Exam #2

This is an open-book, open notes exam. You may take up to three hours. For each transformation shown, draw detailed arrow-pushing mechanisms for each step, including the explicit chemical structure of every reactant and reagent (show every heavy atom - H's not required), all stereochemistry, and all the organic products of each reaction. The abbreviations are exactly as they appear in the publication.

Each problem is worth twenty points.

1. \[ \text{HO} \quad \text{O} \quad \text{Si} \quad \text{PMBO}(\text{=NH})\text{CCl}_3 \quad \text{CSA, CH}_2\text{Cl}_2 \]

2. \[ \text{TBSO}_3 \quad \text{H} \quad \text{TBS} \quad \text{CF}_3\text{CH}_2\text{O}_2\text{P(O)}\text{CH}_2\text{CO}_2\text{H} \quad \text{Et}_3\text{N, DMAP, PhMe} \]

3. \[ \text{OCH}_3 \quad \Delta \quad \text{OCH}_3 \]
4. 
\[
\text{Me}_3\text{SiO} + \text{N}_3
\]
\[
\xrightarrow{\text{SnCl}_4}
\]
\[
\text{Me}_3\text{SiO}
\]