

First Three Letters of Last Name:

TA Name:

Hour Exam #3

5.13 Fall 2006

Organic Chemistry II

November 15, 2006

# KEY

Name \_\_\_\_\_

Signature \_\_\_\_\_

ID# \_\_\_\_\_

1. Make sure your exam has 9 numbered pages plus a periodic table.
2. Write your initials on each page.
3. Look over the entire exam before you begin to familiarize yourself with its length. Do what you know first, then attempt the harder problems.
4. Show all of your work. Partial credit receives points!

Page	Possible Points	Total
1	8	
2	18	
3	21	
4	12	
5	10	
<b>Sum 1</b>	<b>69</b>	

Page	Possible Points	Total
6	10	
7	9	
8	12	
9 (XC)	5	
<b>Sum 2</b>	<b>36</b>	
<b>TOTAL</b>	<b>100</b>	





4. (21 pts) Provide the missing reagents for each reaction. Several steps may be needed for some transformations.

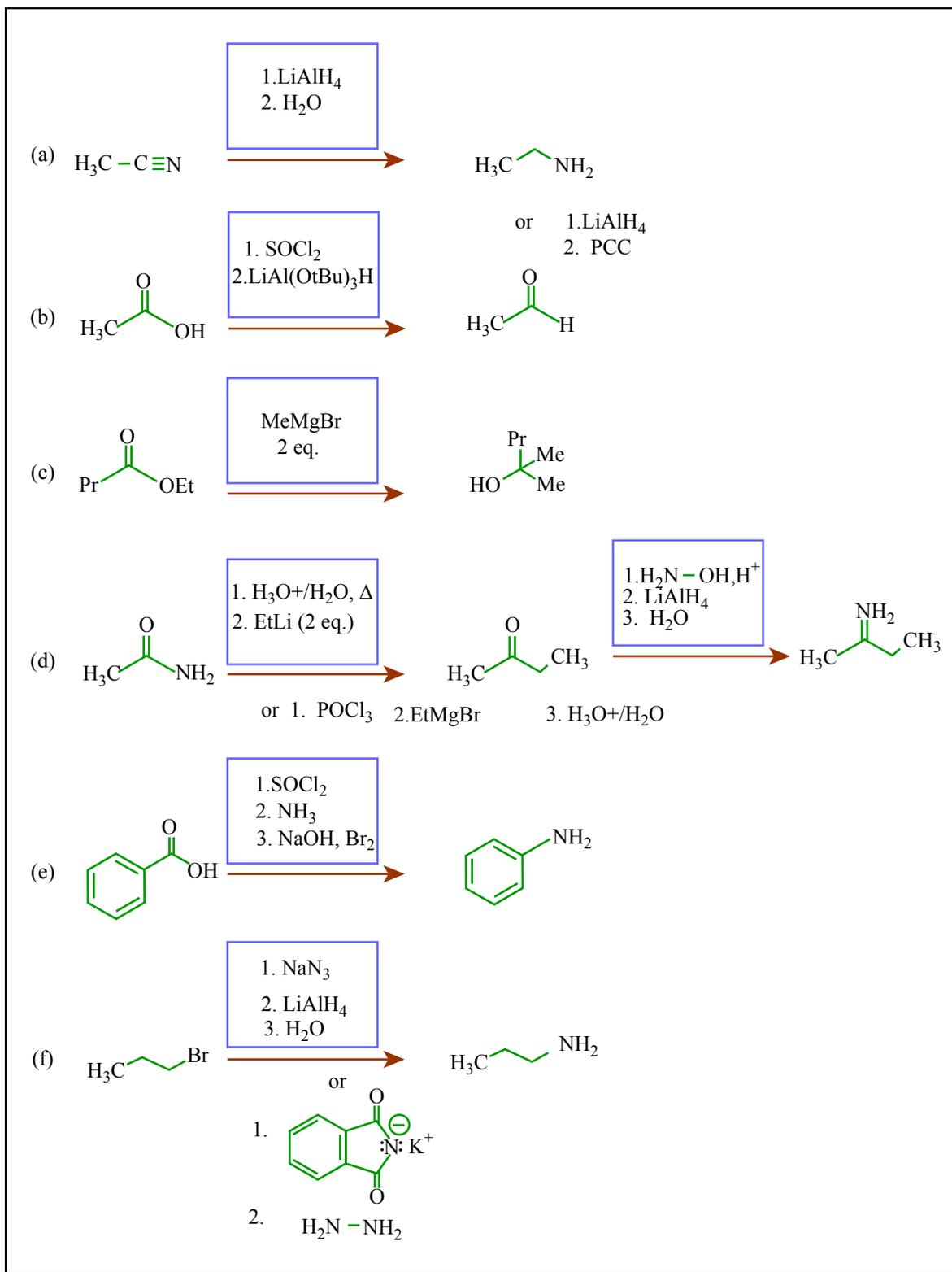


Figure by MIT OCW.

5. (1 2 pts) Consider the labeling experiment outlined below. What level of  $^{18}\text{O}$  incorporation do you expect in the recovered anhydride (high or low)? Your answer should include a mechanism of hydrolysis and a detailed explanation.

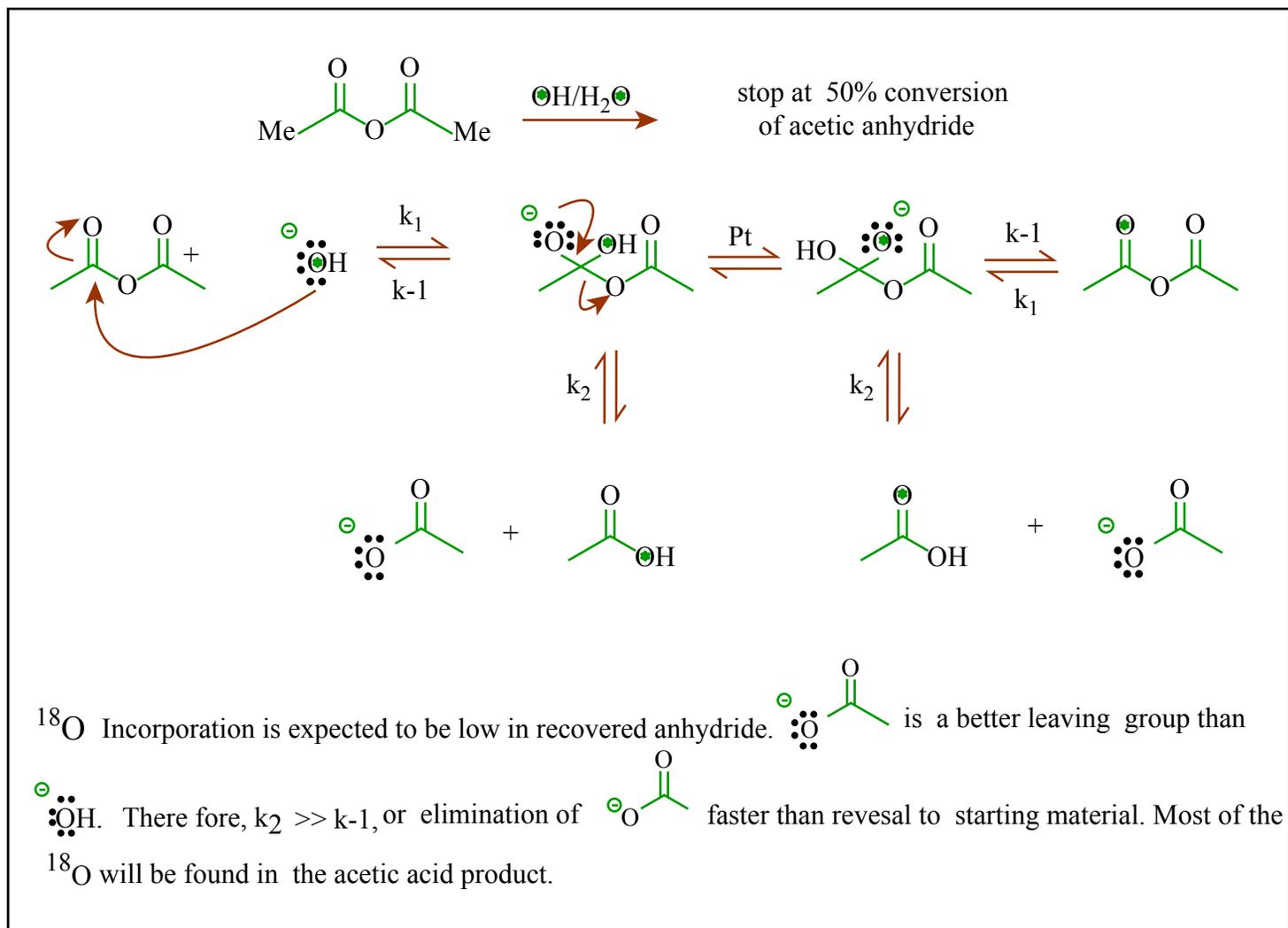


Figure by MIT OCW.

6. (10 pts) Provide a mechanism for the following transformation.

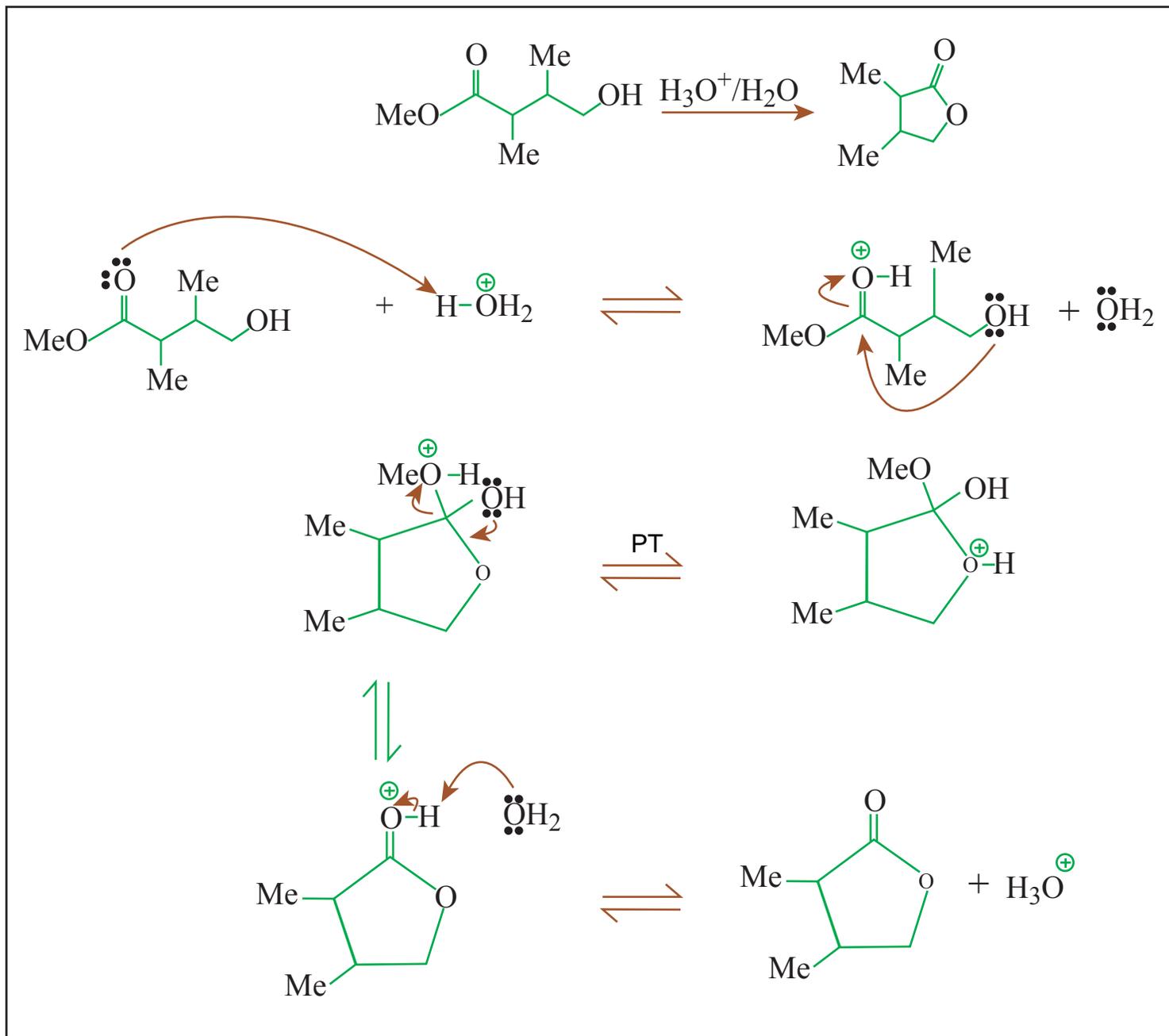


Figure by MIT OCW.

7. (10 pts) Under basic hydrolysis conditions, a nitrile goes through a primary amide intermediate before becoming a carboxylate. Show the mechanism for this reaction and explain why it is NOT a facile method for converting nitriles into carboxylates.

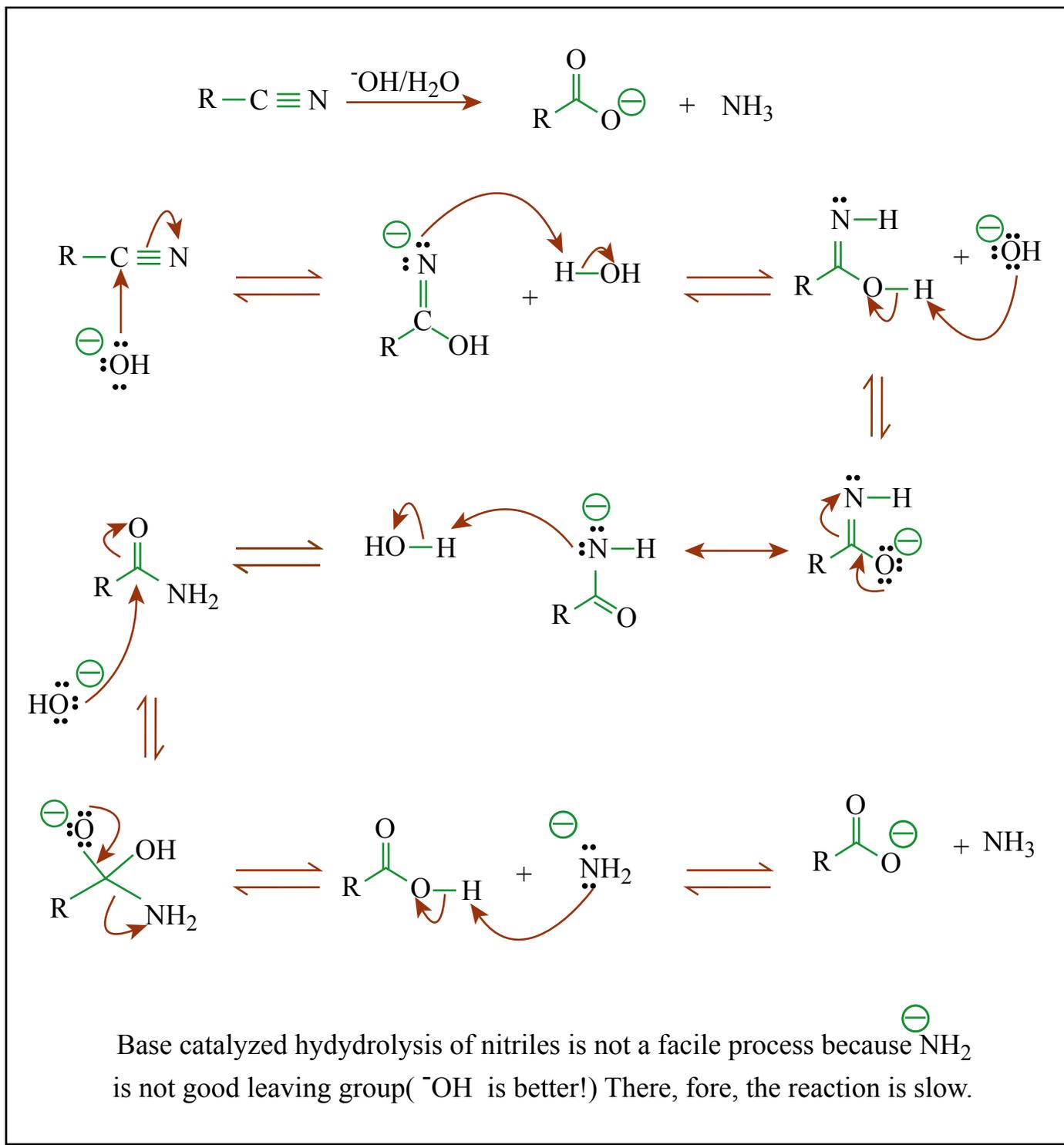


Figure by MIT OCW.

8. (9 pts) Provide a synthesis for the following compound.

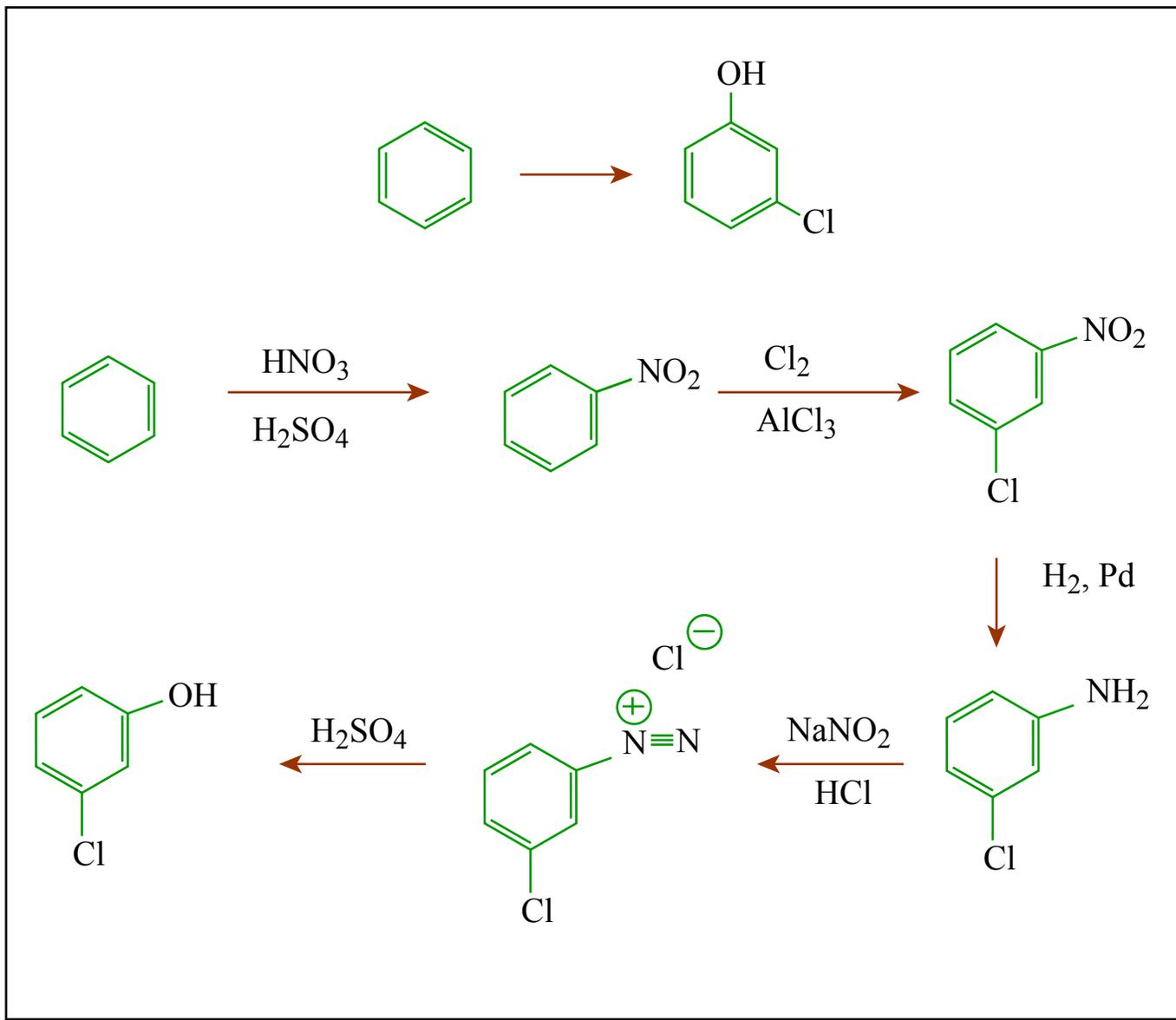


Figure by MIT OCW.

9. (12 pts) Provide a selective synthesis for **ONE** of the following compounds. Circle the molecule that you want graded. All of the carbon atoms of the product should come from either ethanol or compounds that contain just one carbon atom.

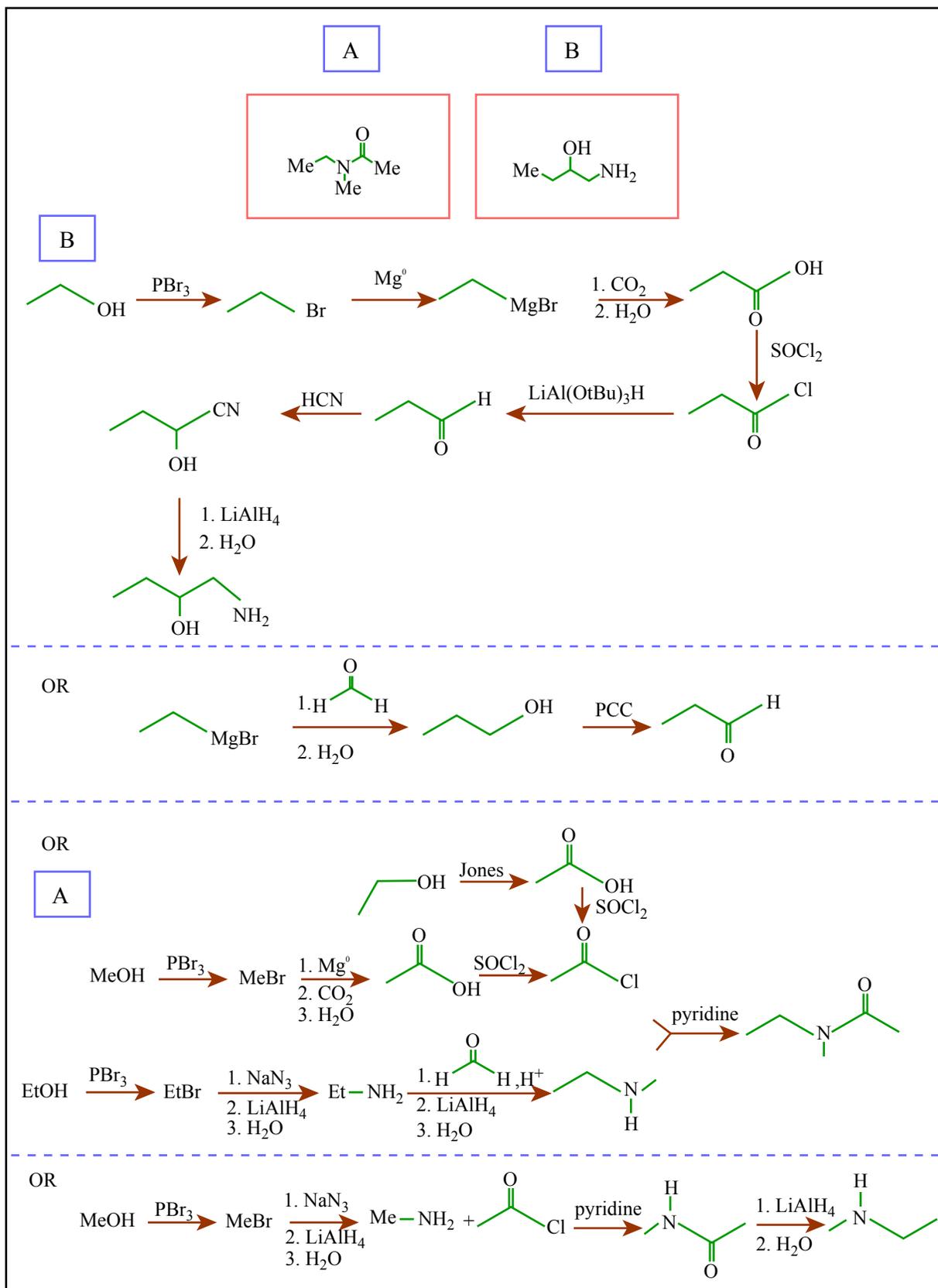


Figure by MIT OCW.

# EXTRA CREDIT

(5 pts) Synthesize methamphetamine (crystal meth) from benzene and any other reagents. All the carbon atoms in the product should come from reagents that only contain one carbon atom.

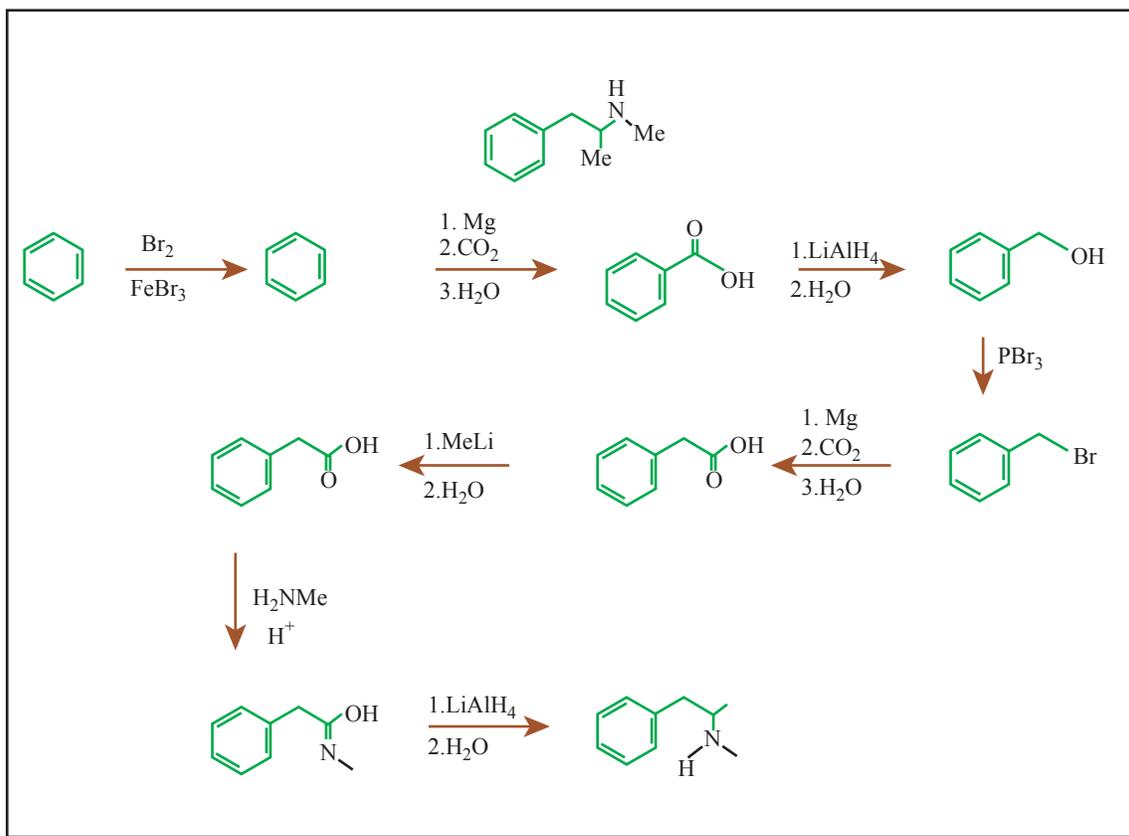


Figure by MIT OCW.