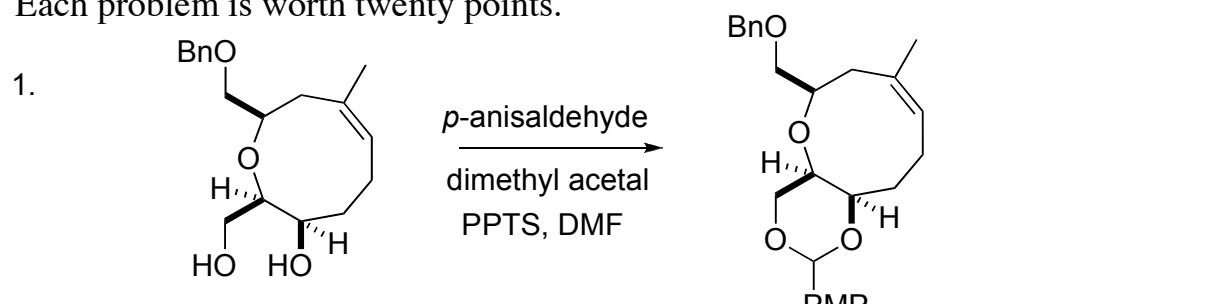
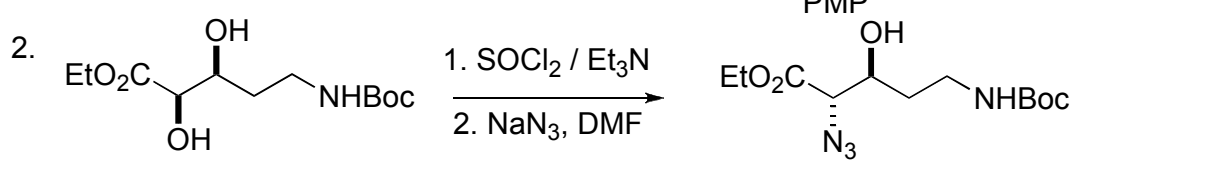


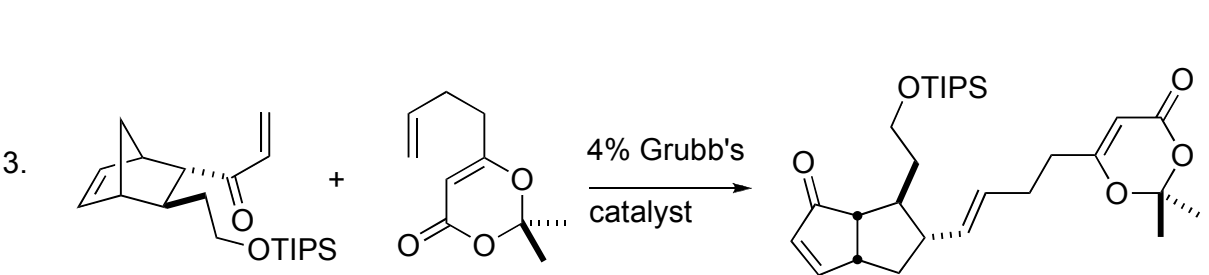
Exam #1

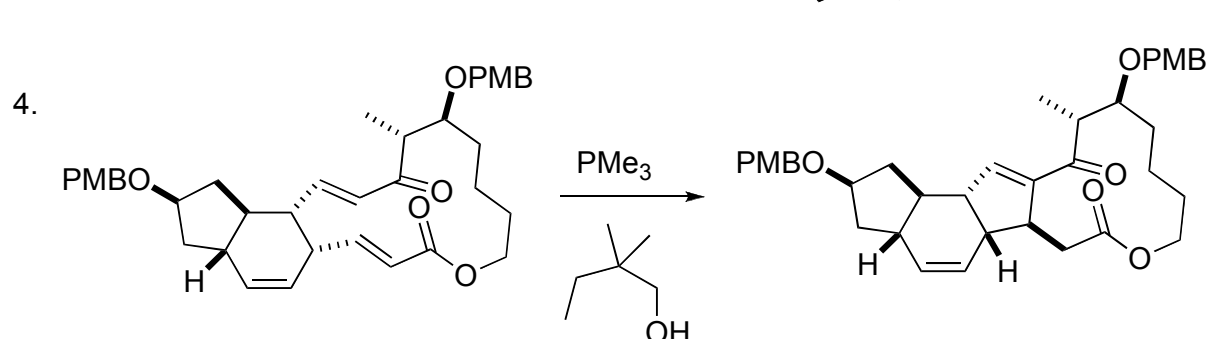
This is an open-book, open-notes exam. You may take up to three hours. For each transformation shown, draw detailed arrow-pushing mechanisms for each step, including the explicit chemical structure of every reactant and reagent shown (show every heavy atom- H's not required), all stereochemistry, and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

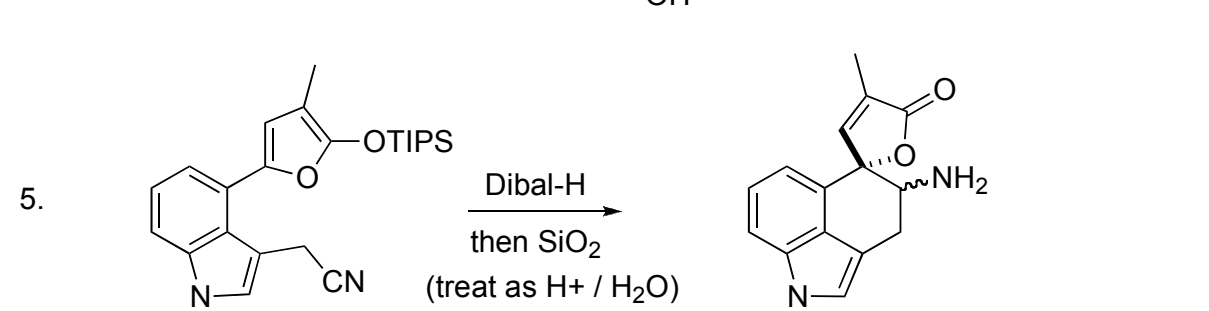
Each problem is worth twenty points.

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1. C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2 $\xrightarrow[\text{PPTS, DMF}]{p\text{-anisaldehyde, dimethyl acetal}}$ C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)OC2
- 

2. CCOC(=O)[C@H](O)[C@H](O)CCNC(=O)OC(C)(C)C $\xrightarrow[2. \text{NaN}_3, \text{DMF}]{1. \text{SOCl}_2 / \text{Et}_3\text{N}}$ CCOC(=O)[C@H](O)[C@@H](N=[N+]=[N-])CCNC(=O)OC(C)(C)C
- 

3. C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2 + C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2 $\xrightarrow[\text{catalyst}]{4\% \text{ Grubb's}}$ C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2
- 

4. C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2 $\xrightarrow[\text{chiral auxiliary}]{\text{PMe}_3}$ C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2
- 

5. C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2 $\xrightarrow[\text{(treat as H}^+ / \text{H}_2\text{O)}]{\text{Dibal-H, then SiO}_2}$ C1=CC=C(C=C1)OC[C@H]2C=C[C@@H](O)[C@H](O)O2