1. Predict the major product of the following reactions. Where important, show stereochemistry.

   a. \[
      \begin{array}{c}
         \text{CH}_3 \\
         \text{H} \\
         \text{H} \\
         \text{I} \\
         \text{NaN}_3 \\
         \text{DMSO}
      \end{array}
   \]

   b. \[
      \begin{array}{c}
         \text{I} \\
         \text{I} \\
         \text{NaOH} \\
         \text{(1 eq.)} \\
         \text{DMSO}
      \end{array}
   \]

2. *Halomon* is a natural product isolated from the red algae *Portiera hornemann*, that is currently in clinical trials as an antitumor agent.

   \[
   \text{Halomon}
   \]

   Predict the product(s) observed when Halomon reacts under S\textsubscript{N}1 and S\textsubscript{N}2 conditions. Identify which conditions are under S\textsubscript{N}1 and which conditions are S\textsubscript{N}2.

3. Explain the following chemical shift data:
4. Complete the following:

CH₃CH(OCH₃)₂

# H signals: [ ]
# C signals: [ ]

multiplicity of signal from H*: [ ]
(singlet, doublet, doublet of doublets, etc.)

**Circle the hydrogen in each molecule that would be shifted furthest downfield.**