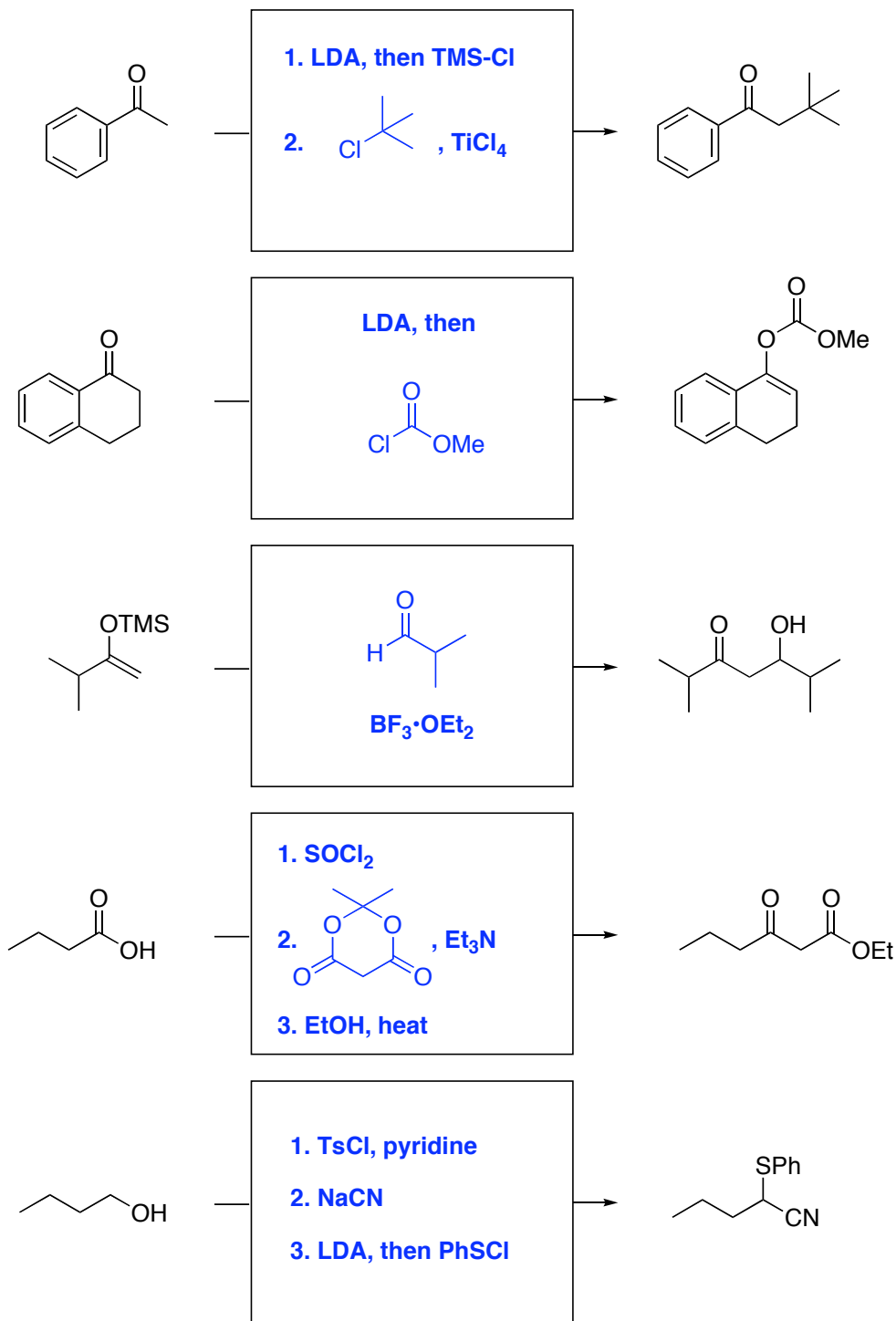
(other answers may also be acceptable)

3. (18 pts) The synthetic diagram shown below outlines the assembly of compound **C**, which served as the precursor of the encircled portion of the anti-HIV natural product, macrolactin (*Angew. Chem. Int. Ed.* **1998**, 37, 1261). Complete this diagram by writing in all missing intermediates and reagents. **It is understood that each reaction is subject to a final aqueous workup.**



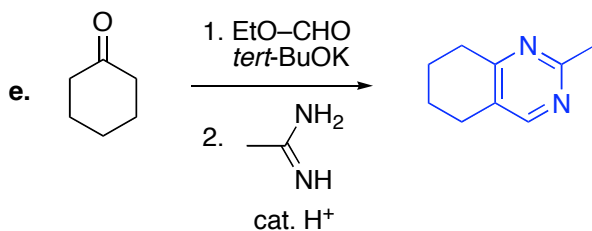
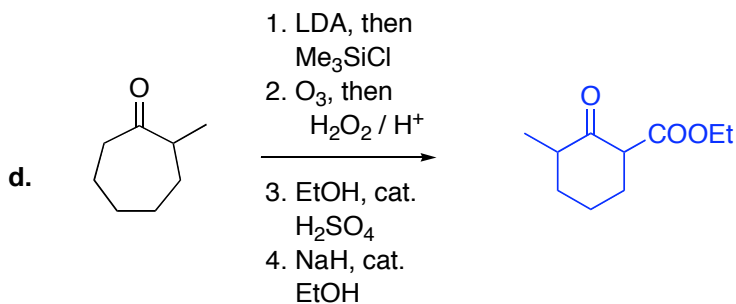
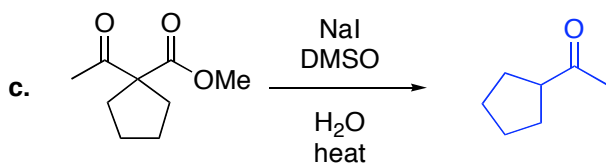
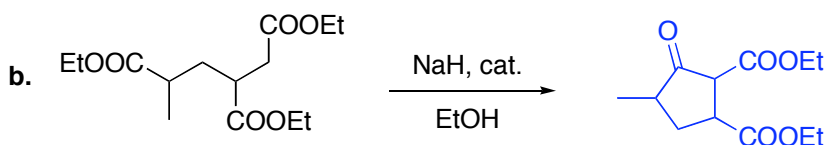
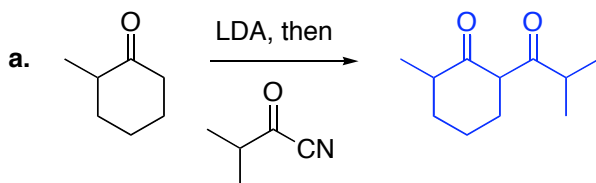
(slightly different answers may also be acceptable)

4. (20 pts.) Propose a method to achieve the following transformations. Present your answers as a numbered list of reagents, in the correct order, which are required to convert the starting compound into the product shown (write in the appropriate boxes). **It is understood that each reaction is subject to a final aqueous workup**:



(other answers may also be acceptable)

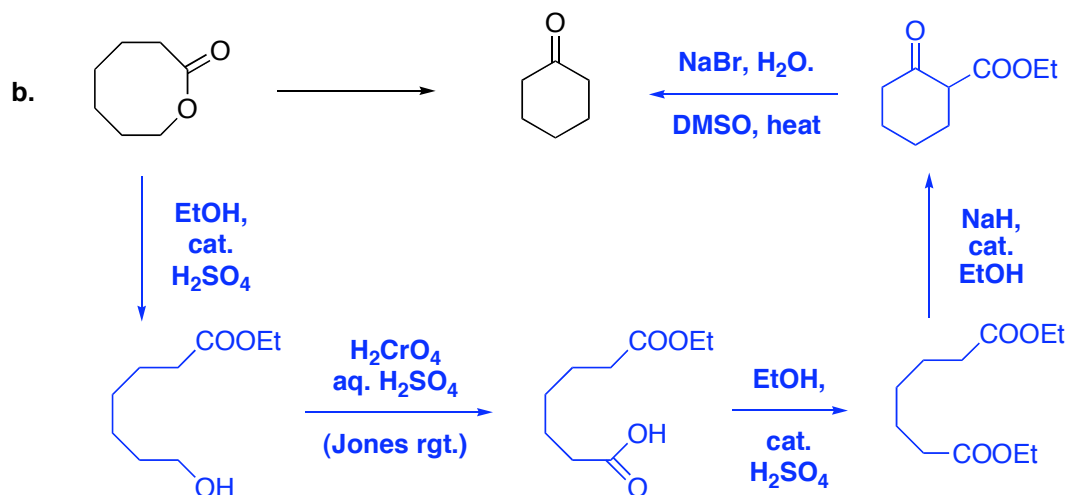
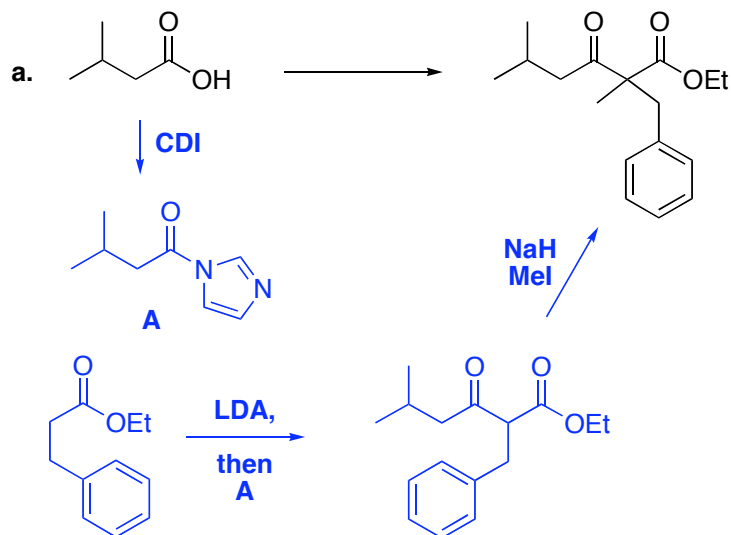
5. (20 pts.) Predict the structure of the major product expected from the following reactions. **It is understood that each reaction is subject to a final aqueous workup.**



6. (20 pts.) Propose a method to accomplish the transformations shown below. In each case, a multistep sequence (= not just one reaction, but several) may be required. Assume the availability of all reagents needed to convert the starting material into the product (e.g., bases, alkyl halides, etc.). Present your answer as a flowchart.

• It is not necessary to draw mechanisms.

• Aqueous workups at the end of each reaction are understood



(other answers may also be acceptable)