CHEM 330

Midterm Exam
October 24, 2008

ANSWERS

Your name: _____

This a closed-notes, closed-book exam

The use of molecular models is allowed

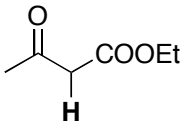
Time: 60 min

this document contains 5 pages

1.	_____	/ 12
2.	_____	/ 16
3.	_____	/ 24
4.	_____	/ 24
5.	_____	/ 24
TOTAL	_____	/100

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

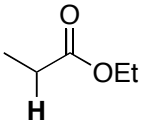
1. (12 pts.) Indicate the approximate pKa's of the protons in boldface in the following compounds. Write your answer in the corresponding boxes.



12

EtO–**H**

18



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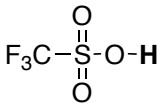

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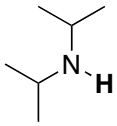

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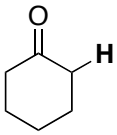

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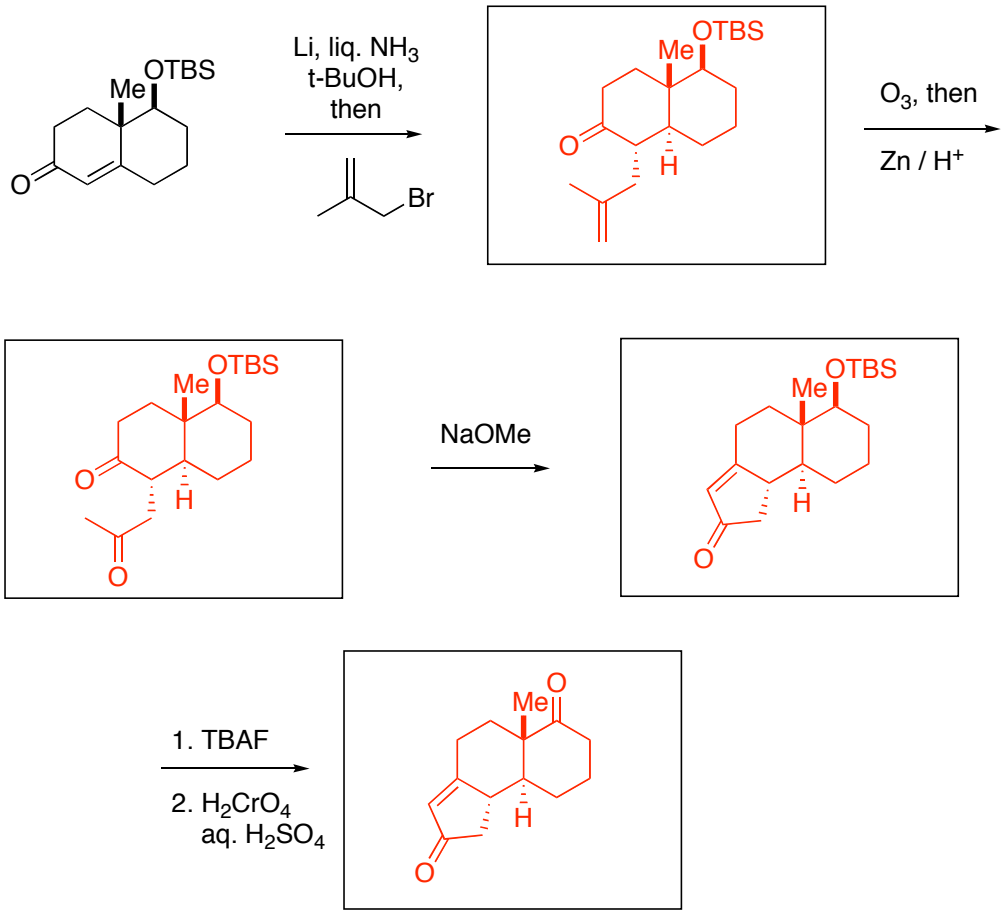
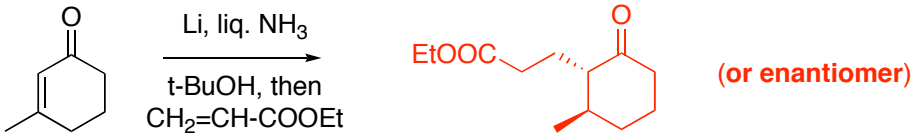
2. (16 pts) Provide the structure of the four missing intermediates in the reaction diagram below:

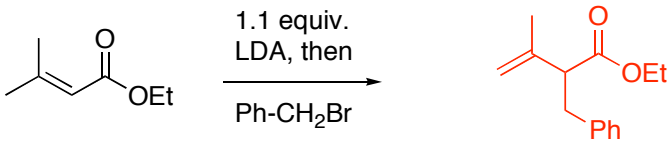


3. (24 pts.) Predict the structure of the major product expected from the following reactions. **It is understood that each reaction is subject to a final aqueous wortkup**.

a



b



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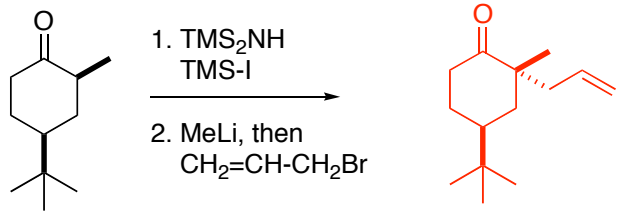
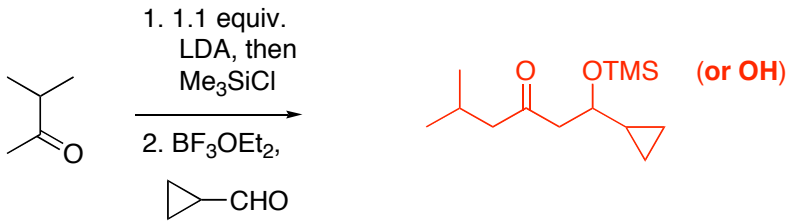
d



e



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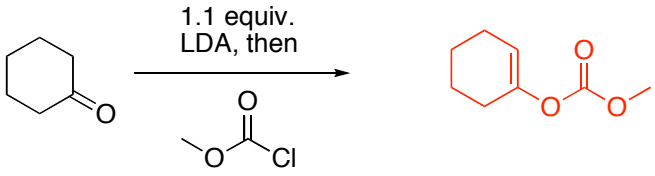
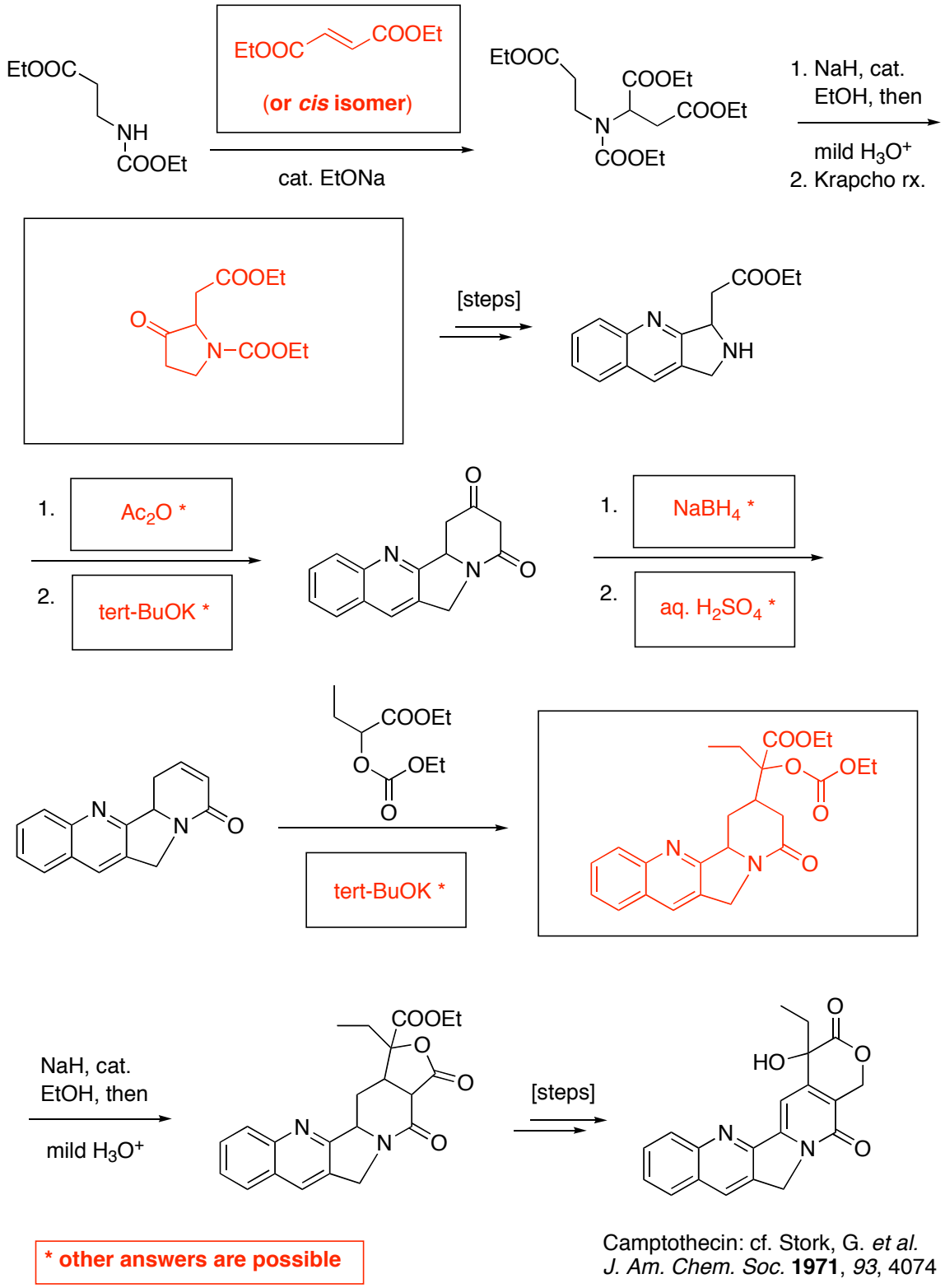


4. (24 pts.) An early synthesis of the antitumor agent, camptothecin, proceeded as shown below. Complete this diagram by writing in all missing intermediates and reagents. **It is understood that each reaction is subject to a final aqueous workup**.

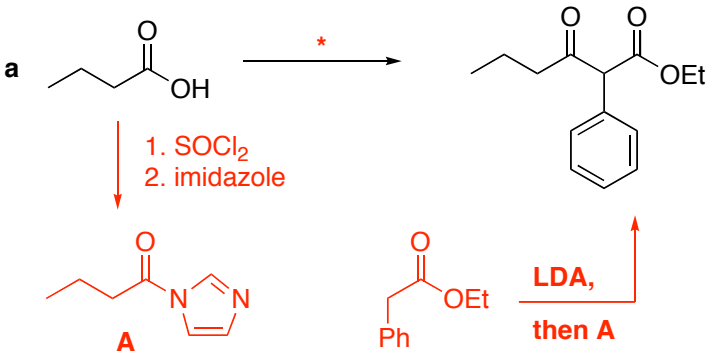


*** other answers are possible**

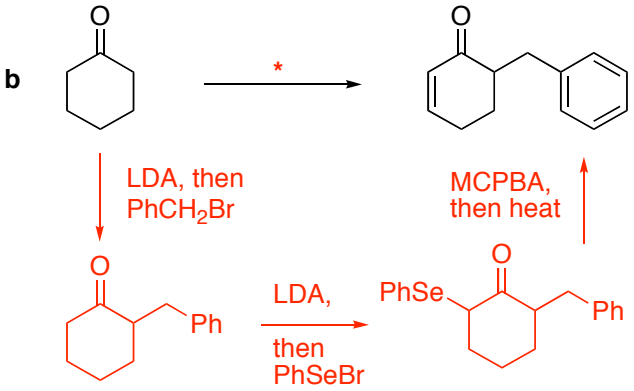
Camptothecin: cf. Stork, G. *et al.* *J. Am. Chem. Soc.* **1971**, *93*, 4074

5. (24 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**.

a



b



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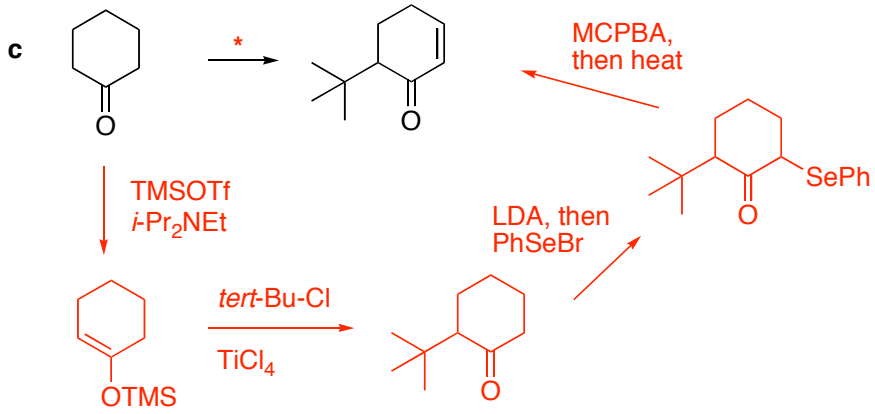

*** other answers are possible**