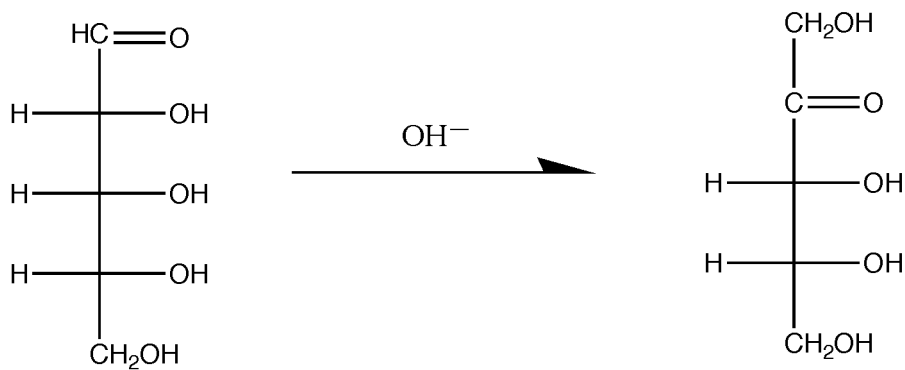


**Exercise 9: Saccharides**

1. Show the base-catalyzed mechanism of D-ribose rearranging to D-ribulose:



2. Sucralose is a noncalorific sugar (taste sweet but is not burned in the body) that is now commonly used in diet products. Sucralose has the structure of sucrose but 3 of the hydroxyl groups have been replaced by chlorine atoms. The three OH positions that have been replaced are the C-4 position of the glucose component and the C-1 and C-6 positions of the fructose component. Draw the structure of Sucralose (in one of its cyclic forms). **Note:** When the hydroxyls were replaced by the chlorines, this was done via an  $S_N2$  mechanistic route.

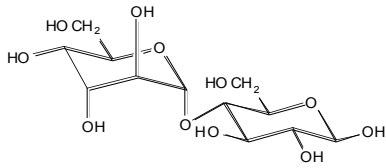
3. Draw the  $\alpha$  and  $\beta$  cyclic forms of D-sorbose and D-mannose. Out of these 4 forms, circle the form that you would consider the most stable. Also indicate which carbons in each form are the **anomeric** carbons. You can find the structure of sorbose and mannose on pp. 925 and 927 (tables 22.1 and 22.2).

4. Draw both possible disaccharides of mannose and sorbose complete with an  $\alpha, \beta$ -1,4'-glycosidic linkage.

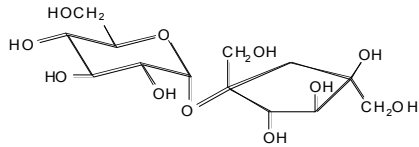
5. a. For the structures below, circle all the 1,4'-glycosidic linkages.

b. Box the di- and tri-saccharides below that would you consider digestible by humans — in other words, which could be enzymatically hydrolyzed to a monosaccharide?

c. For the last 2 structures, label the monosaccharide units that it is made up of (as was done for the first two).



maltose and glucose



Sucrose; glucose and fructose

