Organic Chemistry c3444y

4th Hour Exam

Wednesday, April 18, 2001
Prof. Leighton

Name:_____ **ID#**_____

Signature:_____

- Write your name on every page.
- The exam is 5 pages long (*not* including this one). Please make sure you have all of the pages.
- Write complete ***but succinct*** answers. **Good Luck!**

Question 1 (20 pts): _____

Question 2 (24 pts): _____

Question 3 (21 pts): _____

Question 4 (20 pts): _____

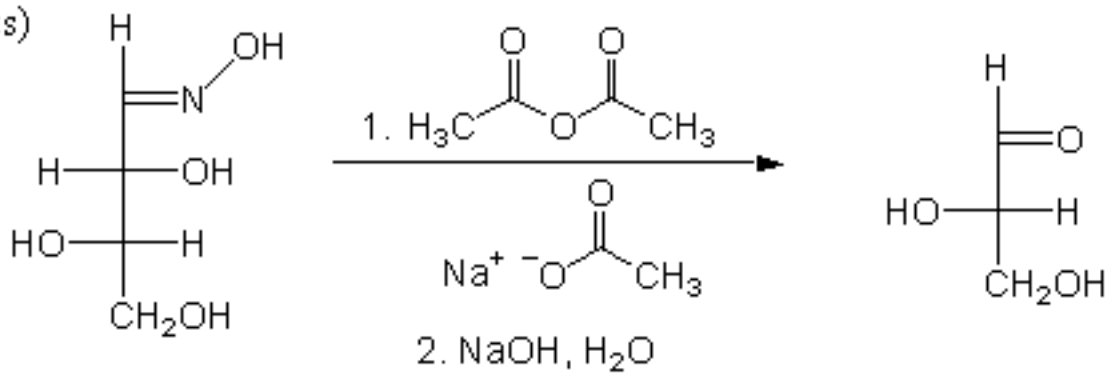
Question 5 (15 pts): _____

Total (100 pts):_____

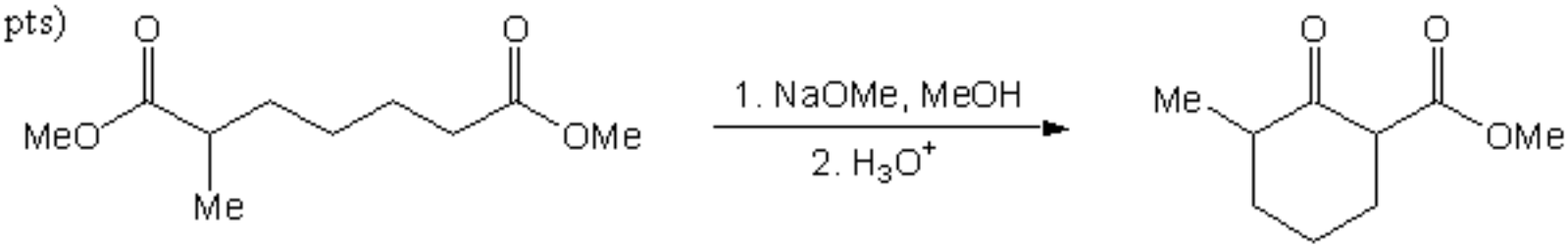
Name: _____

1. Provide detailed mechanisms for the following transformations:

a. (10 pts)



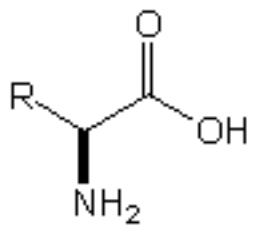
b. (10 pts)



Name: _____

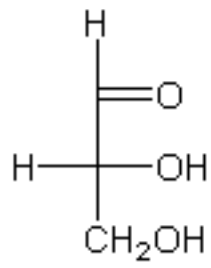
2. Predict the major product(s) of the following reactions:

a. (8 pts)



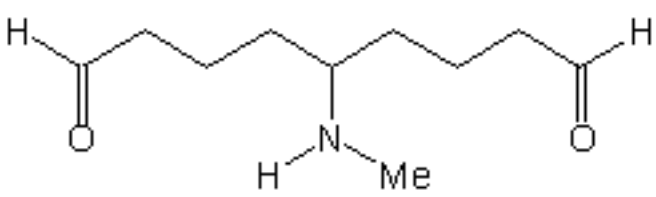
$\xrightarrow[\text{3. } CH_2N_2]{\text{1. } NaNO_2,\ H_2SO_4 \quad \text{2. KBr}}$

b. (8 pts)



$\xrightarrow[\text{3. } H_3O^+]{\text{1. HCN, KCN} \quad \text{2. } H_2,\ Pd}$

c. (8 pts)



$\xrightarrow[\text{(As much as you want)}]{H^+,\ NaBH_3CN}$

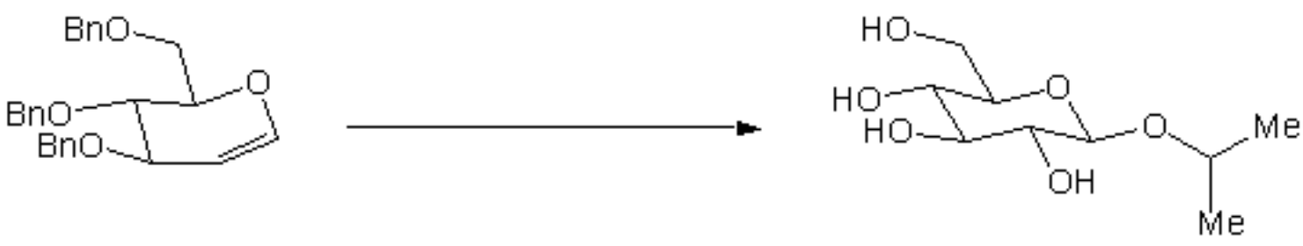
Name: _____

3. Provide the reagents necessary to accomplish the following transformations:
(***More than one step will be required.***)

a. (7 pts)

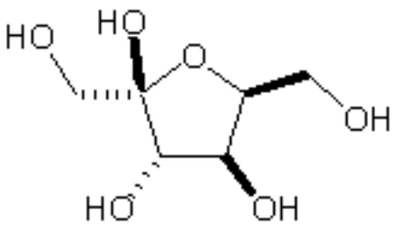
b. (7 pts) (*Hint: Strecker.*)

c. (7 pts)



Name: _____

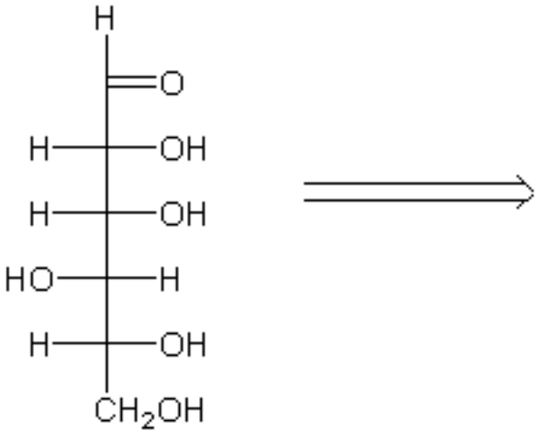
4. a. (10 pts) Provide a Fischer projection and a classification (*e.g.* D-aldotetrose) for the following carbohydrate:



Fischer Projection

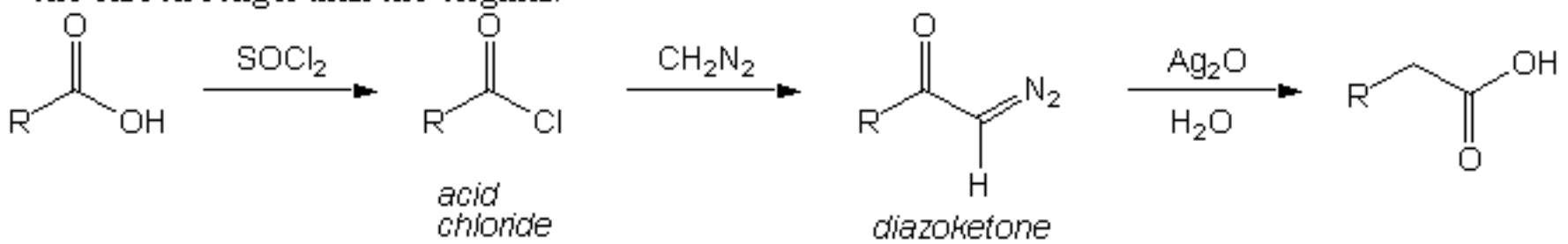
Classification

b. (10 pts) Provide a clear drawing of the most stable **β-PYRANOSE** form of the following ketohexose.



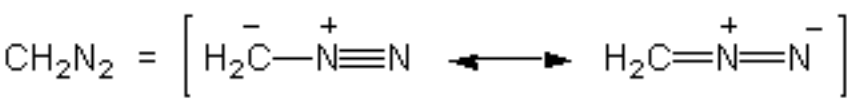
Name: _____

5. Consider the following reaction sequence (known as the Arndt-Eistert Homologation). In the first part, a carboxylic acid is transformed into an acid chloride, and the acid chloride is then treated with diazomethane to give a diazo ketone. In the second part (known as the Wolff Rearrangement), the diazo ketone is treated with a silver salt in the presence of water to give a new carboxylic acid that is one carbon longer than the original.



acid chloride

diazoketone



a. (5 pts) Provide a mechanism for the conversion of the acid chloride to the diazoketone.

b. (10 pts) *Given what you know about the* ***Curtius Rearrangement***, propose a reasonable mechanism to account for the conversion of the diazoketone to the product carboxylic acid. You may ignore the silver oxide, but you will need the water at some point in the mechanism.