CHEM 330

Exam 1
October 19, 2012

ANSWERS

Your name: _____

This document consists of 6 pages

This a closed-notes, closed-book exam

The use of molecular models is allowed

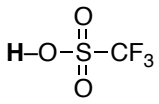
Time: 1.5 h

1. _____ / 10
2. _____ / 15
3. _____ / 15
4. _____ / 20
5. _____ / 20
6. _____ / 20

TOTAL _____ /100

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

1. (10 pts.) Provide the approximate pKa for the dissociation of the H in boldface in the substances shown below:



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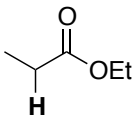

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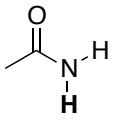

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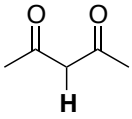

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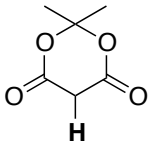

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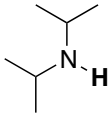

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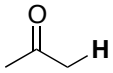

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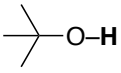


19

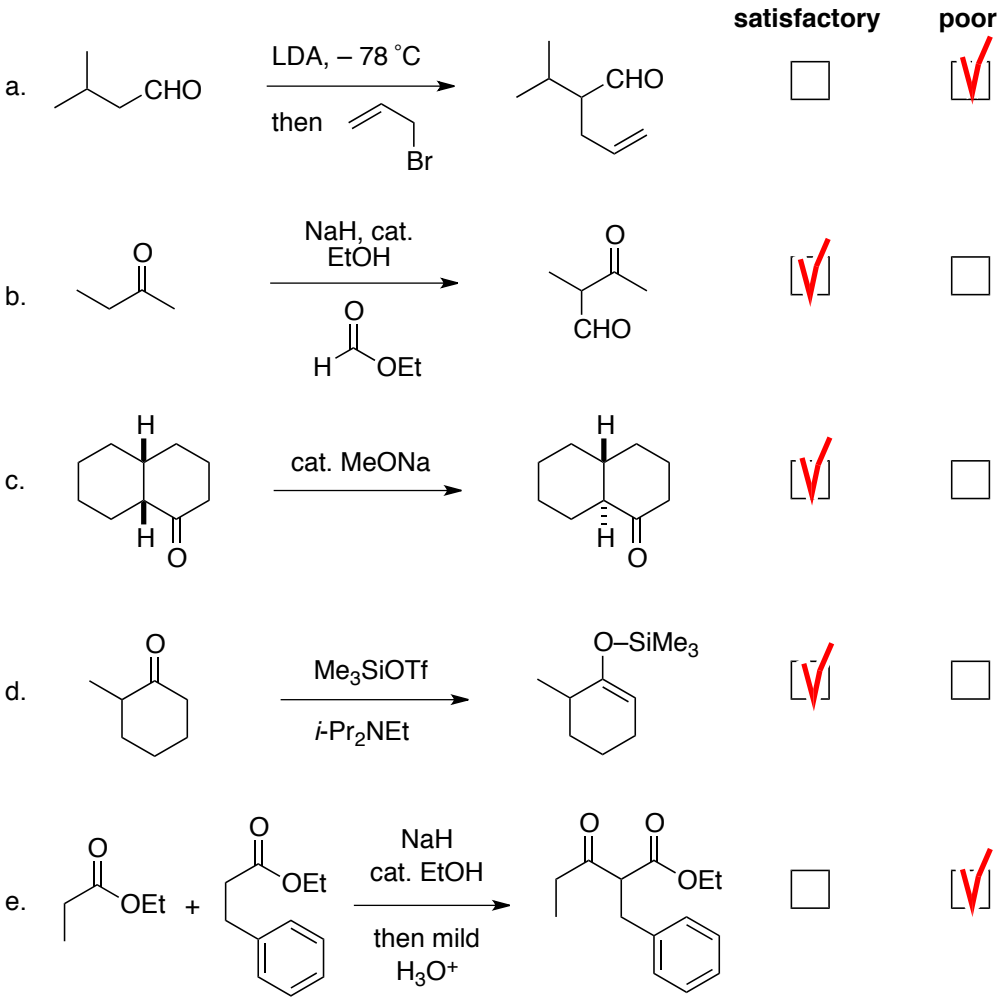
H–H

40

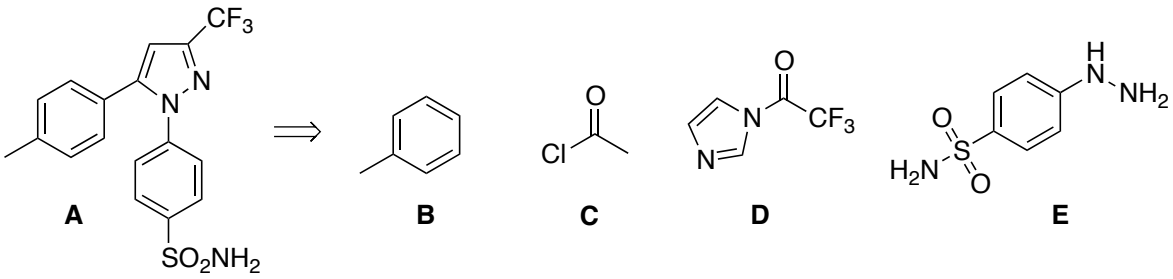
EtO–H

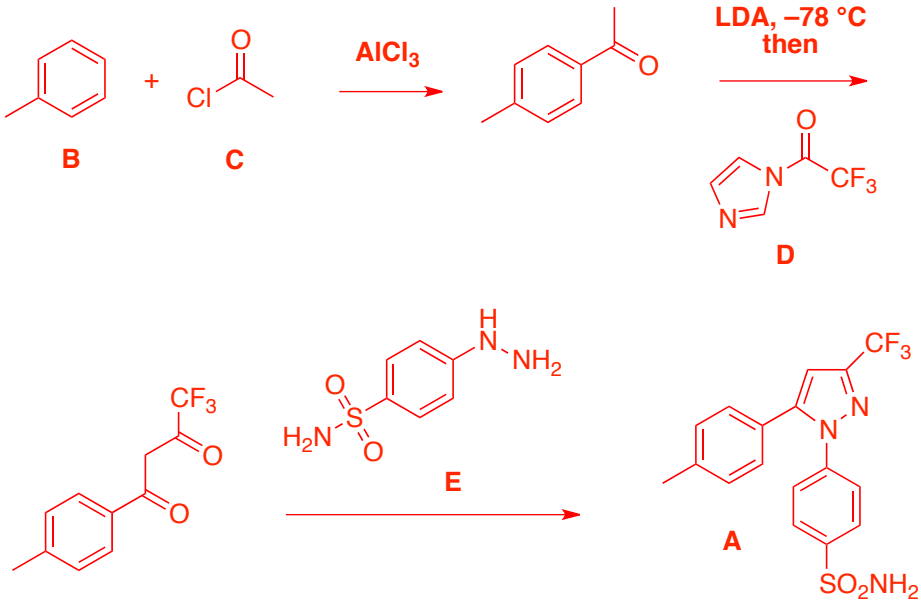
17

2. (15 pts.) Check the appropriate box to indicate whether the procedures shown below correspond to satisfactory or poor methods to achieve the desired transformation:



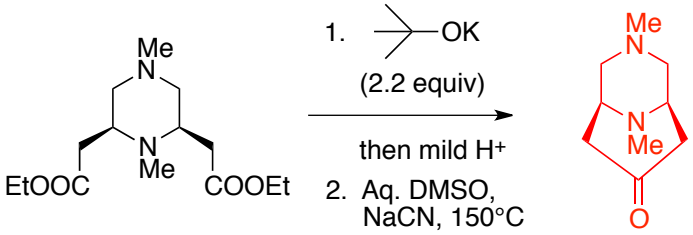
3. (15 pts.) The anti-inflammatory drug, Celebrex®, **A**, is manufactured from building blocks **B** – **E**. Propose a synthesis of **A** from **B** – **E**. Provide your answer as a detailed reaction flowchart that illustrates all reagents necessary to induce the required transformations and all intermediate products. **Note**: aqueous workups at the end of each step of the synthesis are understood and need not be shown. Also, it is not necessary to draw mechanisms.



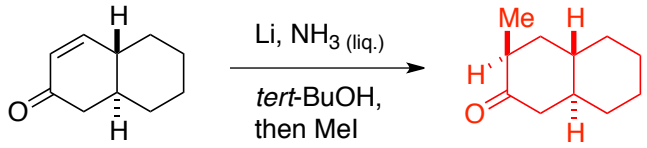


4. (20 pts.) Predict the structure of the major product expected from each of the reactions shown below. **Important**: aqueous workups after each reaction are understood.

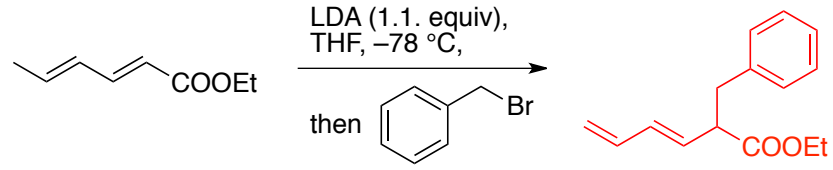
a.



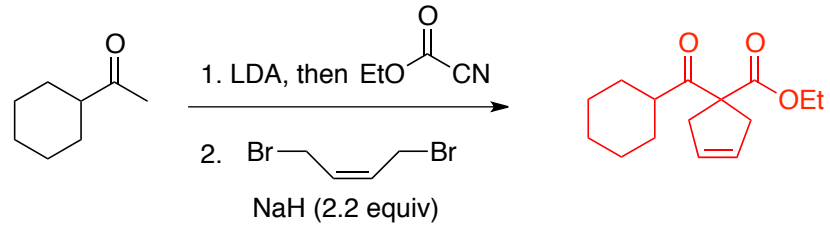
b.



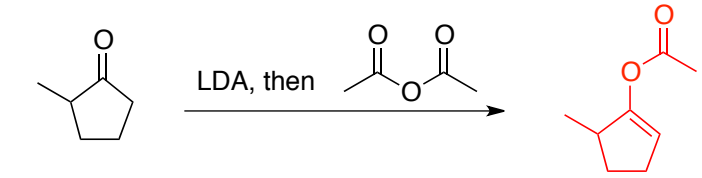
c.



d.

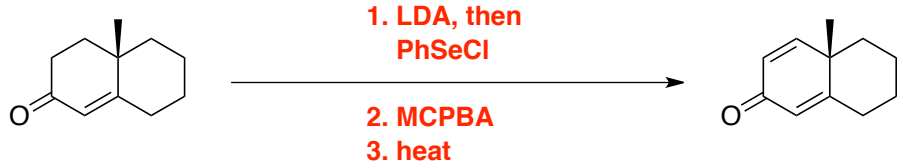


e.

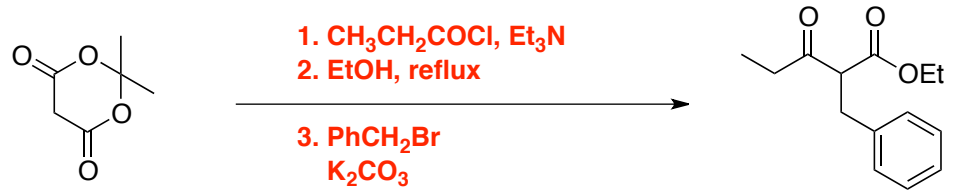


5. (20 pts.) Propose a method to accomplish the transformations shown below. Show all required reagents, in the correct order, as a numbered list above / below the reaction arrow. **Aqueous workups after each step are understood and there is no need to specify them.**

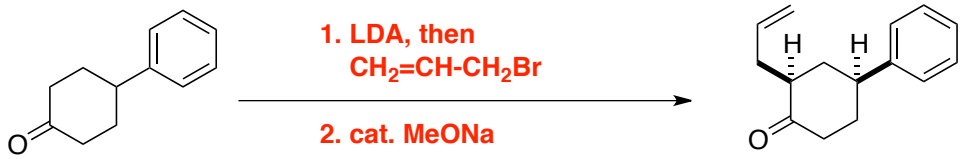
a.



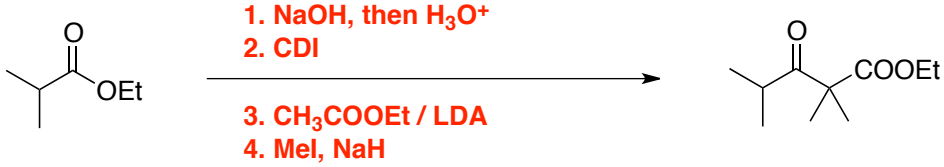
b.



c.



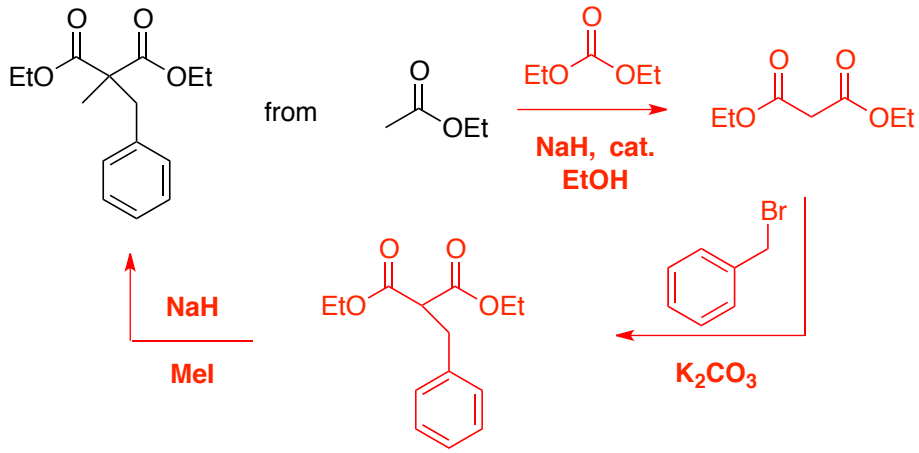
d.



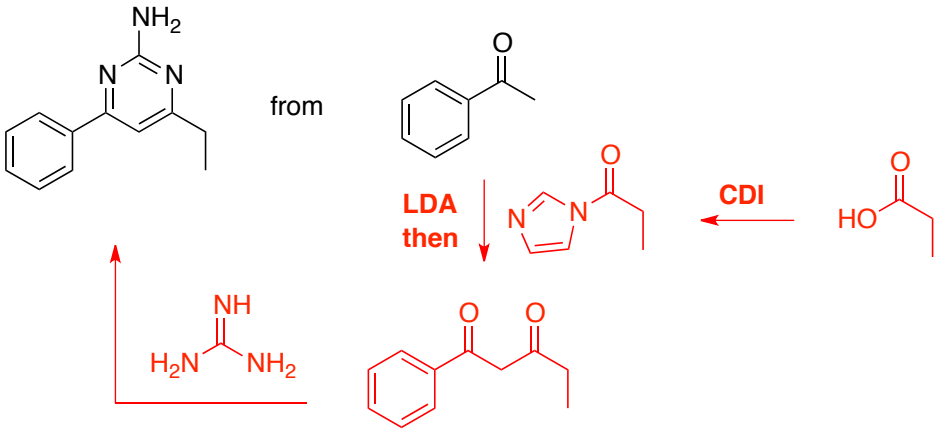
other answers may be acceptable

6. (20 pts.) Propose a method to synthesize the substances shown below from the indicated materials. Assume the availability of all reagents needed to convert the starting compound into the product (e.g, bases, alkyl halides, etc.). Present your answer as a flowchart. **It is not necessary to draw mechanisms**. **Also, aqueous workups after each step are understood.**

a.



b.



other answers may be acceptable