Introduction: The usual. Not to be graded, but to be done and we will review. Just a note: you really need to try to do these problem sets in a timely manner, as it is a bit of work to get them done for you, and not to do them seriously before recitation does not induce me to want to continue this effort.

1) The ester (Z)-7-dodecen-1-yl acetate was recently identified as the pheromone that plays an important role in the mating rituals of elephants. Propose an efficient synthesis of this compound from any carbon source containing fewer than six carbon atoms.

\[
(\text{Z})-7\text{-dodecen-1-yl acetate}
\]

2) Provide the products and supply the missing reagents for the following synthetic sequence:

\[
\begin{align*}
\text{A} & \xrightarrow{\text{Cl, AlCl}_3} \text{PhCHBrCO}_2\text{H} \\
& \xrightarrow{\text{NaCN, DMF}} \text{B}
\end{align*}
\]

3) Provide efficient synthetic sequences for the preparation of each of the following compounds from the indicated starting materials and any other necessary reagents:

a) from
4) Provide a reasonable mechanism for the following reaction:

\[
\text{PhNH}_2 + \text{HCO}_2\text{H} \xrightarrow{\Delta} \text{PhN=CH}_2 + \text{H}_2\text{O}
\]

5) Suggest efficient synthetic sequences for the preparation of each of the following compounds from the indicated starting materials and any other necessary reagents:

a)
6) Spermaceti, a transparent wax, makes up about 11% of sperm whale oil. It is composed mainly of cetyl palmitate, an ester containing 32 carbons. Propose a chemical synthesis of cetyl palmitate from any carbon source containing no more than 10 carbons.