Write out the step-by-step mechanism for the reaction below. Include all intermediates, charges and curved arrows in your mechanism.

Decide if the compounds below are oxidizing agents or reducing agents/nucleophiles.

 $LiAlH_4 \qquad KMnO_4 \qquad BuLi \qquad PCC \qquad NaBH_4 \qquad CrO_3$

What is wrong (if anything) with each reaction below?

Give the major product(s) of the following reactions.

$$OOCH_3$$
 BuLi Et₂O

Br
$$\underbrace{\begin{array}{cccc} 1) \text{ Mg} & 2) & \stackrel{\text{O}}{\searrow} \\ \hline \text{Et}_2\text{O}, \Delta & 3) \text{ H}_3\text{O}^{(+)} \end{array}}$$

$$\begin{array}{c|c} & & & \\ \hline \\ O & & \\ \hline \\ O & \\ \hline \end{array} \begin{array}{c} & & \\ \hline \\ & \\ \hline \end{array} \begin{array}{c} & & \\ \hline \\ & \\ \hline \end{array} \begin{array}{c} & & \\ \hline \\ & \\ \hline \end{array} \begin{array}{c} & & \\ \hline \\ \end{array} \begin{array}{c} & & \\ \hline \end{array} \begin{array}{c} & & \\ \end{array} \begin{array}{c} & & \\ \hline \end{array} \begin{array}{c} & & \\ \hline \end{array} \begin{array}{c} & & \\ \end{array} \end{array} \begin{array}{c} & & \\ \end{array} \end{array} \begin{array}{c} & & \\ \end{array} \end{array} \begin{array}{c} & & \\ \end{array} \end{array} \begin{array}{c} & & \\ \end{array} \end{array} \begin{array}{c} & & \\ \end{array} \end{array} \begin{array}{c} & & \\ \end{array} \begin{array}{c} & &$$

OHC
$$CO_2Et$$
 $NaBH_4$ H_2O , EtOH

Give the reagents needed to transform the following starting materials into the indicated products.