1. (10 points) Draw the structures of B and of C. Please show stereochemistry clearly.

\[
\begin{align*}
\text{A} & \quad \xrightarrow{\text{Br, OCH}_3} \quad \text{B} \\
\text{B} & \quad \xrightarrow{\text{C}_{10}H_{18}O_2} \quad \text{C}
\end{align*}
\]

$^{13}\text{C NMR}$:
- 167.1, s
- 149.8, d
- 120.8, d
- 51.3, q
- 32.2, t
- 31.6, t
- 28.8, t
- 28.0, t
- 22.6, t
- 14.1, q

$^1\text{H NMR}$:
- 0.89, t, J = 7.5 Hz, 3H
- 1.3-1.6, m, 8H
- 2.20, dt, J = 7.3, 7.7 Hz, 2H
- 3.73, s, 3H
- 5.82, d, J = 15.4 Hz, 1H
- 6.95, dt, J=15.4, 7.3 Hz, 1H

2. (10 points) Which product would be formed? Why?

\[
\begin{align*}
\text{OH} & \quad \xrightarrow{\text{KHCO}_3} \quad \text{I}_2 \\
\text{I}_2 & \quad \xrightarrow{\text{I}_2} \quad \text{I}_2
\end{align*}
\]

3. (10 points) Write a synthesis route to D. You may use any starting material that contributes three or fewer carbons to the final product. Absolute configuration is not important, but relative configuration is.

\[
\begin{align*}
\text{D}
\end{align*}
\]