1. Write an electron pushing mechanism for the acid catalyzed interconversion of the two compounds shown below. This reaction is a model for the interconversion of pyranose and furanose sugars. Show all intermediates and use curved arrows to show the movement of electrons that converts one intermediate to the next material. There will be both open chain and cyclic intermediates.
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\[ \text{HO} - \text{H} - \text{HO} \rightleftharpoons \text{H}^{+} \xrightarrow{\text{H}_{2}\text{O}} \text{HOH}_{2}\text{C} - \text{O} - \text{HO} \]

2. (a) Draw a Fischer projection of the open aldehyde form of the following sugar. What is the name of the sugar (After drawing the Fischer projection, compare with Figure 16.1 in your textbook)

(b) Draw one of the furanose anomers of D-Galactose.

D-Galactose
3. (a) Write four resonance structures for uracil. Which one can be used to explain why uracil has aromatic stability?

(b) For Purine, which nitrogen lone pairs are in the plane of the ring and which are part of the π-system.

(b) Draw the hydrogen bonding between uracil and adenine that occurs in DNA-RNA interaction.