Week 2 Worksheet

1. Draw the products of each $S_N1$ reaction and indicate the stereochemistry when necessary.
   a.
   ![Reaction a](image1)

   b.
   ![Reaction b](image2)

   (Smith, 6th Ed., Ch. 1, #60)

2. (a) Rank A, B, and C in order of increasing $S_N2$ reactivity. (b) Rank A, B, and C in order of increasing $S_N1$ reactivity.

   ![Reagents](image3)

   (Smith, 6th Ed., Ch. 1, #63)
3. Fill in the appropriate reagent or starting material in each of the following reactions.

a. 

\[
\begin{array}{c}
\text{BrCH}_2\text{CH}_2\text{I} \\
\rightarrow \\
\text{BrCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{C}_6\text{H}_5
\end{array}
\]

b. 

\[
\begin{array}{c}
\text{C}_6\text{H}_5\text{CH}_2\text{Cl} \\
\rightarrow \\
\text{C}_6\text{H}_5\text{CH}_2\text{C}_6\text{H}_5
\end{array}
\]

c. 

\[
\begin{array}{c}
\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \\
\rightarrow \\
\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{N}_3
\end{array}
\]

d. 

\[
\begin{array}{c}
\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \\
\rightarrow \\
\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{SH}
\end{array}
\]

(Smith, 6th Ed., Ch. 1, #73)

4. Draw the products of each SN1 reaction and indicate the stereochemistry when necessary.
5. Determine the mechanism of nucleophilic substitution of each reaction and draw the products, including stereochemistry.
6. Suppose you have compounds A-D at your disposal. Using these compounds, devise two different ways to make E. Which one of these methods is preferred, and why?