Chem 332 Exam 2 April 11, 2007 Prof Fox 50 minutes 100 points

Show your work in detail

Write your name on every page

Name_____

OMe

Your Name_____

OMe

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



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2. Circle the molecules that are aromatic. No partial credit

(4 points each)







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3. Circle the correct product. No partial credit. Circle only one product (10 points)



4

Your Name_

4. When heated, compound **3** equilibrates with structure **A**, which reacts with **4** to give product **5**. Provide a structure for **A**, and a mechanism for the formation of **A** and **5**.

Molecular orbital analysis is NOT required

(25 points)



Your Name_

5 (a) Upon discovering the thermal rearrangement of **1** to **2**, an overly excitable scientist wrote the mechanism below.



(15 points)

However, the mechanism as written above is NOT reasonable. Provide a detailed explaination (using molecular orbital analysis) that explains why this mechanism is incorrect.

• Hint: the mechanism drawn above is a 4π process that is analogous to the electrocyclic ring closure of butadiene. When crafting your answer to the question above, do not worry about the electrons that are 'not involved' in the rearrangement.

It may be helpful to label the 'uninvolved' part of the ring as follows:

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Your Name_

5 (continued) However, structure 1 does indeed undergo electrocyclic ring closure to form 2.



(b) provide an arrow pushing mechanism (5 points)

(c) Using molecular orbital analysis, explain why the concerted reaction that you just illustrated is permitted under thermal conditions. (10 points)