1. (10 points) Using any piece that contributes three or fewer carbons to the final product, outline a synthesis of A.

\[ \text{MgBr} \quad \text{Br} \quad \text{coupling with allylic halide does not need Cu cat} \]

\[ \text{HBr peroxide} \quad \text{Br} \quad \text{NaCN} \]

2. (10 points) Draw the structure of C, and the mechanism for its formation from B.

3. (10 points) Which product would you expect from the reaction of D with E. Why?

\[ \text{ester is more activating than nitrile} \]

\[ \text{this is the reactive diene} \]

\[ \text{does not like to be cis, not reactive as diene} \]

\[ \text{ester will be endo diene, dienophile geometry maintained} \]

\[ \text{this orientation since alkene stabilizes carbocation} \]