- Consider the following two monosaccharides, (A) and (B).

\[ \text{\(\alpha\)-D-xylofuranose} \]

\[ \text{\(\beta\)-D-altropyranose} \]

Draw Fischer projections of the open chain forms of A and B.

Give the products obtained when D-xylose is treated with the following reagents.

<table>
<thead>
<tr>
<th>[Ag(NH3)₂]⁺ / OH⁻ solution</th>
<th>NaBH₄ in methanol solvent</th>
</tr>
</thead>
</table>

Draw the Haworth structure of a non-reducing disaccharide, which yields D-altrose and D-xylose on acid hydrolysis.
- Lactose, 4-\(O-(\beta-D\text{-galactopyranosyl})-\alpha-D\text{-glucopyranose}\) is the major sugar in human and cow's milk.

![Lactose](image.png)

**Does lactose display mutarotation? Justify your answer.**

**Draw the Fischer projection of the open chain form of D-galactose.**

**Give the products obtained when D-galactose is treated with the following reagents.**

<table>
<thead>
<tr>
<th>Methanol / H(^+) / heat</th>
<th>([\text{Ag(NH}_3\text{)}_2]^{\ominus}) / OH(^-) solution</th>
</tr>
</thead>
</table>

Acid hydrolysis of a non-reducing disaccharide yields D-galactose as the only product. Draw the Haworth structure of one such disaccharide.

How many different disaccharides are possible in the preceding question? What is the relationship between these compounds?
• Consider the structures of the two aldohexoses shown below.

\[ \beta\text{-D-allopyranose} \quad \alpha\text{-D-altropyranose} \]

Draw the Fischer projection of the open chain forms of sugars (A) and (B).

Give the products obtained when D-allose is treated with the following reagents.

<table>
<thead>
<tr>
<th>acidified methanol</th>
<th>NaBH\textsubscript{4} in methanol solvent</th>
</tr>
</thead>
</table>

In the case of the product obtained from the reaction with NaBH\textsubscript{4} in methanol, specify the optical rotation as "(+)", "(−)", "zero" or "cannot be predicted". Justify your choice.

THIS QUESTION IS CONTINUED ON THE NEXT PAGE.
Draw the Haworth structure of β-D-allopyranosyl-α-D-altropyranoside.

Will this disaccharide be a reducing sugar? Explain your answer.