Give the product for the following reactions:

\[ \text{III} + \text{X} \xrightarrow{\text{hv}} Y \]

\[ \text{C}_6\text{H}_5 + \text{MeO} + \text{C}_3\text{H}_4\text{O}_2\text{Me} \xrightarrow{\text{hv}} \]

\[ \text{R}^1\text{N} = \text{C} = \text{O} \xrightarrow{\text{hv}} \]

\[ \text{R}^1\text{N} = \text{C} = \text{O} \xrightarrow{\text{Pd(II) cat.}} \]

\[ \text{R}^1\text{N} = \text{C} = \text{O} \xrightarrow{\text{Pd(II) cat.}} \]
Provide a mechanism for the following transformations:
Mechanisms Continued

\[ \text{[Chemical Structures]} \]
The following two reactions come from the synthesis of (±)-Eremopetasidione, a compound used in Chinese medicine for poisonous snake bites, tonsilitis and contusions.

Give a mechanism for the following steps.