Instructions: Read the directions to each type of question carefully.

1. Write the products of the reaction below (next to the arrow). Also draw a curved arrow mechanism for the reaction showing the intermediate steps below.

   \[ \text{Cyclopentadiene} + \text{Acetyl chloride} \xrightarrow{\text{AlCl}_3} \text{Product} \]

   Mechanism:

2. Write the products of the \(\text{S}_2\) reaction below (next to the arrow). Also draw a curved arrow mechanism for the reaction showing the intermediate steps below.

   \[ \text{CH}_3\text{-CH}_2\text{-I} + \text{OH}^- \xrightarrow{\text{SN2}} \text{Product} \]

   Mechanism:
3. Write what the products would be if the reactants reacted through an $S_{N1}$ mechanism (next to the arrow). Also draw a curved arrow mechanism for the reaction showing the intermediate steps below.

\[
\begin{align*}
\text{CH}_3\text{C} & \quad \text{I} + \text{H}_2\text{O} \quad \xrightarrow{S_{N1}} \\
\text{CH}_3\text{C} & \quad \text{H}_3
\end{align*}
\]

Mechanism:

4. Write the products of the E2 reaction below (next to the arrow). Also draw a curved arrow mechanism for the reaction showing the intermediate steps below.

\[
\begin{align*}
\text{CH}_3\text{C} & \quad \text{I} + \text{OH}^- \quad \xrightarrow{E2} \\
\text{CH}_3\text{C} & \quad \text{H}_3
\end{align*}
\]

Mechanism:
5. Write what the products would be if the reactants reacted through an E1 mechanism (next to the arrow). Also draw a curved arrow mechanism for the reaction showing the intermediate steps below.

\[
\begin{align*}
\text{CH}_3\text{CH}_3 & \quad \text{CH}_3\text{C} & \quad \text{H}_2\text{O} & \quad \text{E}1 \\
& \quad \text{CH}_3 & \quad & \\
\end{align*}
\]

Mechanism: