Chapter 21 Practice Problems set 2
Practice problem 1

Predict whether L-altrose exists preferentially as a pyranose or a furanose. (Hint: in the most stable arrangement for a ring, all the adjacent substituents are trans)
Disaccharide $X$ is hydrolyzed to D-hexoses $A$ and $B$. All sugars ($X$, $A$, $B$) give a positive Tollens test (oxidized with $\text{Ag}_2\text{O}$). $A$ reacts with $\text{Br}_2$ (decolorizes), and $B$ does not. Under aqueous basic conditions, $A$ gives some amount of $B$. When $A$ is treated with $\text{NaBH}_4$, an optically inactive product is formed. Wohl degradation of $A$ followed by reduction with $\text{NaBH}_4$ gives an optically active product. When $X$ is treated with excess $\text{CH}_3\text{I}$, $\text{Ag}_2\text{O}$ and an $\alpha$-glycosidase, $A$ methylated at positions 2, 3, 4, and 6 is formed, along with $B$ methylated at positions 1, 3, and 4.

Provide the structure of $X$