Organic Chemistry c3444y

3rd Hour Exam

Monday, March 27, 2000
Prof. Leighton

Name:_____ **ID#**_____

Signature:_____

- Write your name on every page.
- The exam is 5 pages long (*not* including this one). Please make sure you have all of the pages.
- Write complete ***but succinct*** answers. **Good Luck!**

Question 1 (20 pts): _____

Question 2 (25 pts): _____

Question 3 (15 pts): _____

Question 4 (20 pts): _____

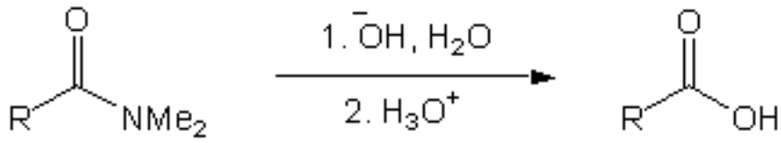
Question 5 (20 pts): _____

Total (100 pts):_____

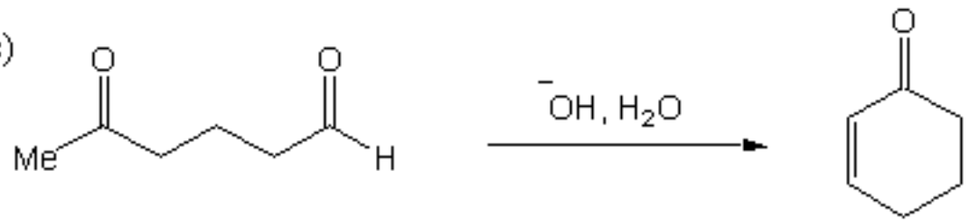
Name: _____

1. Provide detailed mechanisms for the following transformations:

a. (10 pts)



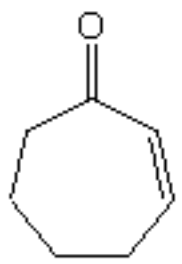
b. (10 pts)



Name: _____

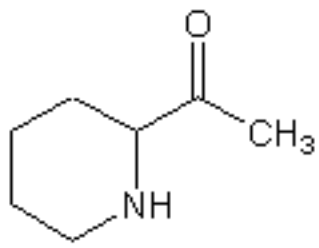
2. Predict the major product of the following reactions:

a. (10 pts)

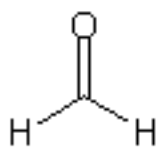


$^{-}OH, H_2O$

b. (10 pts)

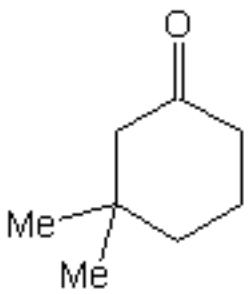


+



H^+

c. (5 pts)



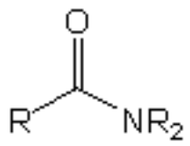
$i\text{-}Pr_2N\text{-}Li$ (LDA)

-78 °C

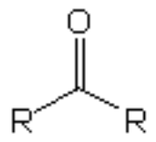
CH_3I

Name: _____

3. a. (5 pts) Using resonance structures, provide a *brief* explanation for the observation that amides typically display a lower C=O stretching frequency in the IR spectra relative to ketones:

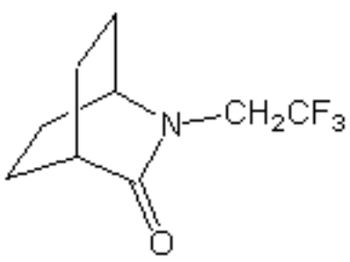


~1670 cm^{-1}

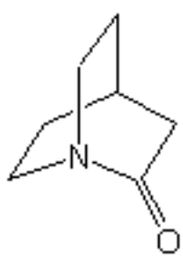


~1720 cm^{-1}

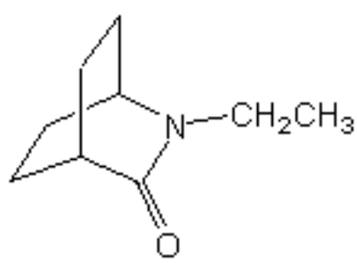
b. (10 pts) Rank the three compounds shown below from lowest frequency to highest frequency for the C=O stretch in the IR spectra. Please clearly write one letter in each box.



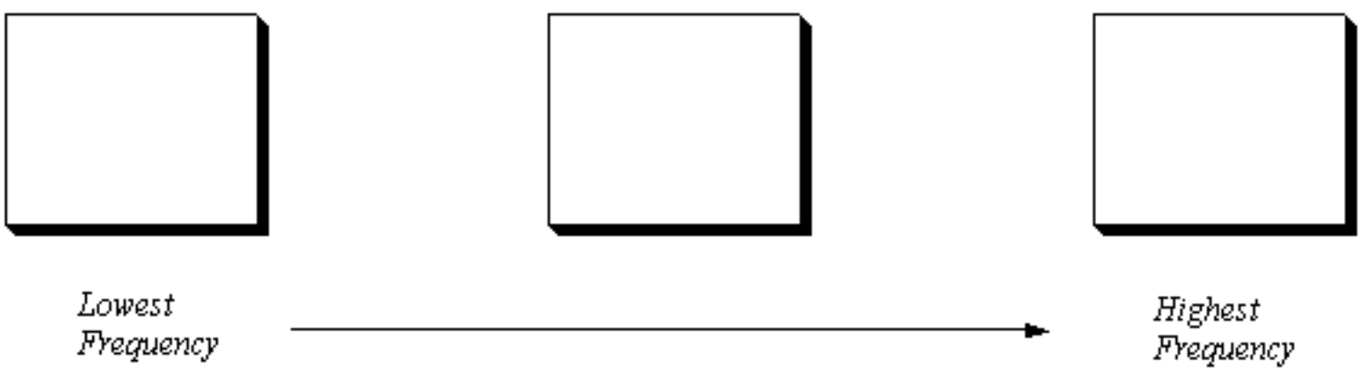
A



B

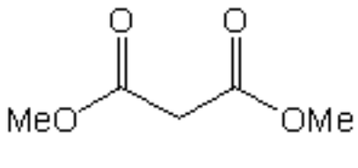


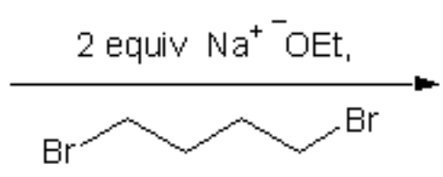
C

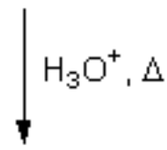


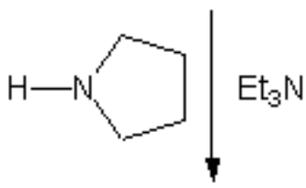
Name: _____

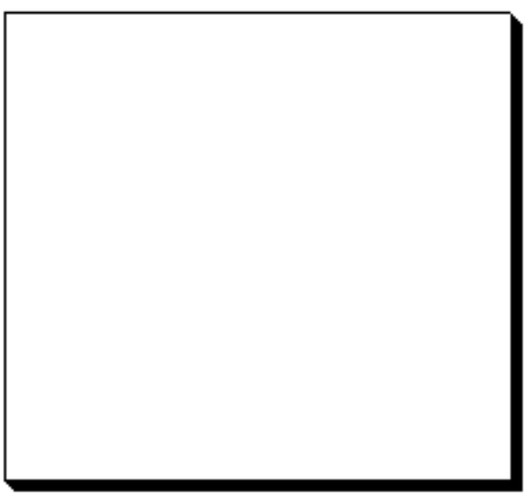
4. (20pts) Provide the missing products of the following sequence of reactions:

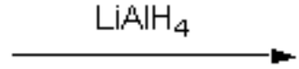


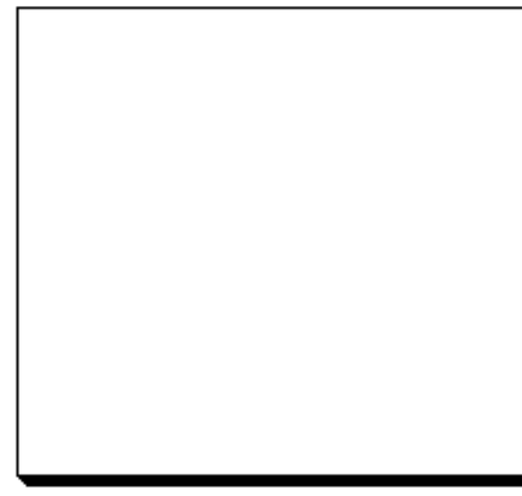






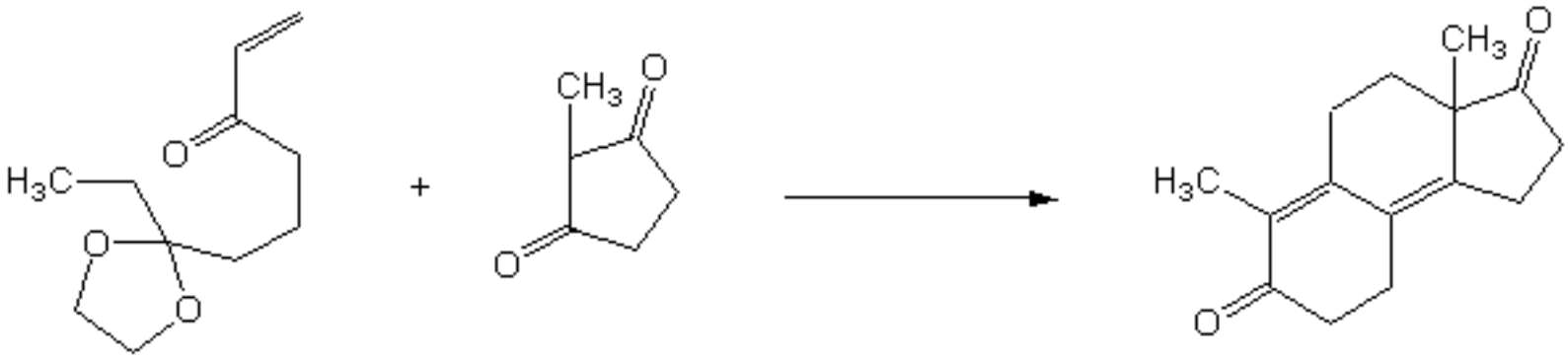




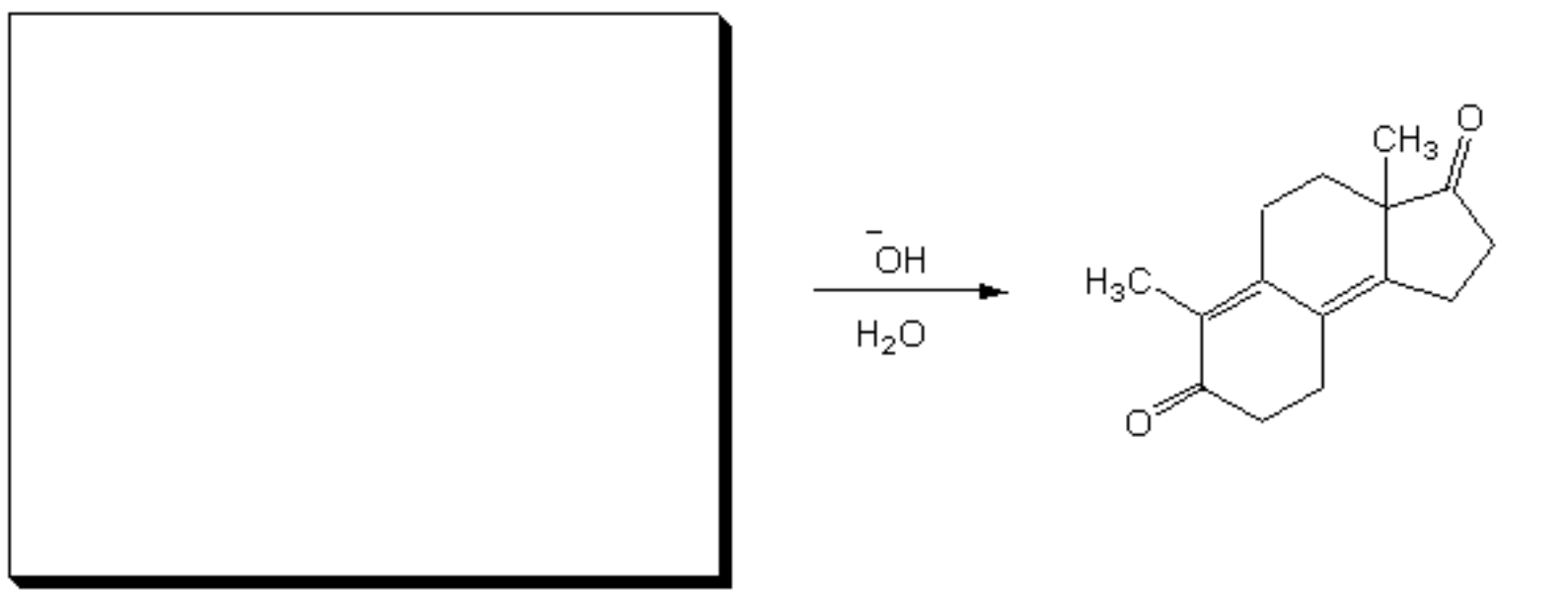


Name: _____

5. The illustrated tricyclic compound may be synthesized in only a few steps from the illustrated starting materials. If you understand the Robinson Annulation, then you can understand this modified version of it.



a. (10 pts) The last step involves *two* aldol condensations, one after the other. The starting material for this double aldol condensation is a tetraketone. Thinking "backwards" from the product, provide the structure of this tetraketone:



b. (10 pts) Show how you might synthesize the tetraketone you have just identified in two steps from the starting materials provided above.