1. Predict the products of the following reactions (4 points each)

**A.**

\[ \text{NMe}_2^+ \text{O} \to \text{heat} \]

**B.**

\[ \text{OAc} \text{O} \text{CO}_2 \text{Pd(PPh}_3)_4, \text{Et}_3\text{N} \]

2. Show the intermediates and compounds generated in the following cross-metathesis (6 points).

3. Show a synthesis for the following (6 points)

\[ \text{start with benzene and anything 2 carbons or less} \]

\[ \text{OAc} \text{O} \text{CO}_2 \text{Ru} \text{R} \text{R} \text{R} \text{R} \text{heat} \]