Short Answer Questions. 40 points.

13. Predict the products of the following reactions. \( A = 10, B = 8, C = 5, D = 2, E = 0 \)

(a) \[
\begin{align*}
\text{CH}_3\text{MgBr} \\
\text{H}_2\text{O}^+ 
\end{align*}
\]

(b) \[
\begin{align*}
\text{NaBH}_4 \\
\text{CH}_3\text{OH} 
\end{align*}
\]

14. Give the structures of \( A, B \) and \( C \) that would complete the reaction sequence to produce the compound shown on the right. \( A = 10, B = 8, C = 5, D = 2, E = 0 \)

\[
\begin{align*}
\text{A} & \xrightarrow{\text{LDA, } -78^\circ\text{C}} \text{B} \\
\text{B} & \xrightarrow{\text{C}} \text{an enolate} \\
\text{an enolate} & \xrightarrow{1. \text{C}} \text{OH} \\
\text{OH} & \xrightarrow{2. \text{H}_2\text{O}} \text{OH} 
\end{align*}
\]
15. Using the curved arrow formalism show the bond making and bond breaking steps involved in the following reaction. \( A = 10, B = 8, C = 5, D = 2, E = 0 \)

16. Propose a synthesis of the following compound from benzene and compounds containing four carbon atoms or less. \( A = 10, B = 8, C = 5, D = 2, E = 0 \)