CHEM 330

Midterm Exam
October 16, 2006

Your name: _____

This a closed-notes, closed-book exam

The use of molecular models is allowed

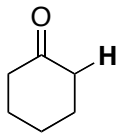
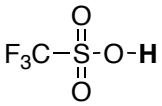
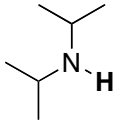
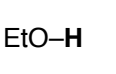
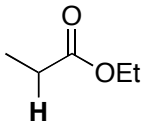
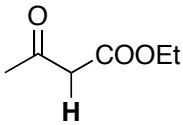
Time: 50 min

this document contains 5 pages

1.	_____	/ 12
2.	_____	/ 12
3.	_____	/ 28
4.	_____	/ 18
5.	_____	/ 30
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.

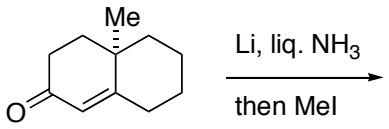
2. (12 pts) Write a chemical equation that illustrates an example of each one of the following reactions encountered in class (**do not** write mechanisms – just the reactions).

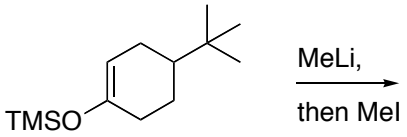
a. Mukaiyama variant of the aldol reaction

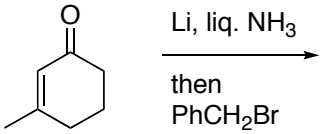
b. Krapcho reaction

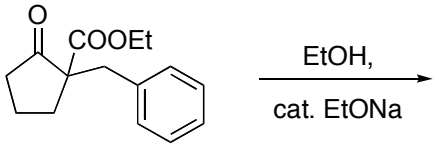
c. Yonemitsu reaction

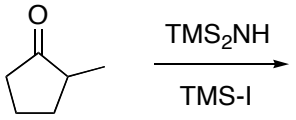
3. (28 pts.) Draw the structure of the major product expected from each of the reactions shown below. Note: it is understood that each reaction is subject to a final aqueous workup.

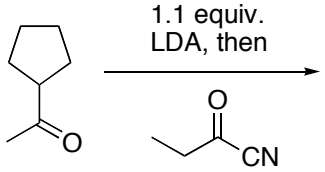
a. 

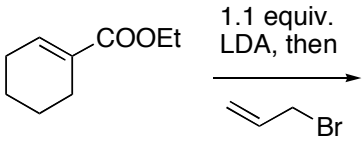
b. 

c. 

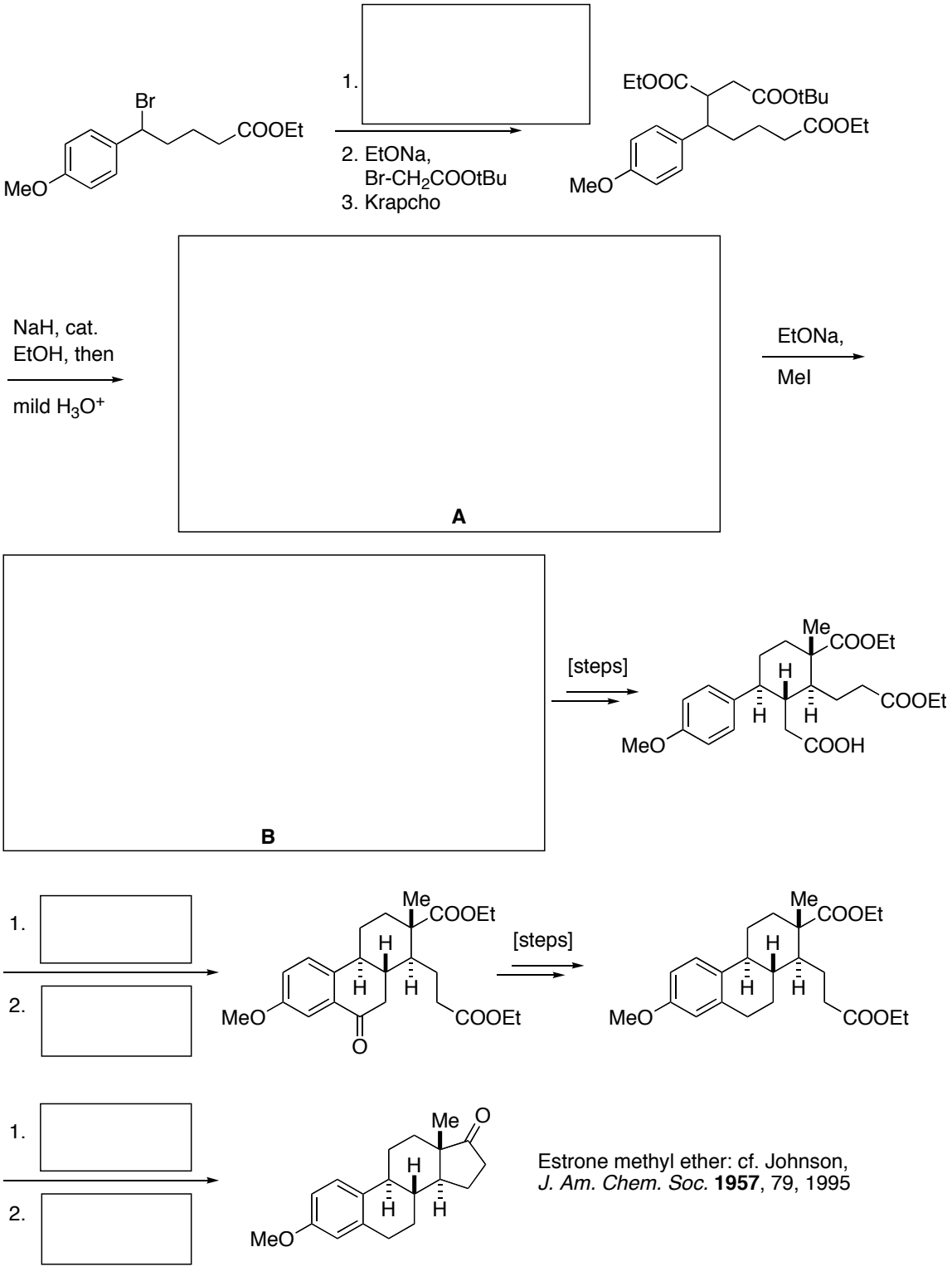
d. 

e. 

f. 

g. 

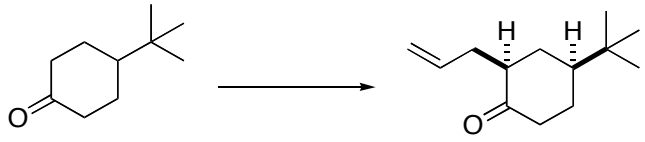
4. (18 pts.) Complete the reaction diagram shown below by writing in all missing reagents and intermediates. **Note**: clearly indicate the configuration of stereogenic carbons in **A** and **B**.



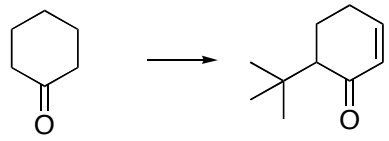
Estrone methyl ether: cf. Johnson, *J. Am. Chem. Soc.* **1957**, 79, 1995

5. (30 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



c