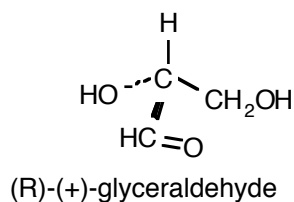


Names: _____
 Chem 227/ Dr. Rusay

Carbohydrates

1. Remember that a Fischer projection is a way of representing 3-D molecules on 2-D surfaces. As in all conventions, there are specific rules to be obeyed. (R)-Glyceraldehyde is the simplest monosaccharide. Convert the 3-D representation into the correct Fischer projection formula.



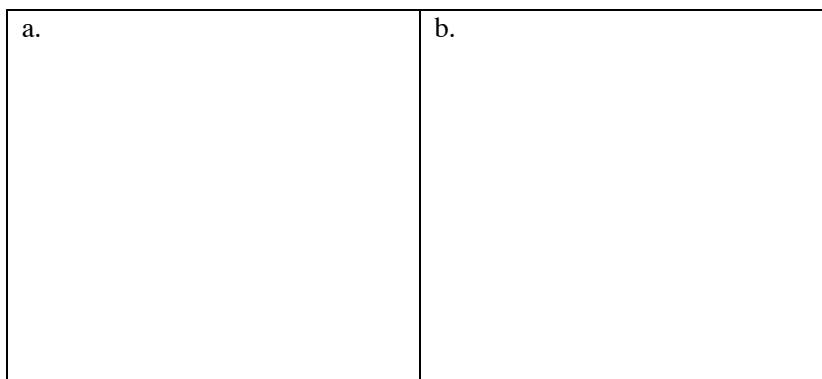
Refer to (I): <http://chemconnections.org/organic/chem227/naming-09.html>

- Draw a Fischer projection formula or Haworth formula for each of the six compounds, whichever you think more appropriate.
- Name each compound: detailed generic or precise names accepted. Consider that one or more are not true "carbohydrates". They do not need to be named or classified.
- Classify each carbohydrate. Indicate if it is a mono-, di-, or polysaccharide and if it is a reducing or a non-reducing sugar.

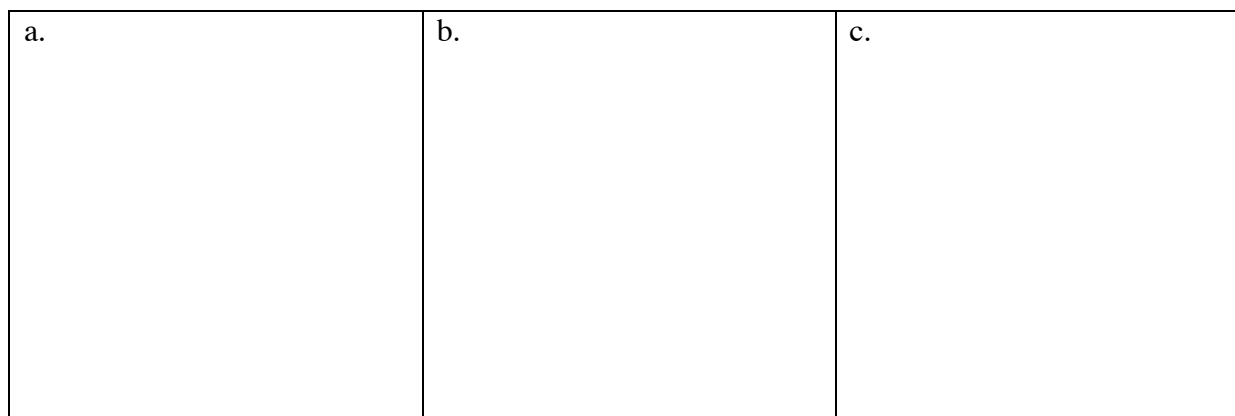
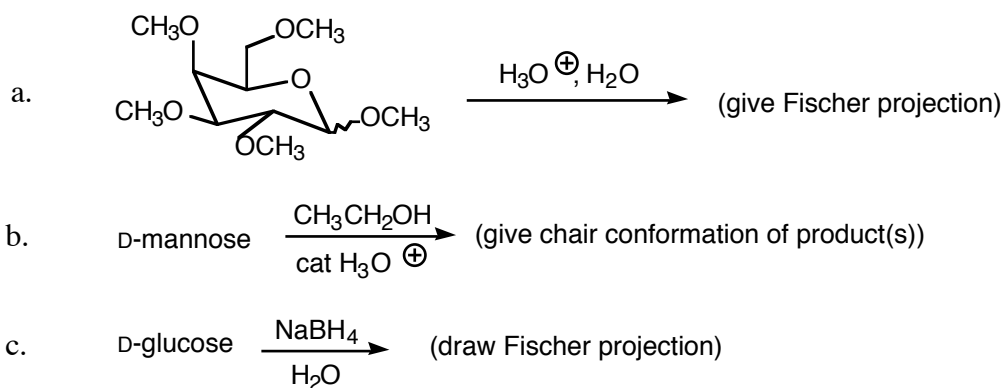
<p>Name: [mono- / di- / poly-] [reduce / non]</p>	<p>Name: [mono- / di- / poly-] [reduce / non]</p>	<p>Name: [mono- / di- / poly-] [reduce / non]</p>
<p>Name: [mono- / di- / poly-] [reduce / non]</p>	<p>Name: [mono- / di- / poly-] [reduce / non]</p>	<p>Name: [mono- / di- / poly-] [reduce / non]</p>

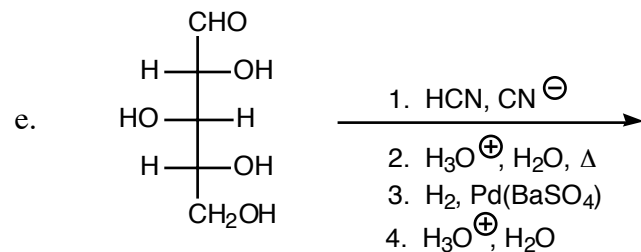
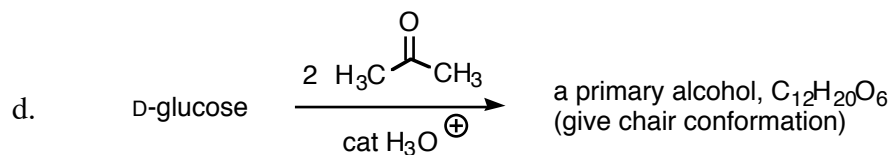
3. Provide structures that satisfy the following descriptions:

- The aldopentose that would give the same aldaric acid as D-arabinose upon oxidation with nitric acid.
- The enediol that is an intermediate in the isomerization of the carbonyl group of D-arabinose from the 1-position to the 2-position in aqueous base.



4. Provide structures for the major organic products of the following reactions:





d.	e.
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5. Refer to: <http://chemconnections.org/organic/chem227/naming-09.html>

a) Select two planets that reflect the proportional difference between the size of a glucose molecule relative to a virus.

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b) Select three planets that reflect the proportional difference between the respective sizes of a virus, a bacterium and a red blood cell.

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c) How many glucose molecules could be contained within: i) the space of a virus and ii) the space of a red blood cell? ($V = 4.189 \text{ r}^3$) Show your calculations.

6. Complete the Wordsearch. Fill-ins for the blanks can be placed at the bottom of the page.

Sugar Wordsearch

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This puzzle contains 29 names, terms, prefixes, and acronyms that describe sugars and their polymers. Find and highlight these terms in the matrix below. "CARBOHYDRATE" is already done for you. Then, correctly transfer them to the blanks in the description below the matrix. Use the letters remaining in the matrix to complete the sentence describing these molecules. Your success will be rewarded. The answers to the Sugar Wordsearch are found below. Good hunting!

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N I E T O R P O C Y L G S U
N I T I H C G L U C O S E G
K E T O S E S S E S O D L A
E A G C H E X O S E I P E R
S S L S E S O B I R A Y S S
O U Y T M P A M A M K R O N
T G C A R B O H Y D R A T E
C A O R E N C L L I F N C G
A R L C O C O E Y S W O U O
L N I H A S E L P M I S R C
A A P S E R E M O N A E F Y
G N I C U D E R E T S E E L
E D D C E L L U L O S E T G

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CARBOHYDRATES can be S_____ S_____s that are either A_____ or K_____ and are therefore R_____ sugars. Table sugar, S_____, is a D_____ of the H_____s F_____ and G_____ in cyclic furanose and P_____ forms, respectively. L_____ is glucose linked to G_____. Plants store energy in the _____ saccharide S_____, which contains A_____ and A_____. The animal equivalent is G_____. The only _____mer in them is the alpha A_____ of glucose. Beta-linked glucose or *N*-acetylglucosamine makes C_____ or C_____, respectively. Both are structural polymers. Complex molecules like G_____s and _____P_____s have sugars attached. Finally, phosphodi_____ bonds link R_____ units in the backbone of _____. Converting the pentose into the deoxy form produces a _____ strand.

Use the remaining letters to fill in the following sentence:
