Chem 332 Exam 4 May 22, 2009 Professor Fox

100 points 120 minutes

Your Name_____

1. Provide reagents. More than one step may be necessary. You do not need to provide mechanisms 2.5 points each



2. Circle the molecules that are aromatic.

2 points each





3. Explain why the $AICI_3$ catalyzed reaction of **1** with acetylchloride (**2**) gives **3** as the major product, with **4** as a minor product. You should include chemical structures that support your answer. A corrrect answer will explain the relative stability of the intermediates leading to each product.





4. Upon heating, compound 5 rearranges to give 6 and 7, but isomeric compounds 8 and 9 are not formed.



a. Provide an arrow pushing mechanism for the formation of **6** or **7**. (3 pts)

b. Provide a molecular orbital representation for the transition state for the rearrangement. HINT: your answer requires you to identify the HOMO of the pi system, and indicate how the symmetry of this HOMO is reflected in the transition state. (7 pts)

4. Upon heating, compound **5** rearranges to give **6** and **7**, but isomeric compounds **8** and **9** are not formed.

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(continued)
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c. Explain why only **6** and **7** are formed. Use your transition state analysis from part B to support your answer. (8 pts)

Your Name_

5. Provide a synthesis starting from **compound 10**, **benzene** and any other materials that contain less than four carbons. You may also use **BOC-protected amino acids** as starting materials.

0 HO `N_____ N H NH_2 || 0 || O Ô Ph 10 17 points = Merrifield resin

6 (a) Provide a detailed arrow pushing mechanism for the conversion of **11** into **12** (b) Provide a detailed arrow pushing mechanis for the conversion of **12** into **13**



7. Circle the D-aldohexoses that upon sequential Kiliani-Fischer synthesis/HNO3 oxidation will give one optically active 7-carbon diacid and one optically inactive 7-carbon diacid.

8 points



3 points each

8. Identify each of the following pairs as being idential, meso, enantiomers, anomers, or non-anomeric diasteromers

(a) OH OH HO OH OH OH



-OH

-H

OH

identical (but not meso)

meso

enantiomers

anomers

diastereomers (but not anomers)



identical (but not meso) meso enantiomers anomers diastereomers (but not anomers)

(c) Ser-Ala-Gly $H_3N + O H_1 + O H_2 + O H_2$

identical (but not meso) meso enantiomers anomers diastereomers (but not anomers)

9

Scratch paper