1. Show how you would synthesize 2-octanone from each compound. You may use any necessary reagents.
   a) 2,3-dimethyl-2-nonene
   b) Heptanal

2. How how you would synthesize octanal from each compound. You may use any necessary reagents.
   a) 1-nonene
   b) 1,1-dichlorooctane

3. Give the missing starting material, reagent or product in the reactions below.
   a) \[
   \begin{array}{c}
   \text{Alcohol} \\
   \end{array}
   \xrightarrow{?} \ \begin{array}{c}
   \text{Alcohol} \\
   \end{array}
   \]
   b) \[
   \begin{array}{c}
   \text{Ethanol} \\
   \end{array}
   \xrightarrow{?} \ \begin{array}{c}
   \text{Acetaldehyde} \\
   \end{array}
   \]
   c) \[
   \begin{array}{c}
   \text{Alcohol} \\
   \end{array}
   \xrightarrow{?} \ \begin{array}{c}
   \text{Cyclopentanone} \\
   \end{array}
   \]
   d) \[
   \begin{array}{c}
   \text{Cyclohexene} \\
   \end{array}
   \xrightarrow{?} \ \begin{array}{c}
   \text{Phenylacetaldehyde} \\
   \end{array}
   \]