Exam #1

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. \[ \text{MOMO} \text{MeO}_2C\text{H}_2\text{C} = \text{OH} \text{OBN} \xrightarrow{\text{CH}_3\text{C(OEt)}_3, \text{phenol}, 125 \degree \text{C}} \text{MOMO} \text{MeO}_2C\text{H}_2\text{C} = \text{OEt} \text{OBN} \]

2. \[ \text{NH}_2\text{OTIPS} + \text{O} \text{N} \text{O} \text{K} \text{O} \xrightarrow{1. \text{p-TsOH}, 50 \degree \text{C}, \text{PhH}} \text{MeO}_2C\text{N} \text{O} \text{K} \text{O} \text{OTIPS} \]
   \[ \xrightarrow{2. \text{ClCO}_2\text{Me}, \text{NaHMDS}} \]

3. \[ \text{OEt} \text{C} \text{H}_2\text{C} = \text{OH} \xrightarrow{1. \text{LDA; prenyl bromide Bu}_4\text{Ni}} \text{O} \text{C} \text{H}_2\text{C} = \text{OH} \]
   \[ \xrightarrow{2. \text{MeLiLiBr; HCl/H}_2\text{O}} \]

4. \[ \text{HO} \text{C} \text{O}_2\text{Me} \text{TIPS} \xrightarrow{\text{Dess-Martin periodinane, CH}_2\text{Cl}_2} \text{CO}_2\text{Me} \text{TIPS} \]

5. \[ \text{H} \text{Si} \text{O} \text{C} \xrightarrow{1. \text{cat [Rh(acetone)_2 - (P(OPh)_3)_2] BF}_4, \text{CO, PhH, 60 \degree C}} \text{HO} \text{Si} \text{OH} \]
   \[ \xrightarrow{2. \text{MeLi}} \]
