Organic Chemistry c3444y

2nd Hour Exam

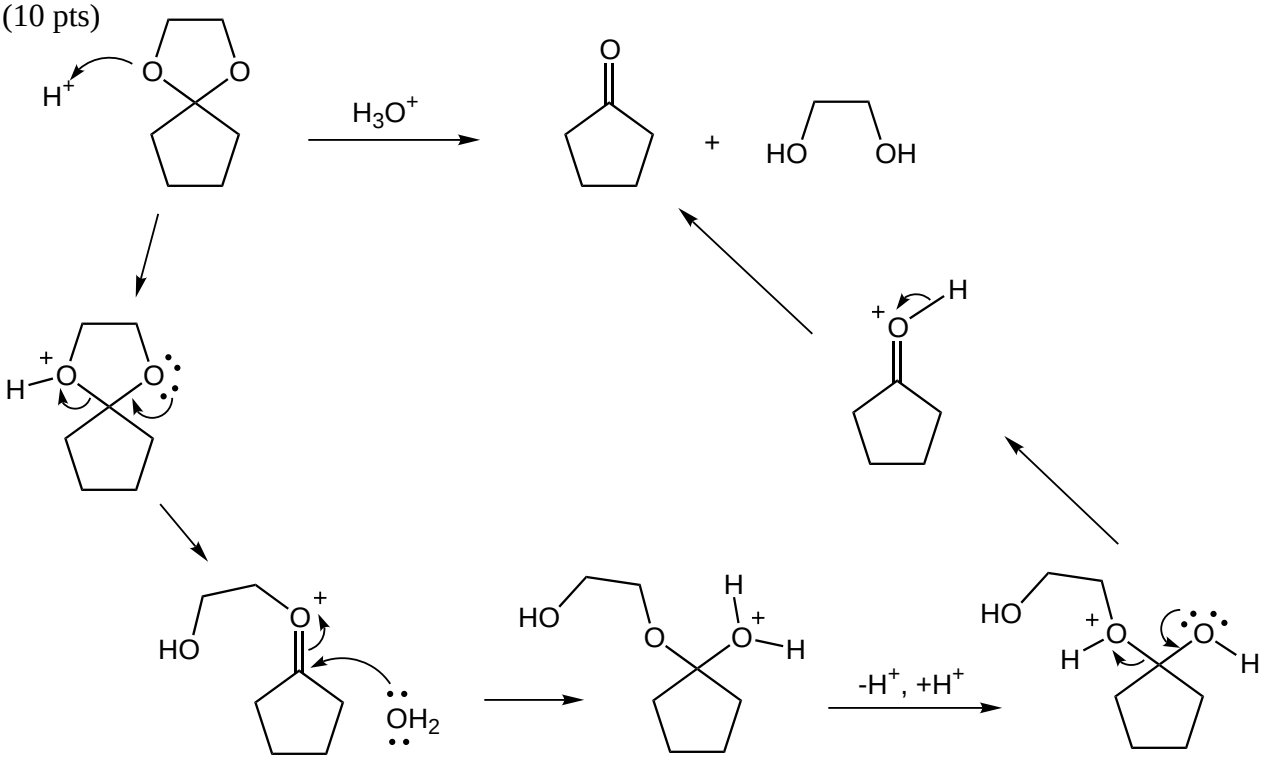
Friday, Mar. 8, 2002
Prof. Leighton

Answer Key

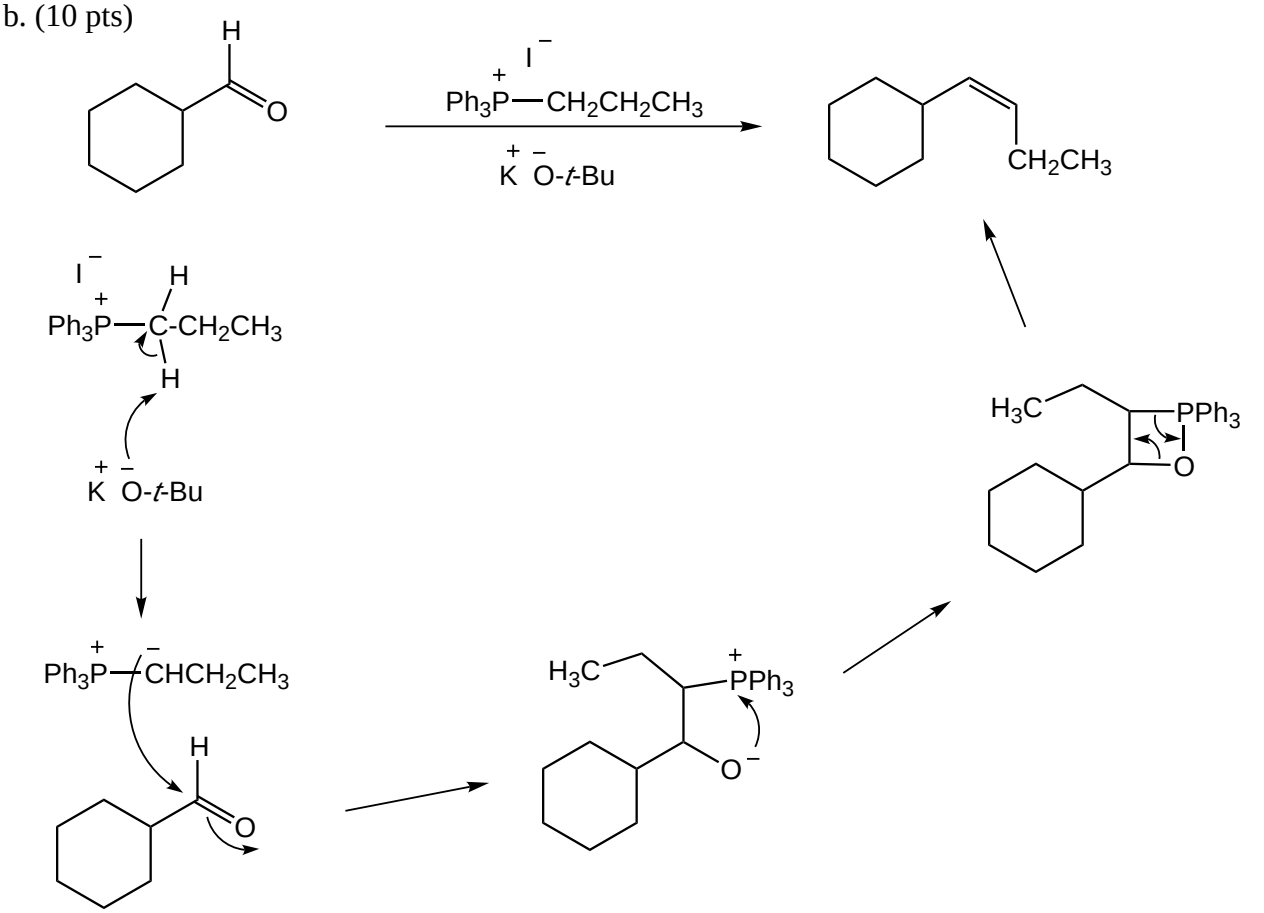
Name: _____

1. Provide detailed mechanisms for the following transformations:

a. (10 pts)



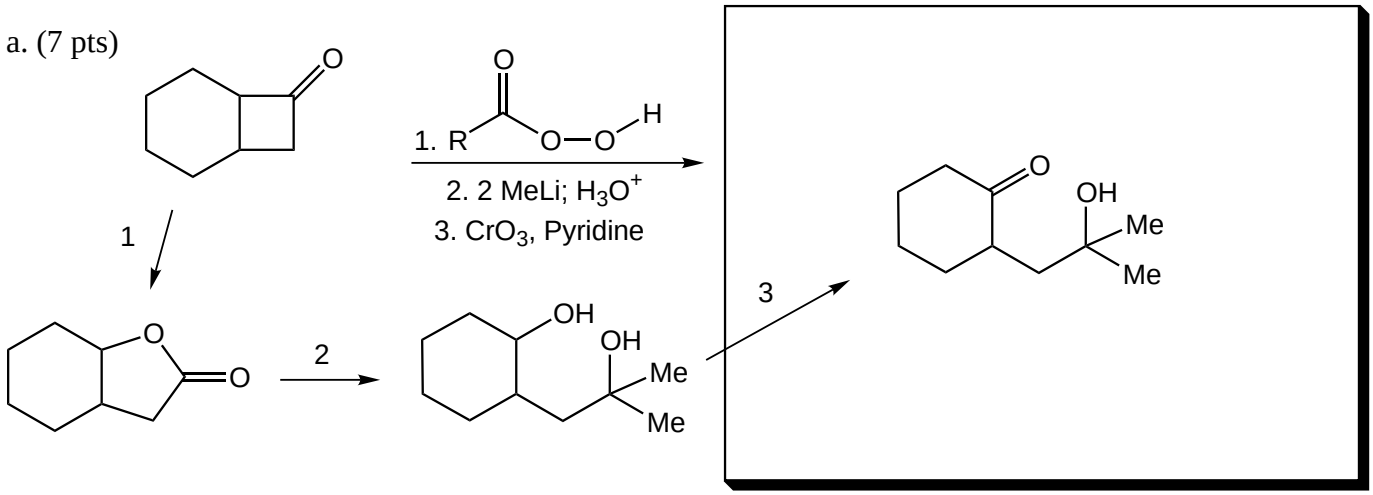
b. (10 pts)



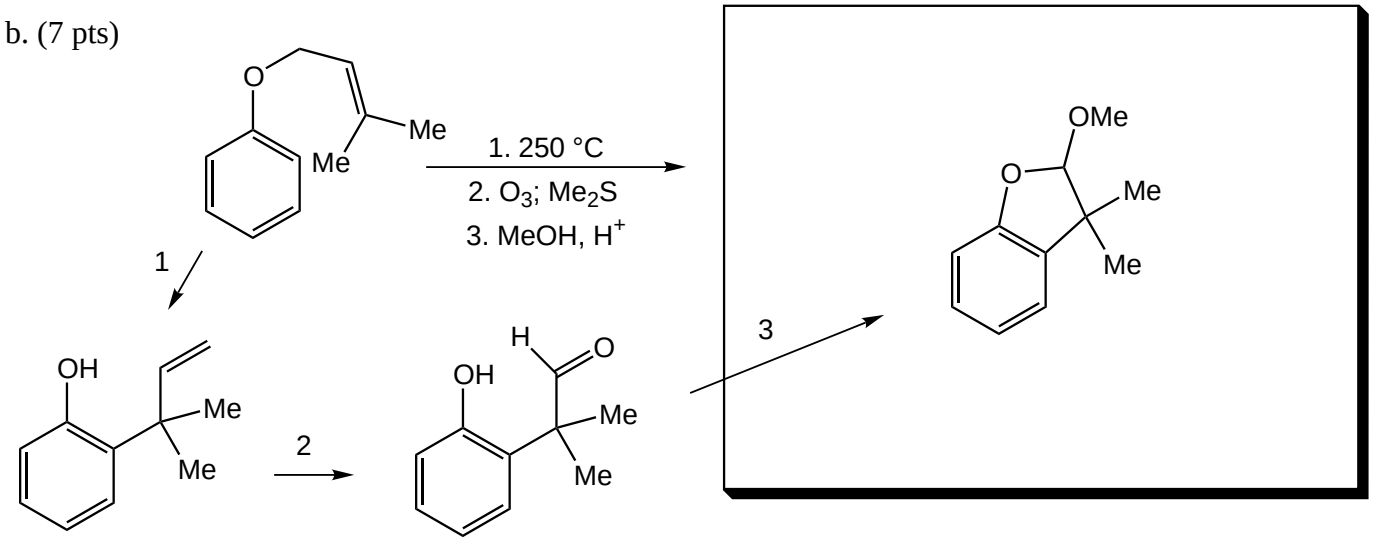
Name: _____

2. Predict the major product of the following reactions:

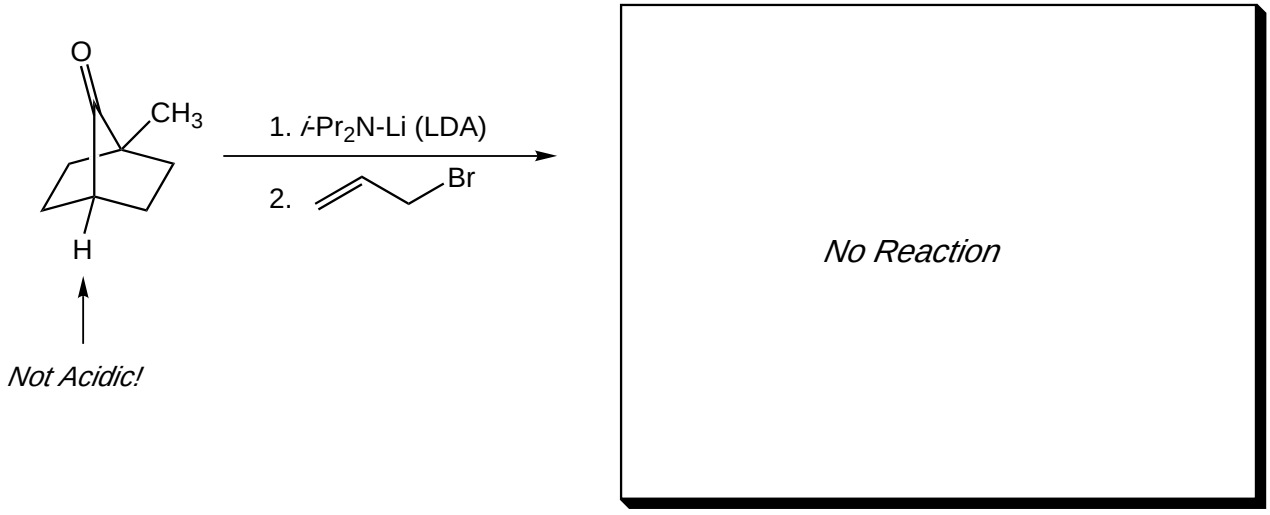
a. (7 pts)



b. (7 pts)

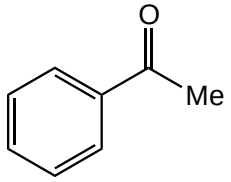


c. (6 pts)

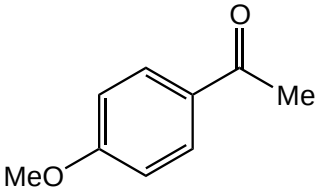


Name: _____

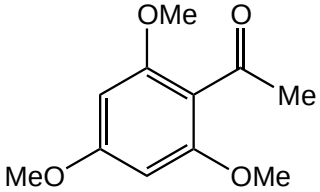
3. a. (10 pts) By simple resonance arguments, the C=O IR stretches of the first two compounds shown below make sense. By the same reasoning, we would expect the compound on the right to have a C=O IR stretching frequency even lower than 1675 cm^{-1}. As you can see, this is not the case. Provide an explanation for the unexpectedly high C=O IR stretching frequency of the compound on the right. (REMEMBER: orientation matters...)



~1690 cm^{-1}

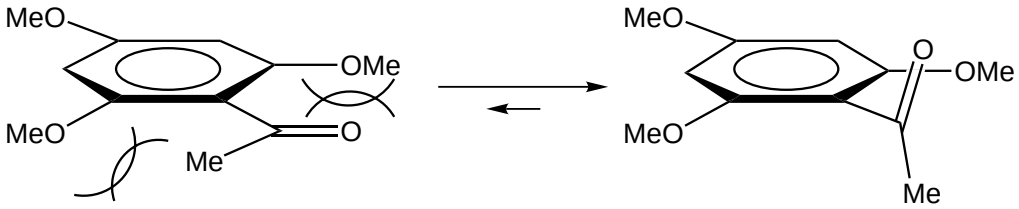


~1675 cm^{-1}



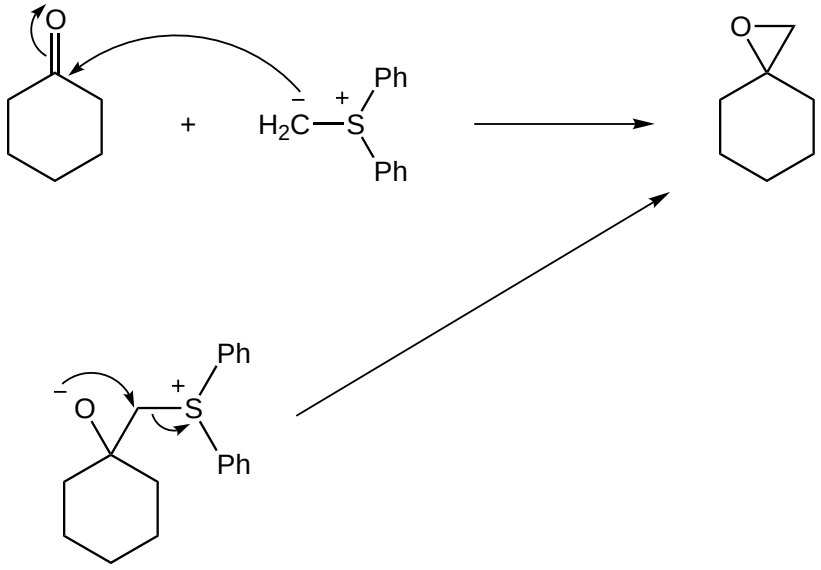
~1700 cm^{-1}

Steric Hinderance!



In order to avoid these steric interactions, the ketone will have to rotate as shown. However, in the process, conjugation/resonance between the aromatic ring and the ketone has been broken. The pi system of the ring and the pi system of the ketone are orthogonal. Therefore, the three methoxy groups have no effect!

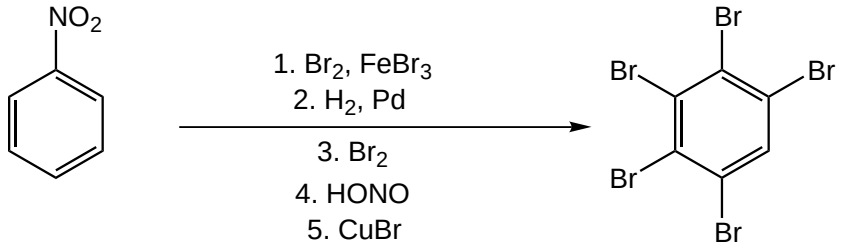
b. (10 pts) Sulfur ylids do several reactions that P-based ylids do not. Here is one. Provide a mechanism for this unusual epoxidation reaction.



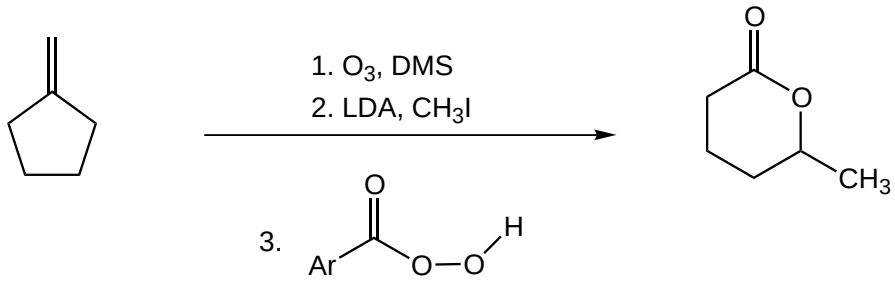
Name:_____

4. Provide the reagents necessary to accomplish the following transformations:
(More than one step will be required.)

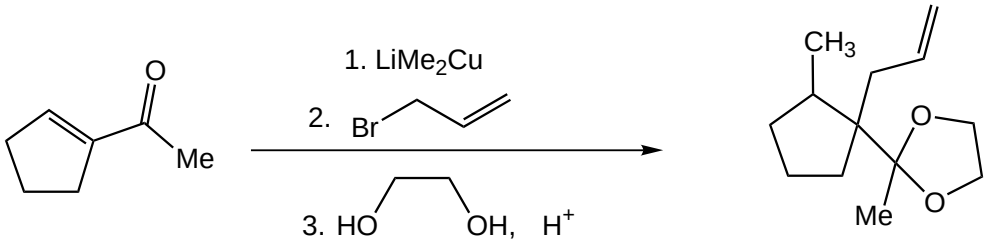
a. (7 pts)



b. (7 pts)

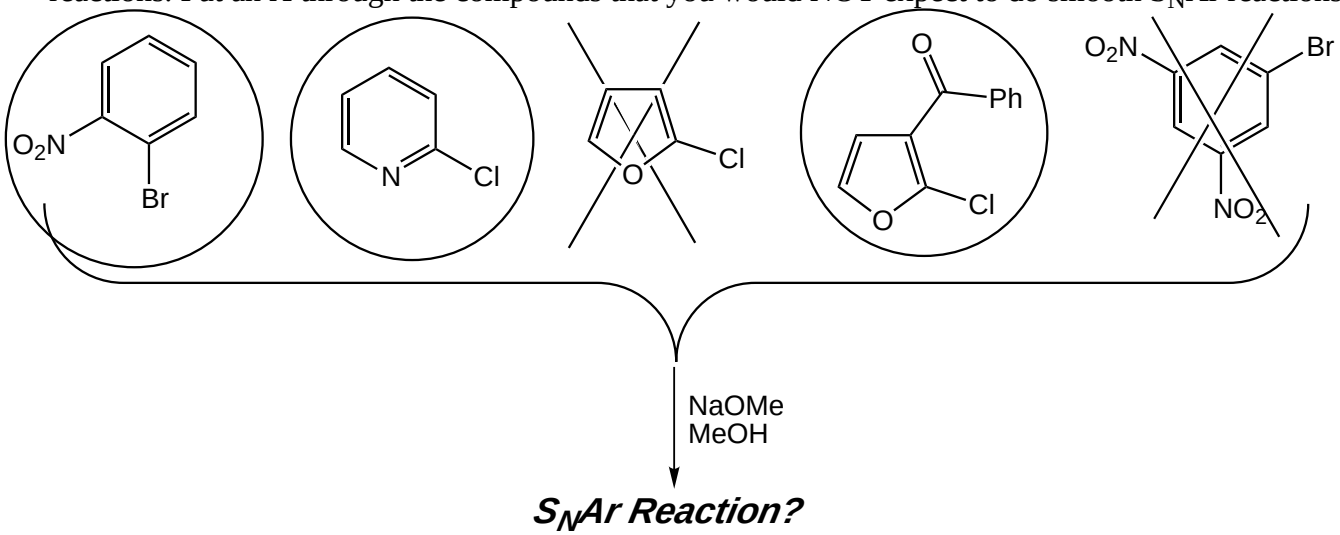


c. (6 pts)

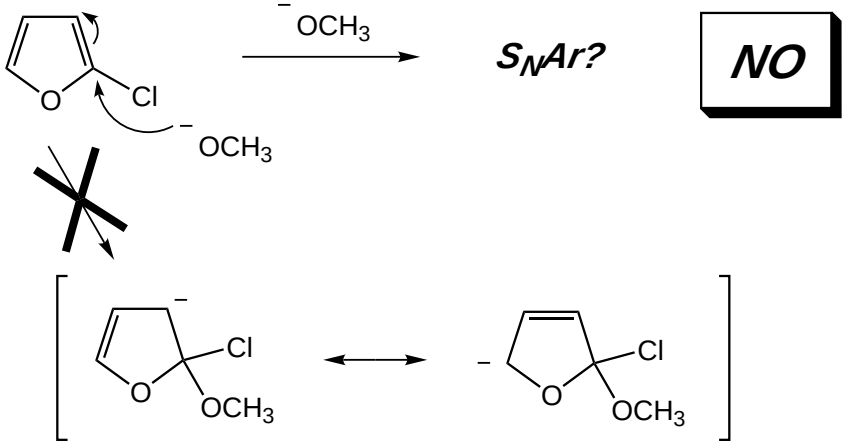


Name: _____

5. a. (15 pts) Circle each of the following compounds that you would expect would do smooth S_NAr reactions. Put an X through the compounds that you would NOT expect to do smooth S_NAr reactions.



b. (5 pts) Explain, using resonance structures, your answer for the third compound above.



No special stability for this anion. Thus we would not expect it to form.