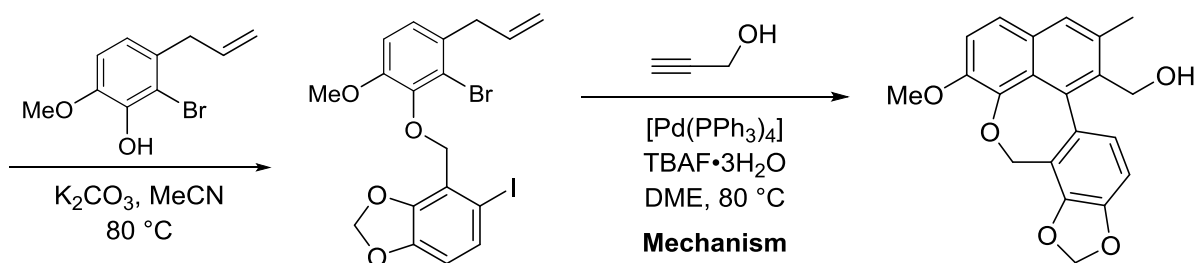
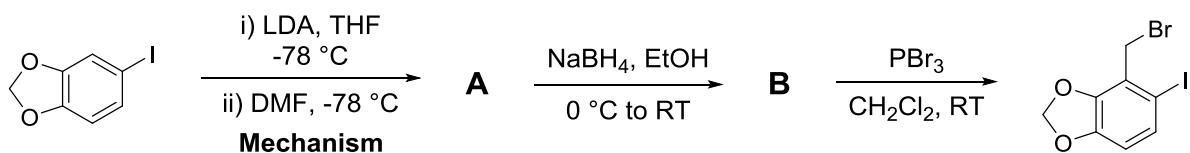


Problems for March 5th

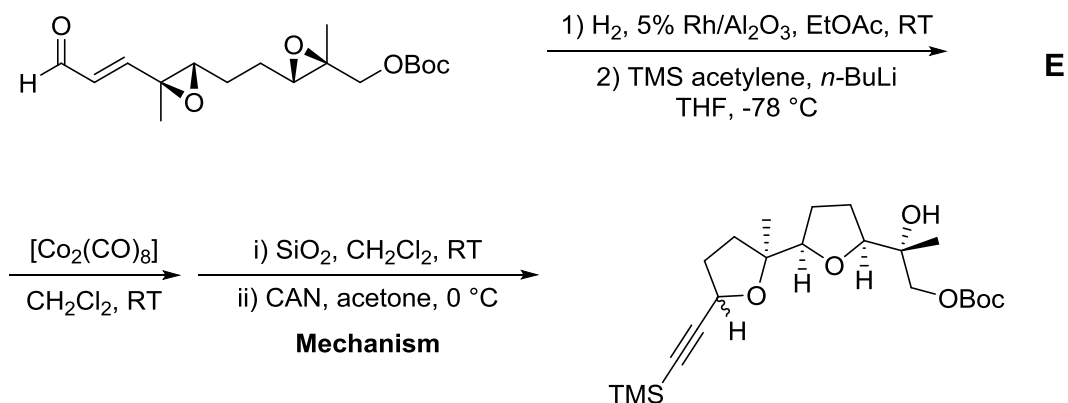
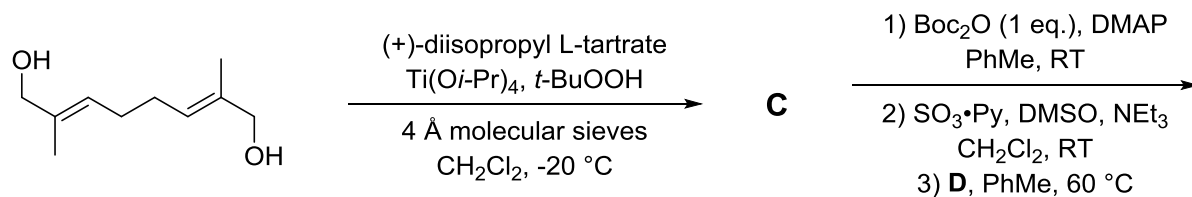
Problem 1

The synthetic sequence shown below has recently been applied towards the synthesis of the natural product linoxetine. Please provide the structure of intermediates **A** and **B**, and show the mechanism for the first and last steps.



Problem 2

The synthesis below has recently been used as a model system for a synthesis of the natural product teurilene. Please provide the structure of intermediates **C** and **E**, reagent **D** and a mechanism for the final step.



Problem 3

The following sequence is a recently published synthesis of key structural components of the algal toxin polycavernoside A. Please provide the structure of intermediates **F** and **G** and reagent **H**. Also please suggest a synthetic route from **G** to the shown intermediate, and give the mechanism for the final step. The structure of ligand **X**, reagent **Y** and catalyst **Z** is given below.

