

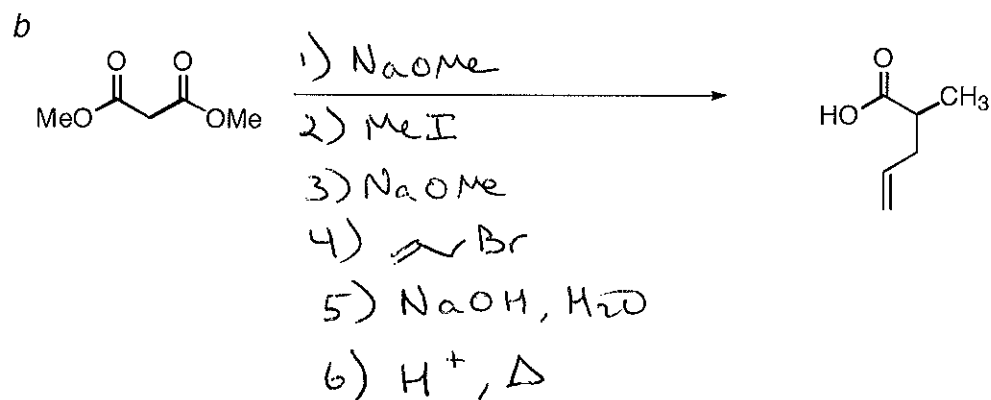
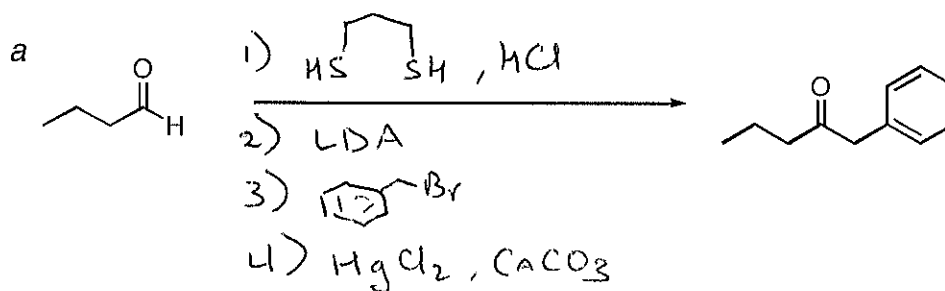
Chem 332
Exam 2
April 7, 2006
Prof Fox
50 minutes
100 points

Show your work in detail

Write your name on every page

Name_____

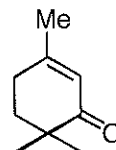
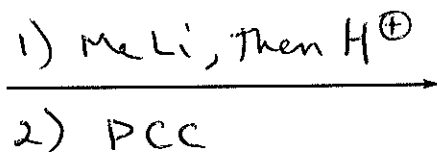
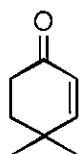
1. Provide reagents. More than one step may be required (5 points each)
Mechanisms are not needed.



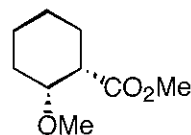
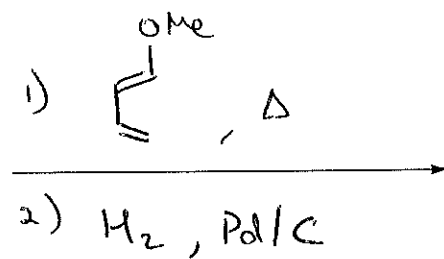
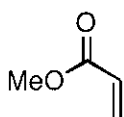
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Mechanisms are not needed.

(5 points each)

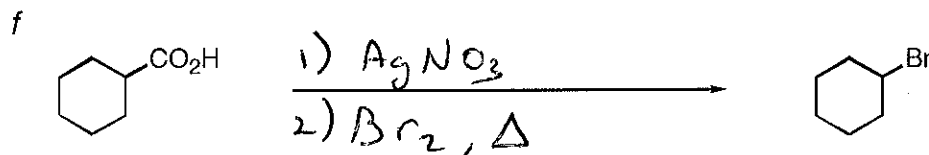
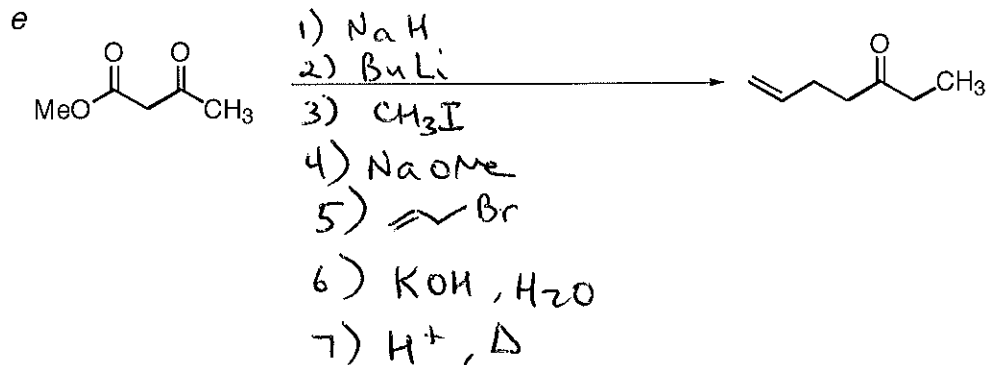
c



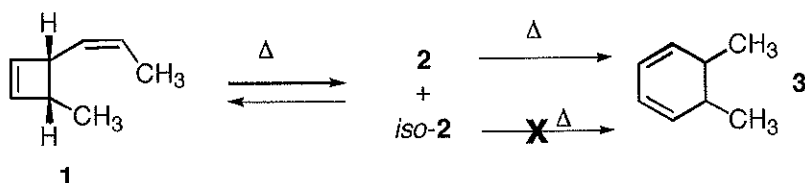
d



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

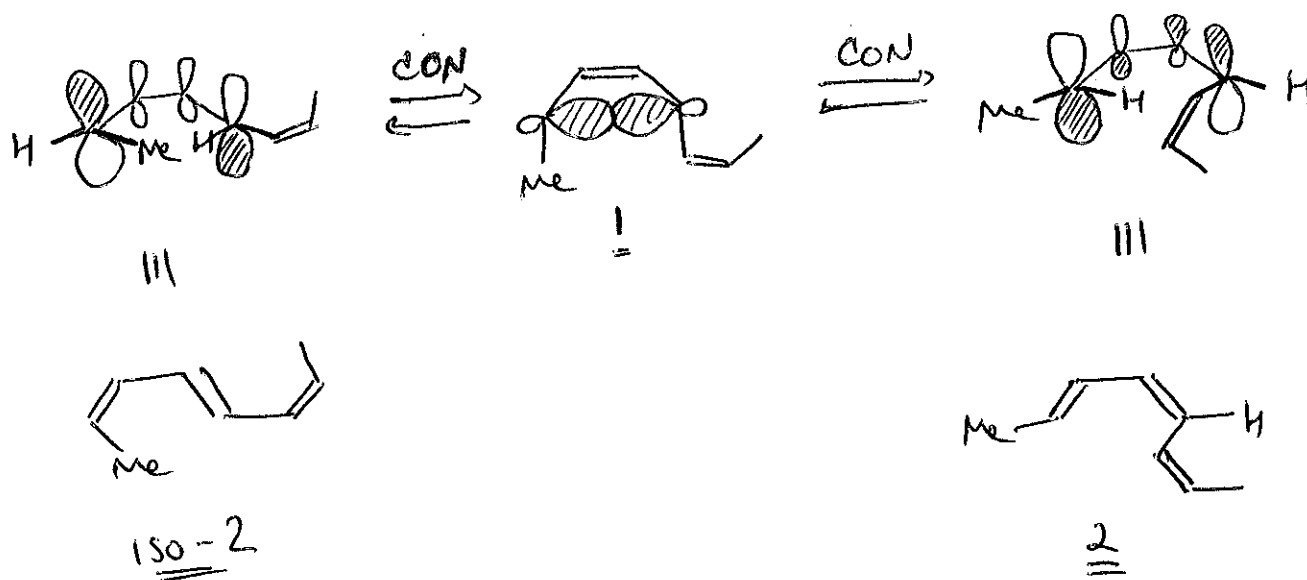


2. When compound **1** is heated, it forms an equilibrium mixture with product **2** and an isomeric product (*iso-2*). Product **2** further rearranges to a cyclohexadiene **3**. However, *iso-2* does not directly react to give **3**.

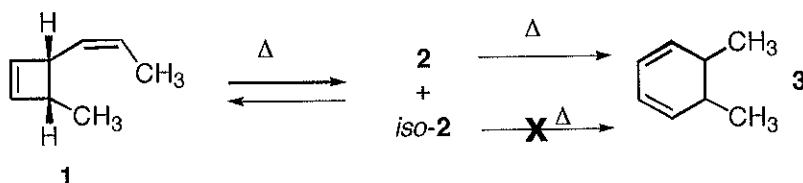


a. Provide structures for **2** and *iso-2*. Provide a detailed explanation for its formation (using a molecular orbital analysis). (10 points)

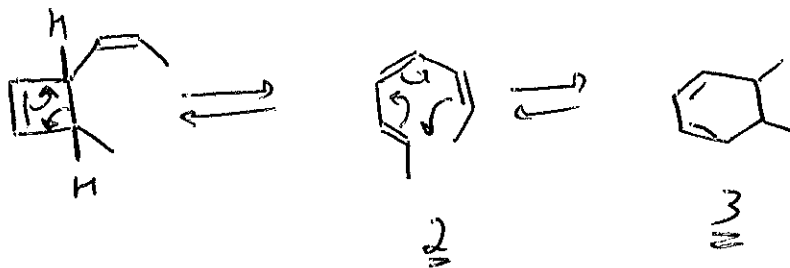
Thermal opening is controlled BY THE HOMO, which has "unlike" symmetry. Two conrotatory options are possible, leading to 2 and iso-2.



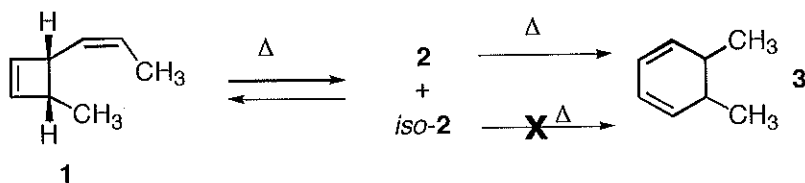
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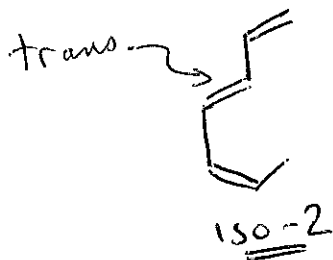
b. Provide an arrow pushing mechanism for the formation of **2** and **3**. (10 points)



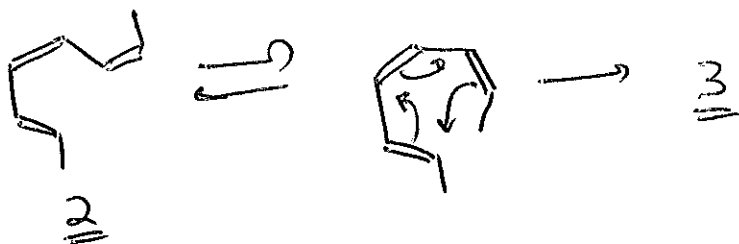
2. (cont)

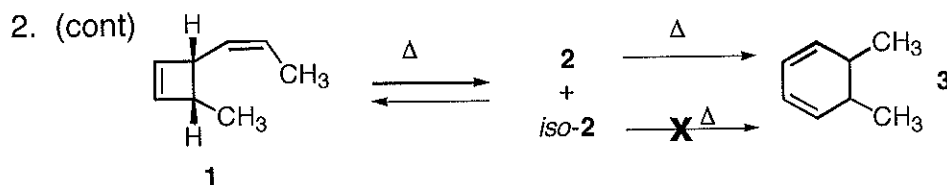
c. Explain why *iso-2* does not rearrange to product **3** (10 points)

iso-2 CONTAINS A TRANS ALKENE, AND THUS IS UNABLE TO CYCLIZE



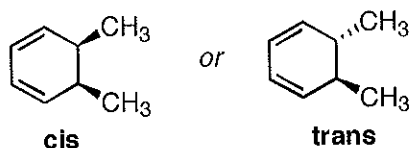
2 can cyclize because ALL Alkenes are cis





d. Although two diastereomers with structure **3** are possible, only one is formed. Circle the correct diastereomer (cis or trans), and provide a detailed explanation for its formation (using a molecular orbital analysis). (10 points)

circle the diastereomer of **3** that is formed



Thermal Reaction is controlled BY THE HOMO of the hexatriene, which has "LIKE" Symmetry.

