1. **(2 points)** Provide appropriate reagents and product structures in the boxes for the following transformations.

- **(a)**
  - Reaction: Jones reagent
  - Reagents: H₂CrO₄, acetone
  - Product: 

- **(b)**
  - Reaction: 
  - Reagents: 
  - Product: 

- **(c)**
  - Reaction: 
  - Reagents: 
  - Product: 

- **(d)**
  - Reaction: LiAlH₄, ether
  - Product: 

2. **(2 points)** Provide expected products from the following sequence of reactions.

- **(a)**
  - Reaction: 
  - Reagents: Mg, THF
  - Product: 

- **(b)**
  - Reaction: 
  - Reagents: 
  - Product: 

- **(c)**
  - Reaction: 
  - Reagents: 
  - Product: show two products 

- **(d)**
  - Reaction: 
  - Reagents: 
  - Product: 

- **(e)**
  - Reaction: 
  - Reagents: 
  - Product: 

- **(f)**
  - Reaction: 
  - Reagents: 
  - Product: 

- **(g)**
  - Reaction: 
  - Reagents: 
  - Product: 

- **(h)**
  - Reaction: 
  - Reagents: 
  - Product: 

3. **(6 points)** Propose a synthesis of the following ketone product from the provided ester and alkyl halide starting materials.

\[
\text{[Structure of ketone product]} \quad \rightleftharpoons \quad \text{[Structure of starting materials]} \quad + \quad \text{[Structure of ketone product]} \quad + \quad \text{Br-alkyl group}
\]