1. One step in the biosynthesis of fatty acids involves the conversion shown below. The enzyme that is used in this process is called β-ketoacyl reductase. As you might expect, it does not act alone and requires a coenzyme to affect the transformation. What coenzyme do you think will work? Draw its structure and use it to postulate a mechanism to account for the conversion.

\[
\begin{align*}
\text{β-ketoacyl reductase} + & \text{coenzyme} & \rightarrow \text{SH} \\
\text{SH} & \rightarrow \text{OH} \\
\end{align*}
\]

2. In class I spoke about a transformation wherein the Schiff base of pyridoxal phosphate and an amino acid undergoes loss of carbon dioxide. Where does the CO₂ go? Fortunately, it is captured - reversibly [this is handy because the product can then also serve as a source of CO₂ when needed] - by another coenzyme called biotin. I bet you've heard of this substance - eh? Look in your text for its structure. Draw it for yourself. Formulate a mechanism to illustrate the reaction of biotin with CO₂ to form carboxybiotin.

\[
\begin{align*}
\text{carboxybiotin} & \rightarrow \text{CO₂H} \\
\end{align*}
\]