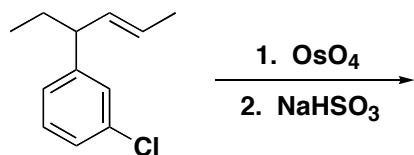


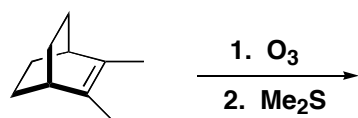
CHE 230 Practice Problems 4

1. Provide the expected organic product of the reactions below. If a reaction will proceed with well-defined stereochemistry, show that stereochemistry in the product. If no reaction will occur, write 'No Reaction.'

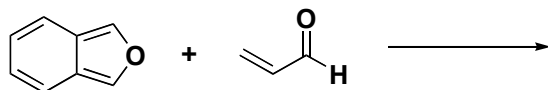
a)



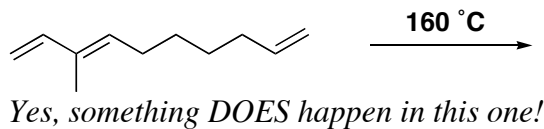
b)



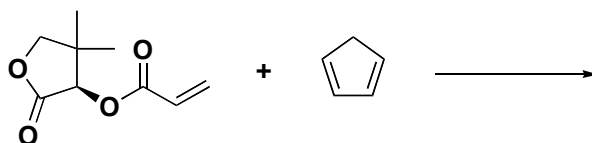
c)



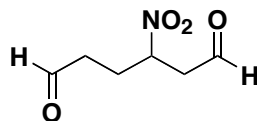
d)



2. In the example below, is the product chiral and will it necessarily be racemic?.



3. **Synthesis.** Propose a viable synthesis of the compound below, starting from any compounds containing *four carbons or less*.



Hints: How have you made aldehyde groups in the past?
What reactions do you know that form carbon-carbon bonds?