

Chem 332

Exam 2

2008

Prof Fox

50 minutes

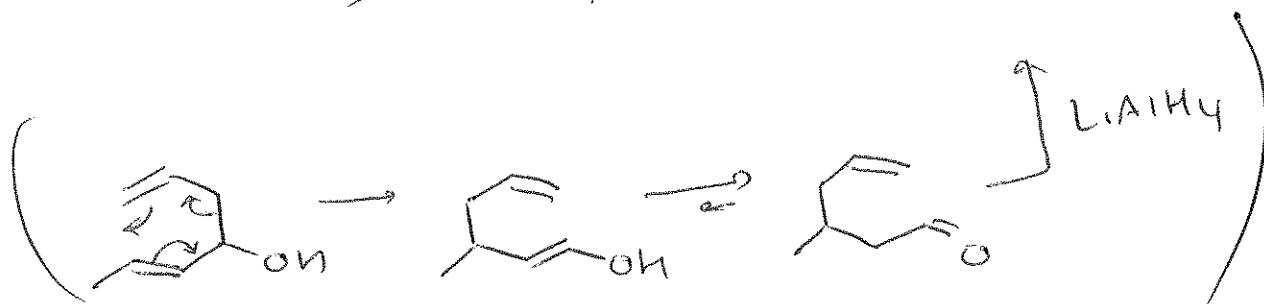
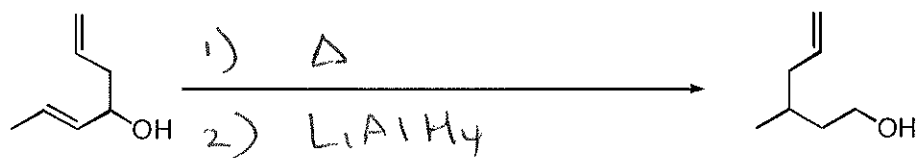
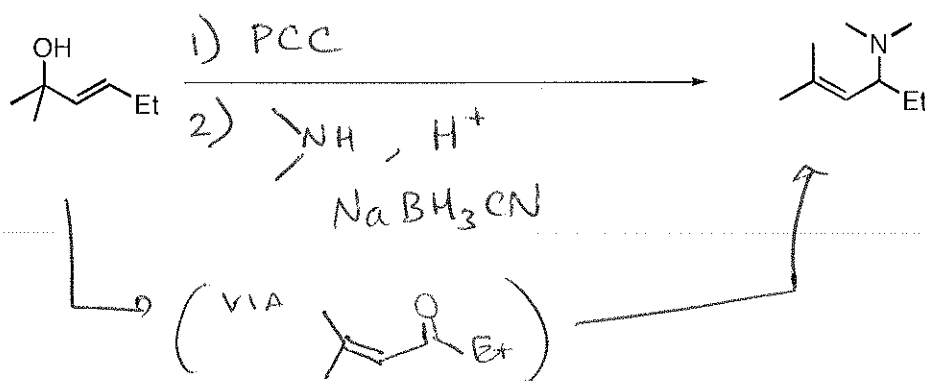
100 points

Show your work in detail

Write your name on every page

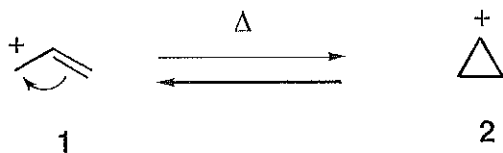
Name_____

1. Provide reagents. More than one step may be required (5 points each)
Mechanisms are not needed.

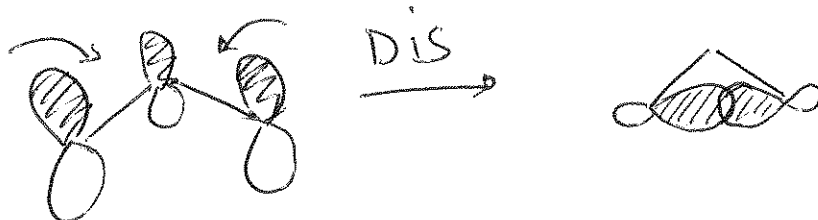


2. Consider the electrocyclic closure of compound **1** to give **2**.

(25 points)

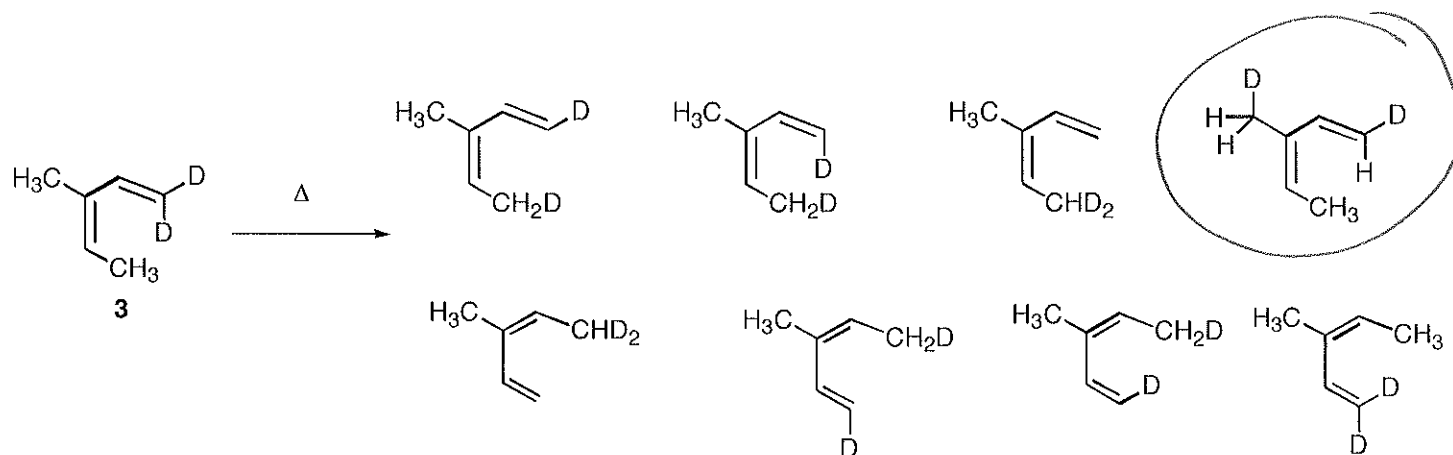


Using orbital symmetry considerations, predict if this reaction will proceed via conrotatory or disrotatory electrocyclic ring closure. Use molecular orbital theory to explain your answer

 $3\pi, 2e^-$ 

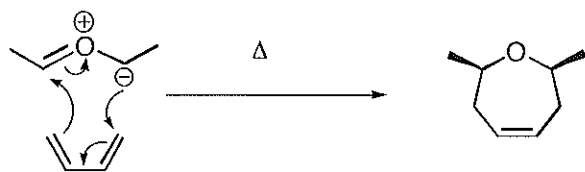
(15 points)

3. Heating compound **3** leads to isomeric products. Circle the structure below that is NOT FORMED when **3** is heated. Circle only one answer. You do not NOT need to provide an explanation for your answer.

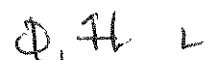
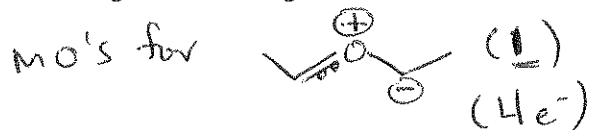


4. Consider the thermal cycloaddition depicted below

(25 points)



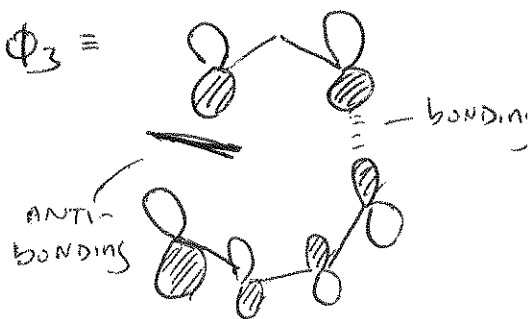
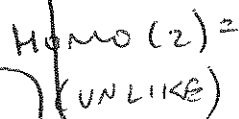
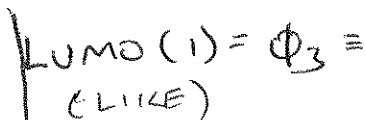
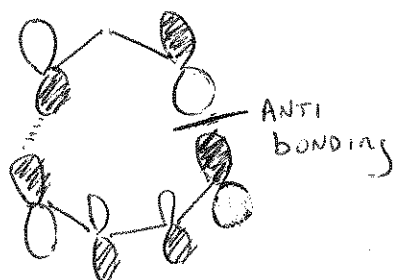
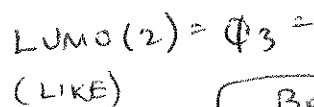
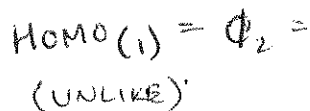
Would you expect this to be a concerted process under thermal conditions? Explain in detail using an argument that is grounded in molecular orbital theory.



For a concerted process, we need a FILLED/Empty Interaction.

Two combinations are possible: HOMO(1) + LUMO(2)

or
HOMO(2) + LUMO(1)



BOTH ARE
NOT SYMMETRY ALLOWED
DUE TO
ANTI BONDING INTERACTION

(25 points)

5. Provide a detailed arrow pushing mechanism. Your answer does NOT require molecular orbital analysis. Your mechanism must account for the stereochemistry of the product.

