1. Write the product and mechanism for the following transformation.

\[
\text{Cl} \quad \text{1. } \text{NaN}_3 \\
\text{2. heat} \\
\text{3. CH}_3\text{NH}_2
\]

2. Complete the following synthesis. Show all intermediate isolated compounds.

\[
\text{OH} \quad \text{1. NaN}_3 \\
\text{2. heat} \\
\text{3. CH}_3\text{NH}_2
\]
3. Write the mechanism of the following hydrolysis of the methyl glycoside of β-D-allose.

\[
\text{HOCH}_2\text{O} \xrightarrow{\text{H}_3\text{O}^+} \text{HOCH}_2\text{O}_\text{H}_2\text{O} \rightarrow \text{HOCH}_2\text{O}_\text{H}_2\text{O} \quad + \quad \text{HOCH}_2\text{O}_\text{H}_2\text{O}
\]

4. Draw all the products of acid and base hydrolysis.

\[
\text{HOCH}_2\text{O} \xrightarrow{\text{H}_3\text{O}^+} \text{HOCH}_2\text{O}_\text{H}_2\text{O} \rightarrow \text{HOCH}_2\text{O}_\text{H}_2\text{O} \quad + \quad \text{HOCH}_2\text{O}_\text{H}_2\text{O}
\]
5. Draw the sugar that is epimeric with \( \alpha \)-L-glucopyranose at C-4 in Haworth projection and in its most stable chair conformation. Does it give an optically active acid upon oxidation with HNO\(_3\)? Oxidation with HNO\(_3\) converts the aldehyde and end alcohol to carboxylic acids. Assume the diacid is in open chain form.

6. Draw the mechanism of the following reaction. Show all electron-pushing arrows and intermediates.