

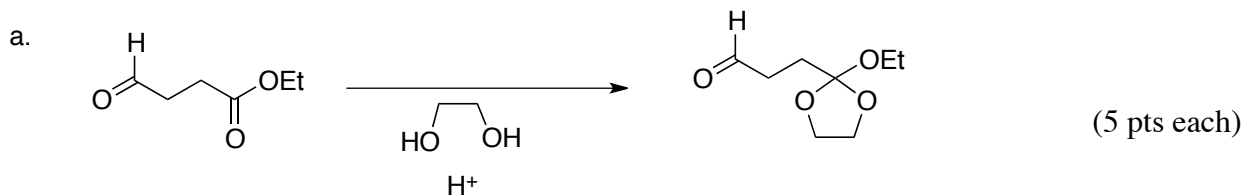
Chem 331
Exam 3
2011
Prof. Fox
50 minutes

The exam is open book,
Open notes. Models are permitted
Show your work in detail

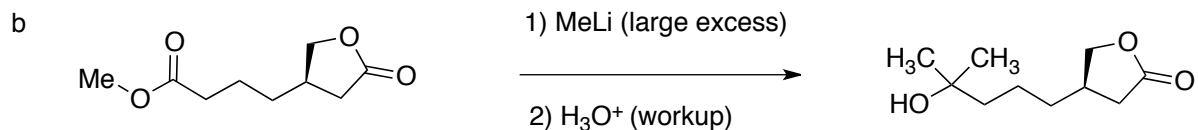
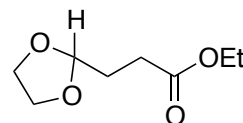
WRITE YOUR NAME ON EVERY PAGE

NAME _____

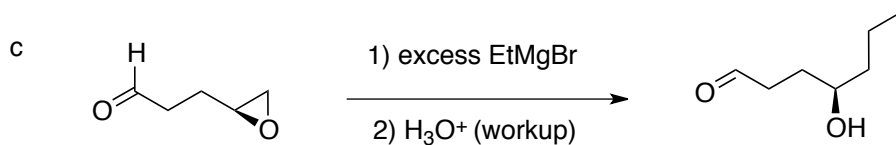
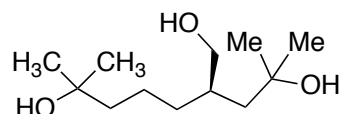
1. The reactions shown below would not proceed as shown. Explain why (be concise), and indicate which product would be formed instead.



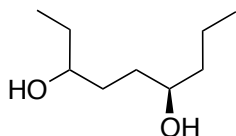
Aldehydes react with alcohols or diols to form acetals. Esters do not. The product would be:



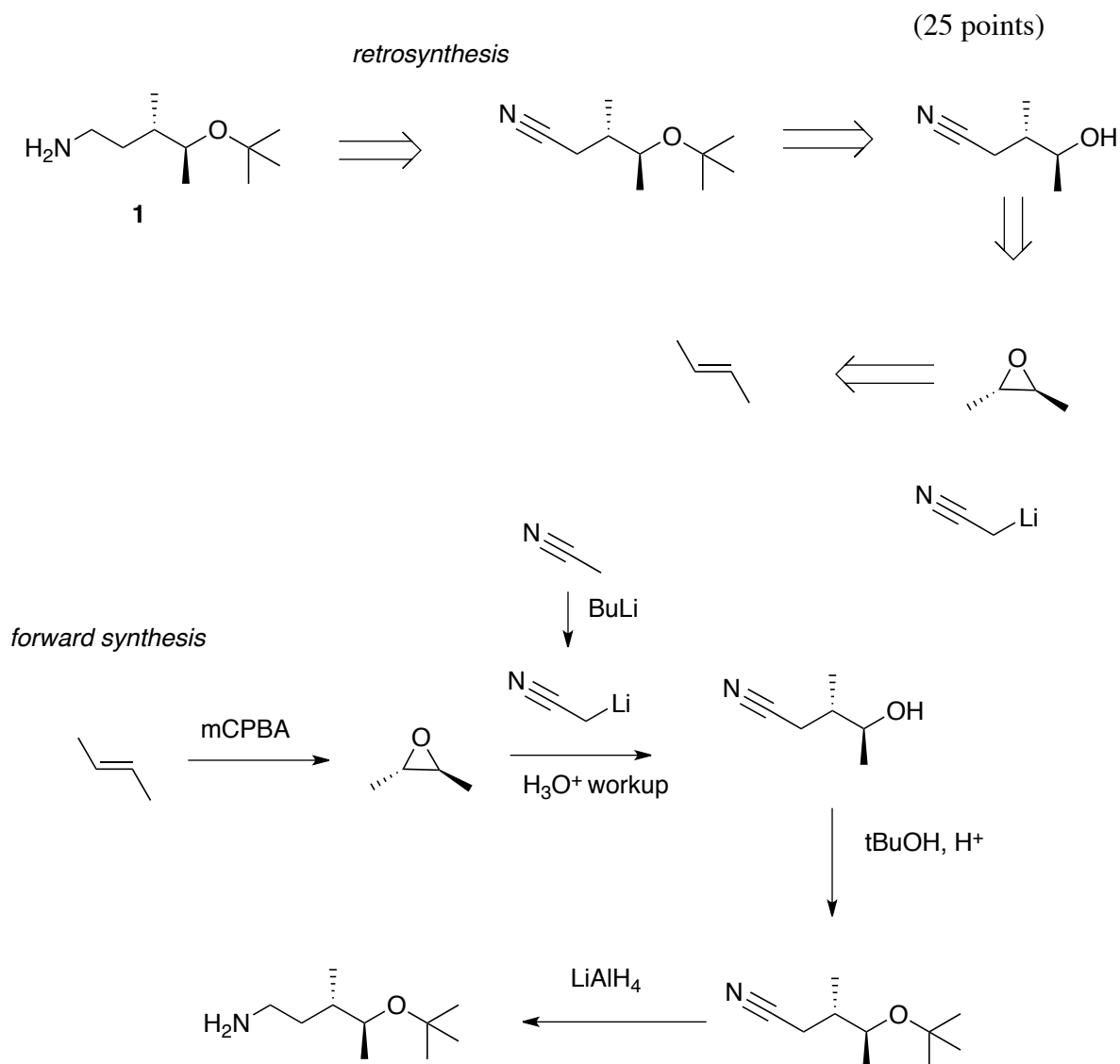
The lactone (a cyclic ester) would also react with MeLi. The product would be



both the aldehyde and epoxide would react with EtMgBr. The product would be:



2. Propose a synthesis for **1** starting with any materials that contain 4 carbons or less. You may also use *reagents* that contain more than 4 carbons (e.g. Ph_3P , LDA, MCPBA, DIBAL, DCC, pyridine, TsCl, Et_3N).

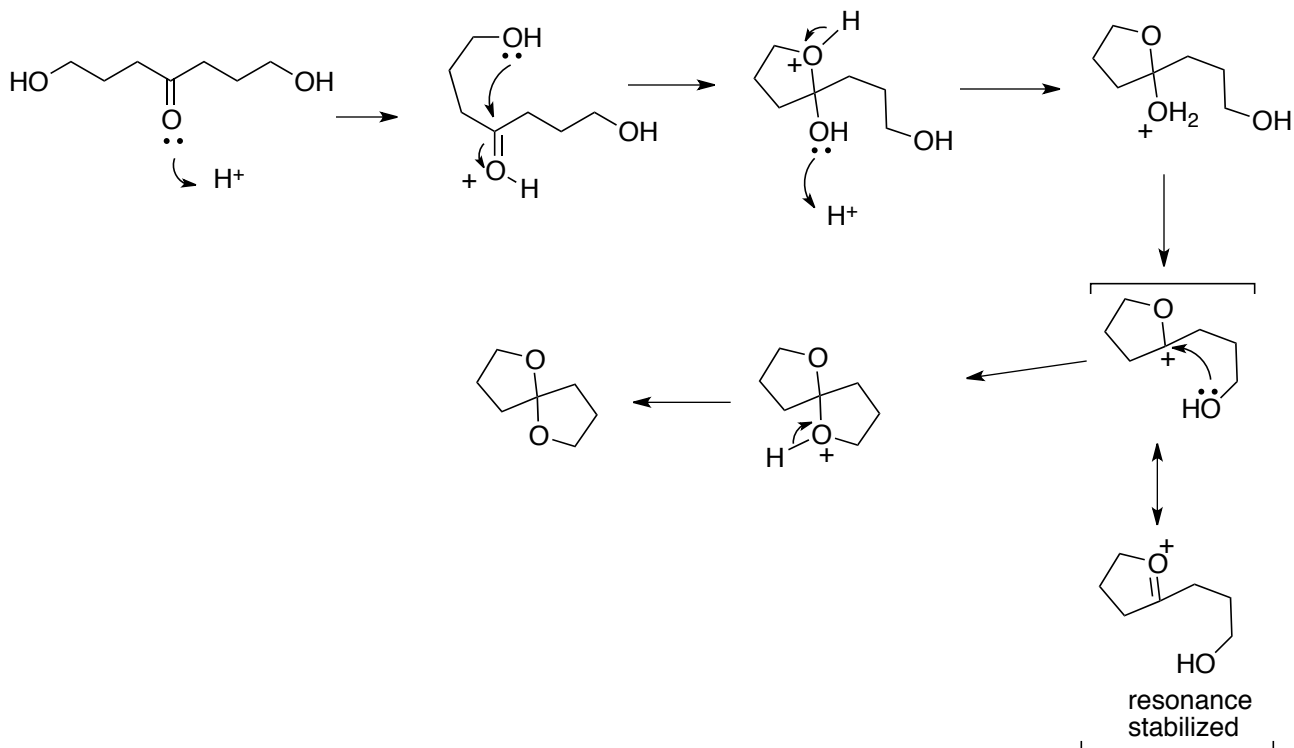
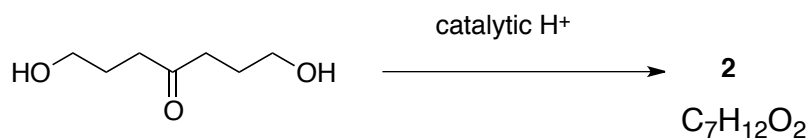


3. Propose the structure of **2**. Provide a mechanism for its formation. (20 pts) ^{13}C NMR

110.2, s
 69.6, t, 2 carbons
 29.8, t, 2 carbons
 20.8, t, 2 carbons

 ^1H NMR

3.90–3.80 (m, 4H)
 2.06–1.81 (m, 4H)
 1.90–1.80 (m, 4H)



4. Propose a detailed arrow pushing mechanism

(20 pts)

