PSet # 8.

1. *trans*-1,2-Cyclohexanediol is much more reactive toward periodate cleavage than the cis isomer. Explain why. Show the product formed in these reactions.

\[
\text{cis} \quad \text{NalO}_4 \quad \text{FASTER} \quad \text{trans} \quad \text{NalO}_4 \quad \text{SLOWER}
\]

2. Provide a model to determine if the reaction below will provide the indicated diastereomer as the major product. If not, propose an efficient method to convert the undesired diastereomer to the desired one.

\[
\begin{align*}
\text{H} & \quad \text{O} \\
\text{O} & \quad \text{Me} \\
\text{H} & \quad \text{OMe} \\
\text{Et} & \quad ? \\
\text{H} & \quad \text{OMe} \\
\text{Et} &
\end{align*}
\]

3. The acid-catalyzed reaction shown is highly energetically favorable. Provide a mechanism for the transformation. Why is this reaction so energetically favorable?

\[
\text{H}_3\text{C} \quad \text{HO} \quad H_2\text{O}^+ \quad \text{H}_3\text{C} \quad \text{C} \quad \text{H}
\]

4. Propose a synthesis of dioscorine, starting from the indicated compound and using any materials you choose.

\[
\text{H}_3\text{C} \quad \text{N} \quad \text{O} \quad \text{O} \quad \text{N} \quad \text{H}_3\text{C} \quad \text{C} \quad \text{H}
\]

5. Andrew Myers developed a procedure for masking aldehydes as morpholine nitriles. Provide a mechanism for the process.

\[
\text{H} \quad \text{NHP} \quad \text{HCN} \quad \text{N} \quad \text{NHP} \quad \text{HN} \quad \text{N} \quad \text{H} \quad \text{N} \quad \text{NHP} \quad \text{F}_2\text{CCH}_2\text{OH}
\]