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 Sucralose has the structure of sucrose but 3 of the hydroxyl groups have been replaced by chlorine atoms.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 $S_N^2$ 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).