

## CHEM 8321/4321

November 20, 2023

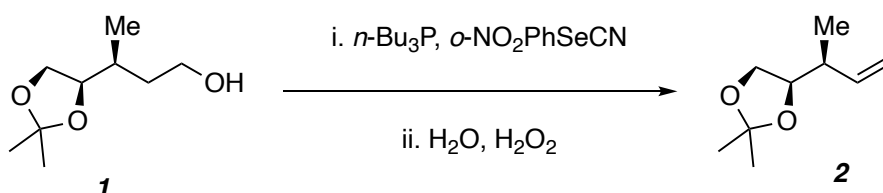
## Problem Set #11

T. R. Hoye

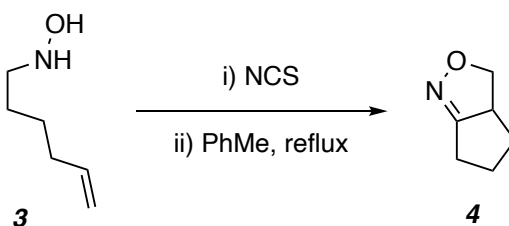
Due in class, Monday November 27, 2023

**Detailed Mechanism** Provide a detailed mechanism [i.e., *explicitly* show (using curly arrows) *EVERY* intermediate, formal charge (where relevant), equilibrium, and bond-making and -breaking step] to account for the following transformations:

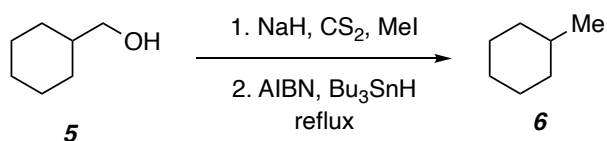
a) The dehydration of the alcohol **1** to afford the olefin **2**.



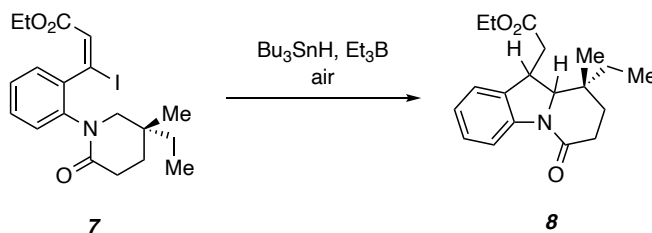
b) The cyclization of the hydroxylamine **3** to the cyclic oxime **4**.



c) The conversion of the alcohol **5** to methylcyclohexane (**6**).

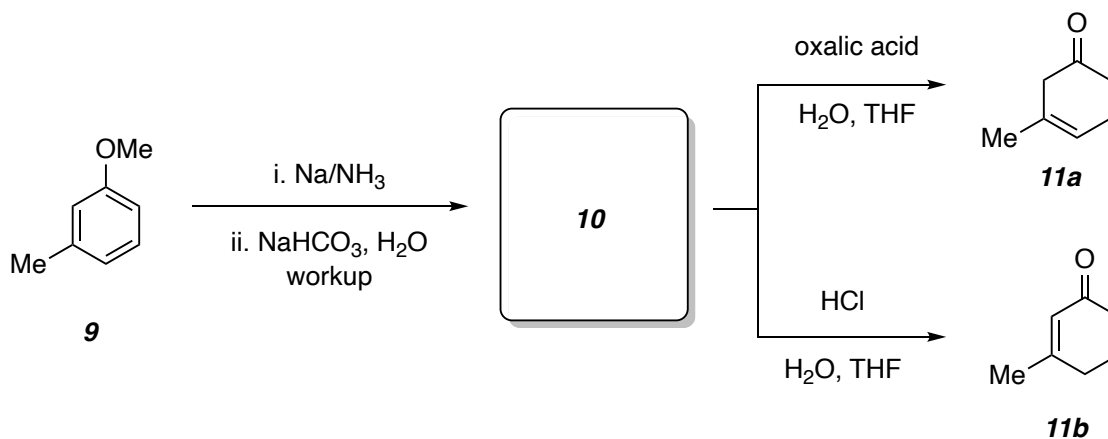


d) The cyclization of **7** to form **8**. (*hints*: one equiv of tributyltin hydride is used; far less than one equiv of  $\text{Et}_3\text{B}$  is used; both are consumed;  $\text{Et}_3\text{B}$  reacts very rapidly with even very low concentrations of  $\text{O}_2$ .)



**Other Problems**

1. Draw the structure **10** that results following the subjection of the anisole derivative **9** to sodium in ammonia followed by a non-acidic workup. Two different enones (**11a** and **11b**) result from the treatment of the intermediate **10** with oxalic acid versus hydrochloric acid. Account mechanistically for why different major products are formed from these two hydrolysis reactions.

**Reaxys Database Search**

- According to the Reaxys database, how many single-step transformations convert benzene to any 1,4-disubstituted benzene derivative?
- How many of your answers to a) use acetonitrile as the solvent?
- How many of your answers to a) use iodine as a reagent?