Chem 332 Exam 4 May 23, 2005 Prof. Fox 180 minutes 100 points

Show your work in detail

WRITE YOUR NAME ON EVERY PAGE

NAME

1. Provide reagents for the following transformations (2 pts each)



NAME



2a Circle the correct product (no mechanisms or partial credit). 3 pts

2b Circle the correct product (no mechanisms or partial credit). 3 pts



2c Circle the aromatic molecules. No partial credit. 3 pts each (points are also given for uncircled answers)



3 The reaction of anionic compound **A** to form **B** is fast, and the equilibrium lies strongly in the direction of **B**.



a. Explain why the equilibrium lies in the direction of **B**. You do NOT need to provide an arrow pushing mechanism, but do provide a clear picture that helps explain your answer. (3 points)

3 The reaction of anionic compound **A** to form **B** is fast, and the equilibrium lies strongly in the direction of **B**.



b. In contrast to the above observation, it is found that the equilibrium of C and D lies in the opposite direction, and favors the formation of C. Explain in detail. Again, it is essential to provide a clear picture that helps explain your answer. (9 points)



4 Consider the thermal reaction of trans,trans-1,4-dimethylbutadiene with allylcation:



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

NAME

5 Provide a synthesis of **A** using benzene and any other materials that contain **4 carbons or less.**



12 pts

6 Provide a detailed arrow pushing mechanism. Hint: this reaction is sometimes classified as an "Aza-Cope-Mannich reaction" (Aza means "contains nitrogen") (12 points).



NAME

7 Provide a detailed arrow pushing mechanism.



9

NAME

8 Circle the structures of the D-aldohexoses (shown below) that give meso compounds upon oxidation with HNO3.



1 point each (points are also given for uncircled answers): 8 points total

Identify the following pairs as identical, anomers, enantiomers, or (non-anomeric) diastereomers. Write your answers on the line below the structures. (3 points each)



10 Using Solid phase synthesis, show how to synthesize the tripeptide Val-Phe-Ala. As starting materials, you should use any of the naturally occuring amino acids, Merrifield resin, and any other materials. (10 points)



Merrifield Resin

Your final product should be cleaved from the Merrifield resin and free of any protecting groups. Be sure to draw the chemical structures of your product and intermediates (i.e., do not use the three letter abbreviations.)

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