1. Give the starting material and reagents over the arrow for the following reactions. **No credit for hydrogenations.**

   a) \( \text{Br} \)
   b) \( \text{KOCCH}_3 \)
   c) \( \text{Br} \)

2. Circle the alkyl halide which would undergo the most rapid \( S_n2 \) reaction with NaOCH\(_2\)CH\(_3\).

   ![Circle the alkyl halide](image)

3. Give the products of the following reactions including all stereoisomers and showing stereochemistry in 3-D.

   a) \( \text{NaOCH}_3 \)
   b) \( \text{NaOCH}_3 \)
   c) \( \text{OCH}_3 \)

4. Draw the mechanism of the following reaction showing all intermediates and electron-pushing arrows. Draw the transition state \( \dagger \) of the rate-determining (slow) step.

   ![Draw the mechanism](image)