1. Provide mechanisms that explain the following results. Be sure to show any intermediates that are formed, and indicate the flow of electrons with arrows.

a) \[
\begin{align*}
\text{HBr} & \rightarrow \text{Br} & \text{Br} \\
\end{align*}
\]

b) \[
\begin{align*}
\text{HCl} & \rightarrow \text{Cl} & \text{OCH}_3 \\
\end{align*}
\]

c) \[
\begin{align*}
\text{Br}_2 & \rightarrow \text{Br} & \text{Br} & \text{Br} & \text{Br} \\
\end{align*}
\]

2. Give the structures for the compounds A-E in the following reaction scheme.
3. The structures of three monomers are shown below. Vinyl chloride is polymerized to make PVC that is used for plastic pipes, tetrafluoroethylene polymerizes to Teflon, and acrylonitrile is used to make Orlon. Show what each of these polymers will look like.

Vinyl chloride

Tetrafluoroethylene

Acrylonitrile

4. Poly(ethyl acrylate) has the repeating formula shown below. Give the structure of the monomer.

5. An unknown alkene reacts with 3 moles of H₂ in the presence of a catalyst to give 1-isopropyl-4-methylcyclohexane. When this same alkene is reacted with O₃ followed by NaHSO₃, the following compounds are formed. Give the structure of the original alkene.