Organic Chemistry c3444y

2nd Hour Exam

Monday, Feb. 26, 2001

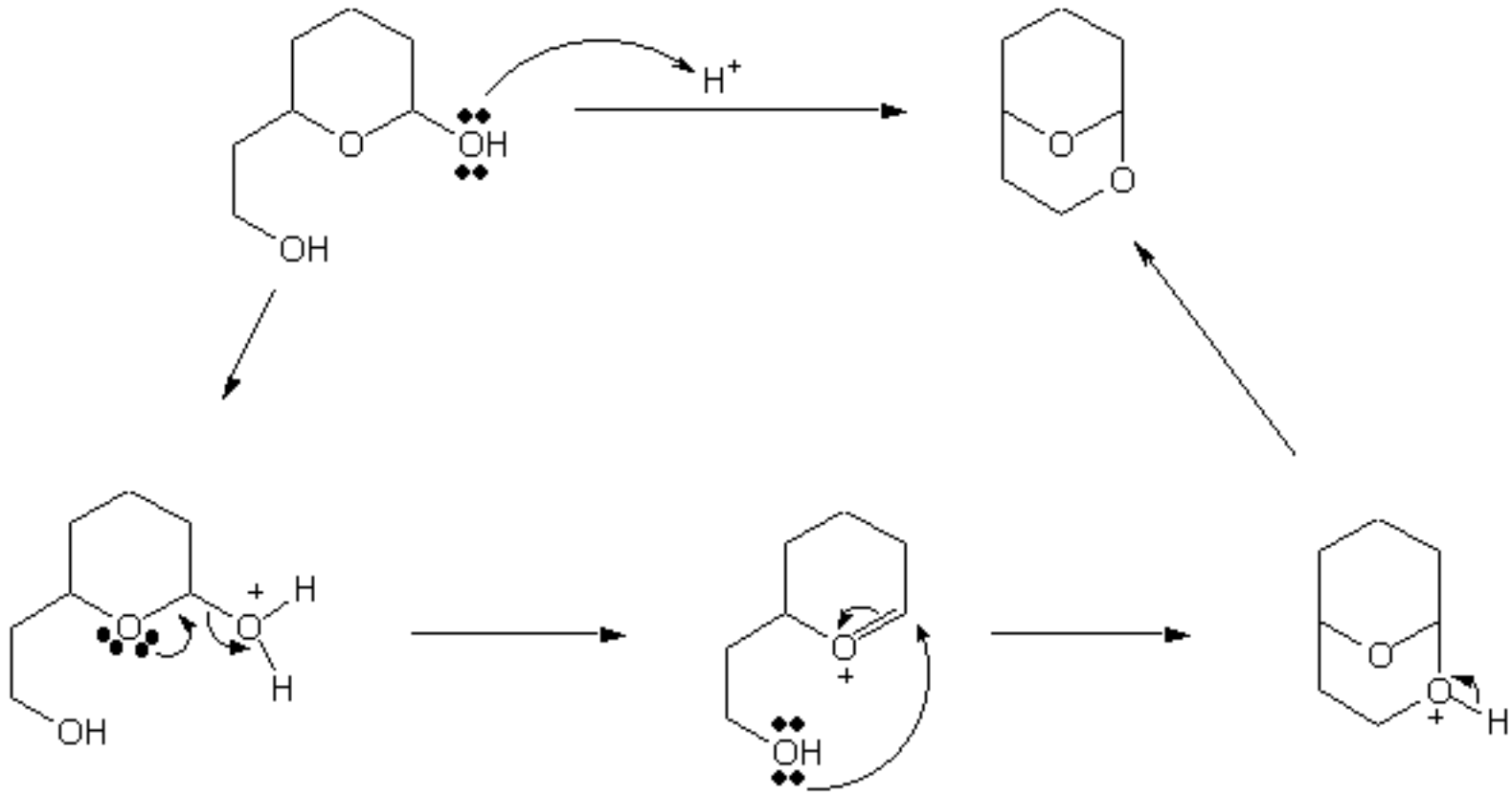
Prof. Leighton

Answer Key

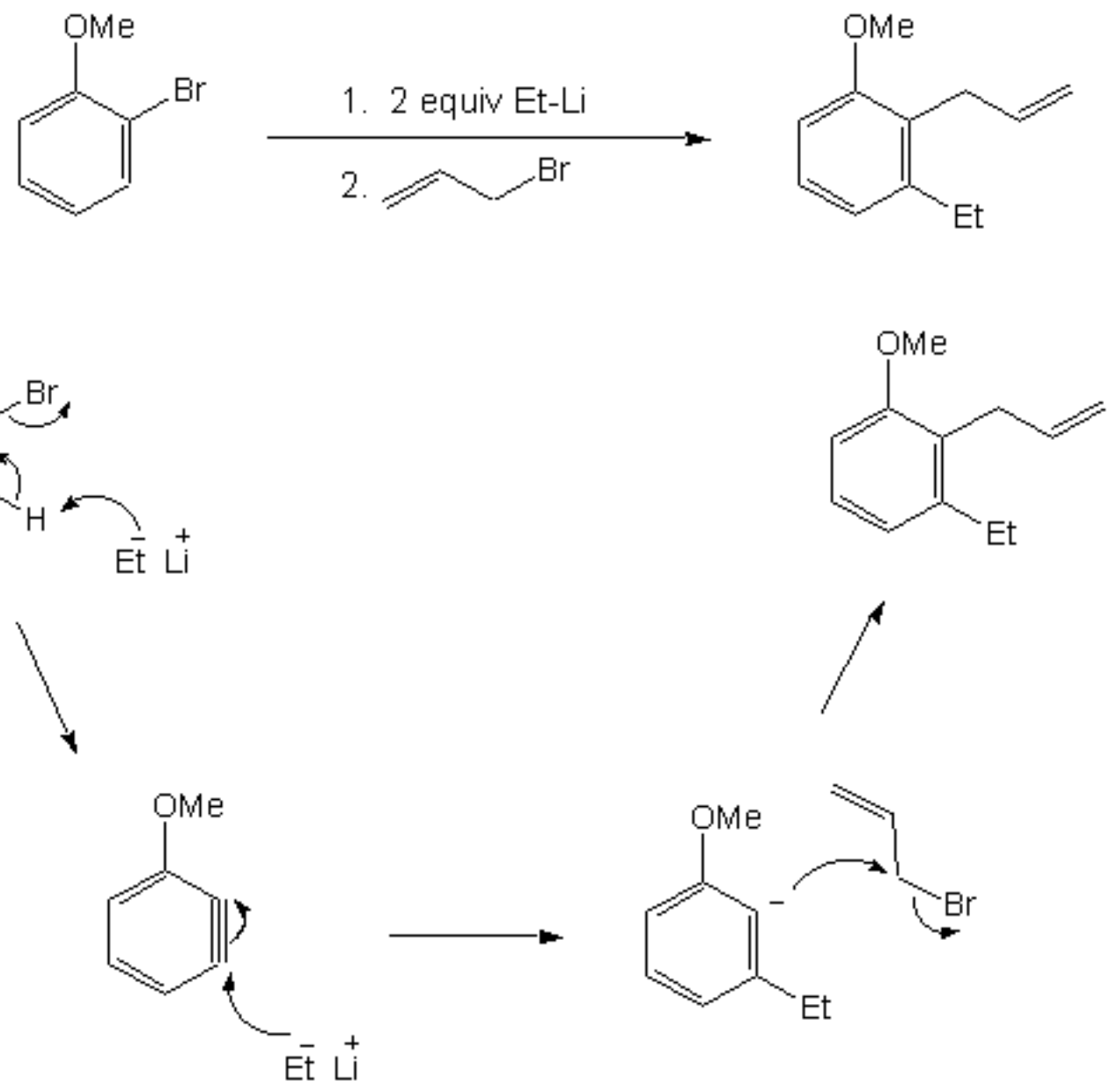
Name: _____

1. Provide detailed mechanisms for the following transformations:

a. (10 pts)



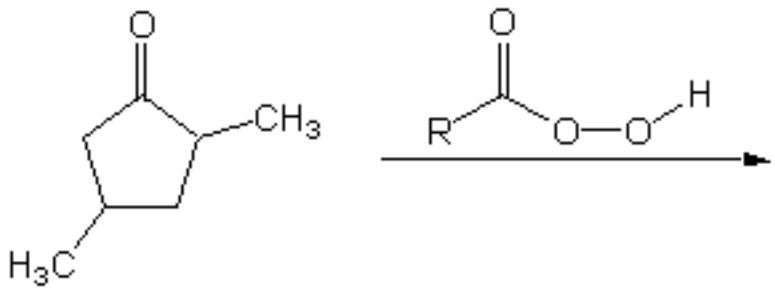
b. (10 pts)

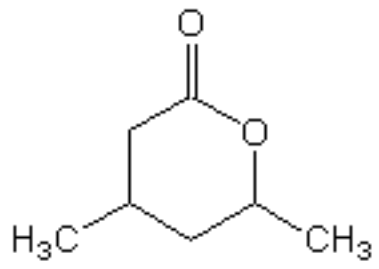


Name: _____

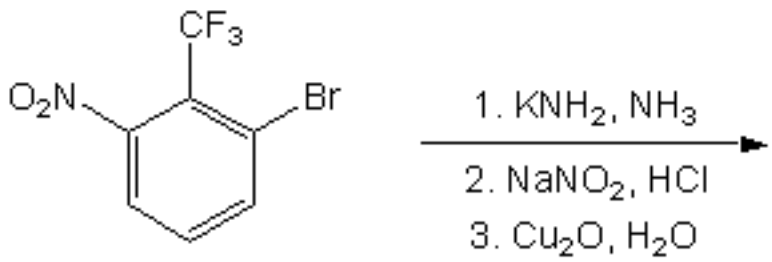
2. Predict the major product of the following reactions:

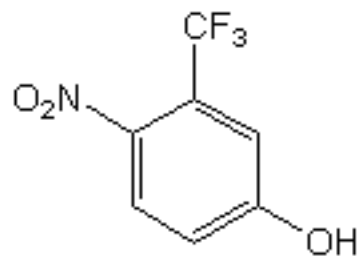
a. (7 pts)



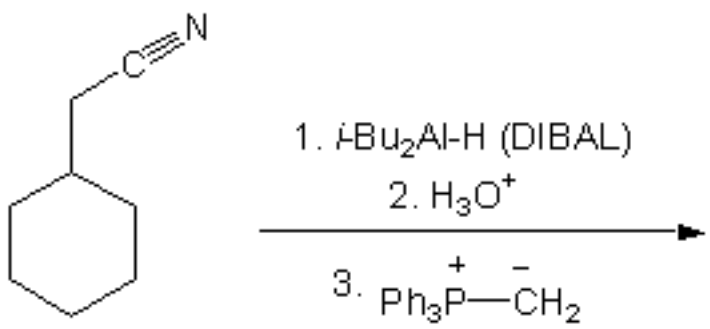


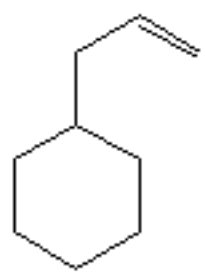
b. (7 pts)





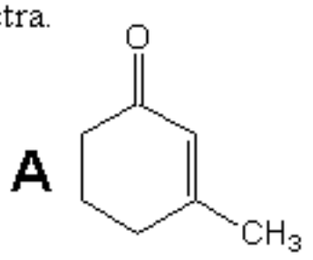
c. (6 pts)

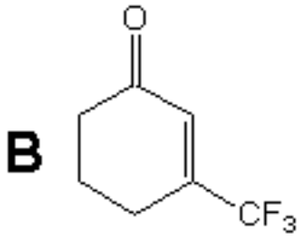


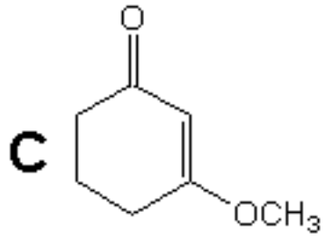


Name: _____

3. a. (10 pts) Rank the three ketones shown below in order of increasing C=O stretching frequency in the IR spectra.

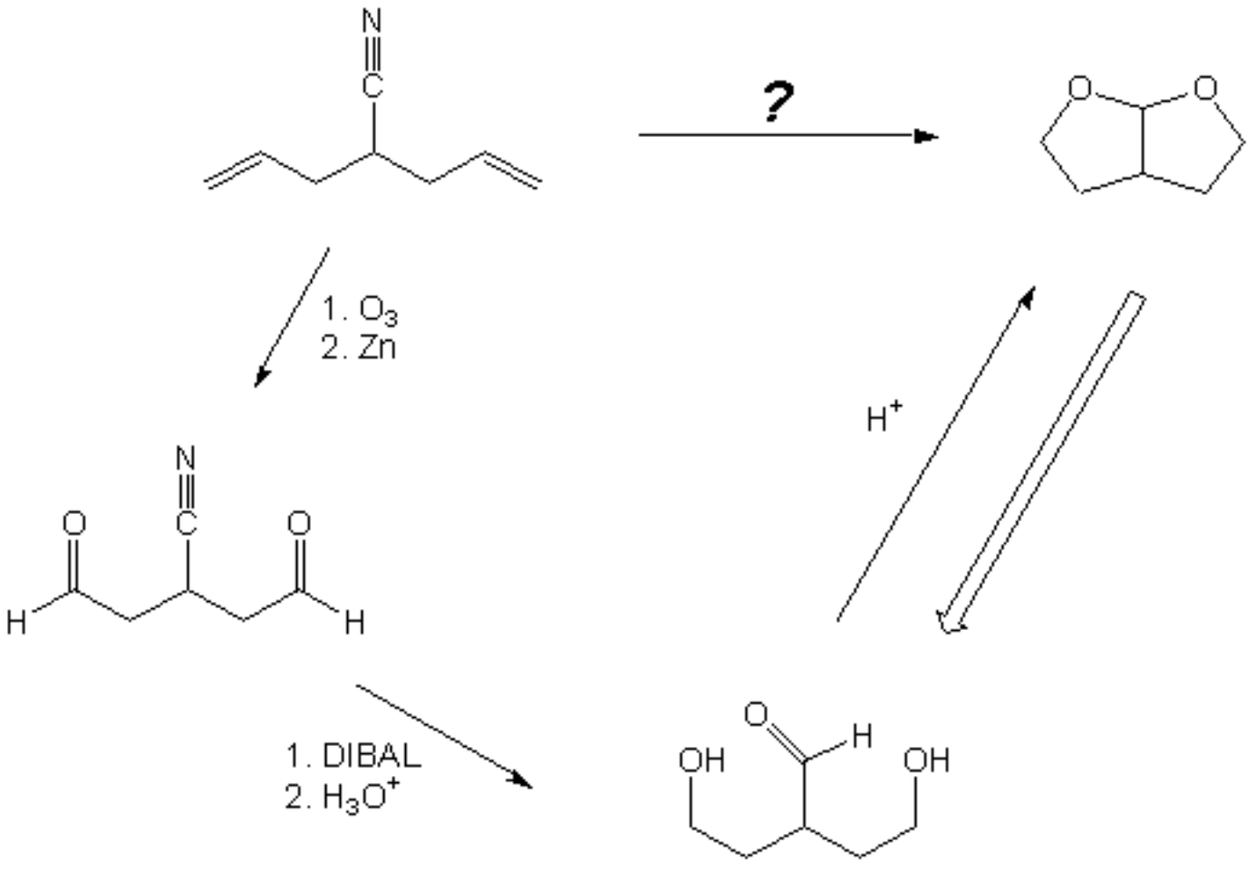






C	A	B
lowest frequency	*intermediate frequency*	*highest frequency*

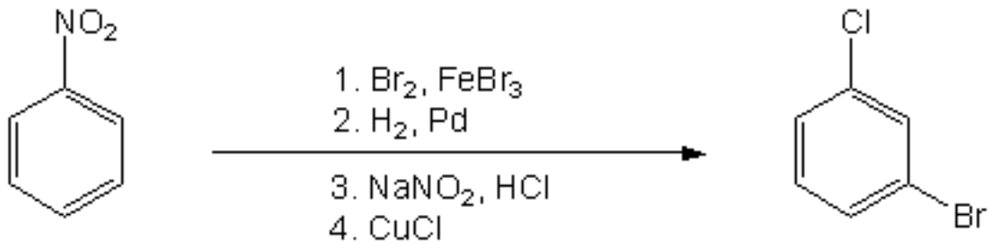
b. (10 pts) Propose a synthesis to convert the given starting material into the product acetal.
(As we've discussed, it will prove helpful to work backwards from the product one step.)



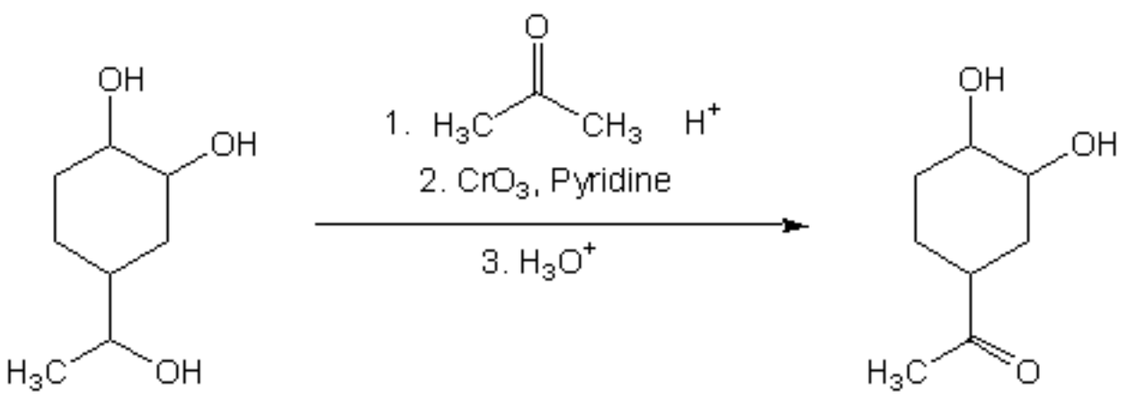
Name: _____

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

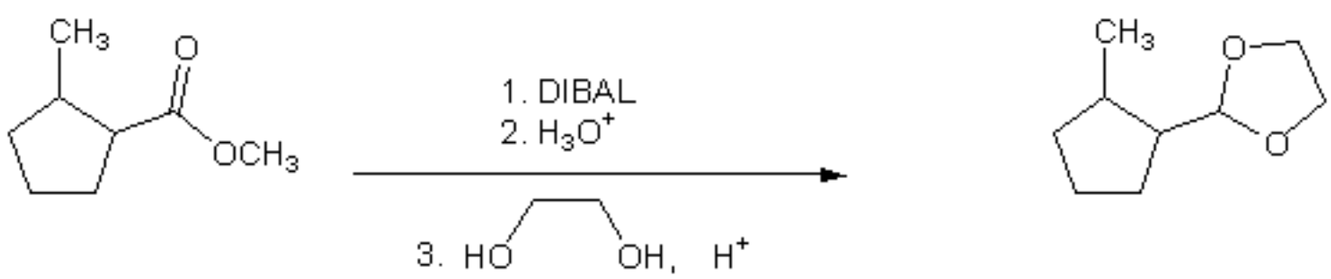
a. (7 pts)



b. (7 pts)

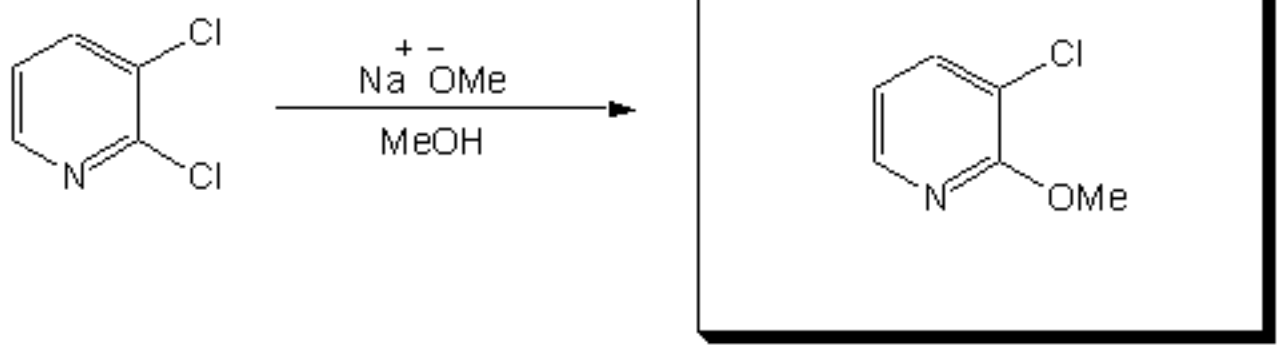


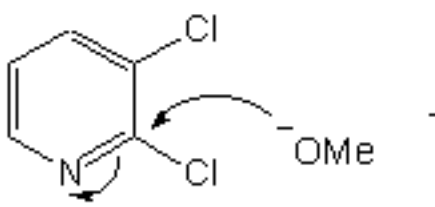
c. (6 pts)

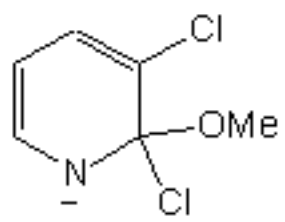


Name: _____

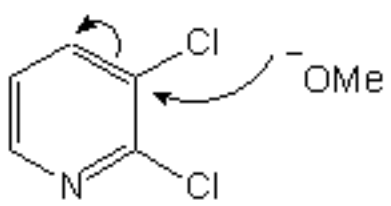
5. a. (10 pts) Predict the product of the following reaction, and rationalize your answer with clear drawings demonstrating why you chose that product.

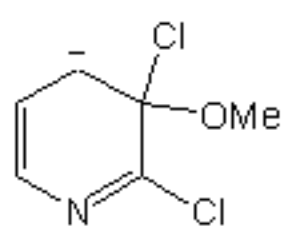






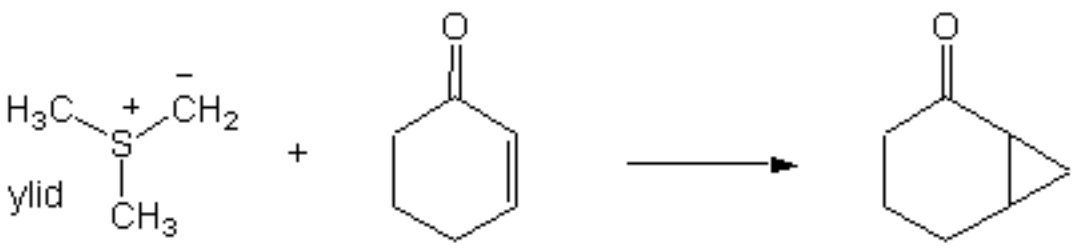
Attack at this position leads to an anion that enjoys special stability in that one of the resonance structures (shown) has the negative charge on the relatively electronegative N. (Other resonance structures not shown.)

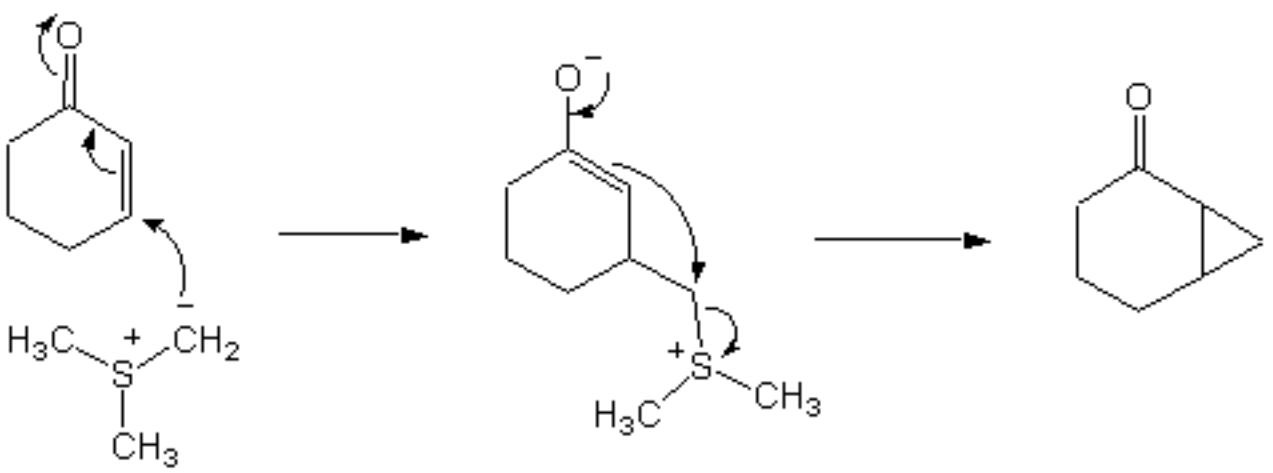




Attack at this position would lead to an anion that enjoys no special stability (other resonance structures not shown). Therefore this will not happen.

b. (10 pts) In contrast to phosphorous-based ylids, sulfur-based ylids typically react with ketones to give unusual products. For example, the illustrated ylid reacts with cyclohexenone to give the illustrated cyclopropane. Provide a mechanism for this reaction. (*Even though you haven't seen this reaction before, you know enough to be able to do this. To start, just try to decide what is a logical first step.)*





This is just a different version of a conjugate addition followed by an alkylation of the enolate that is formed. In this case the alkylation is intramolecular so a ring is formed.