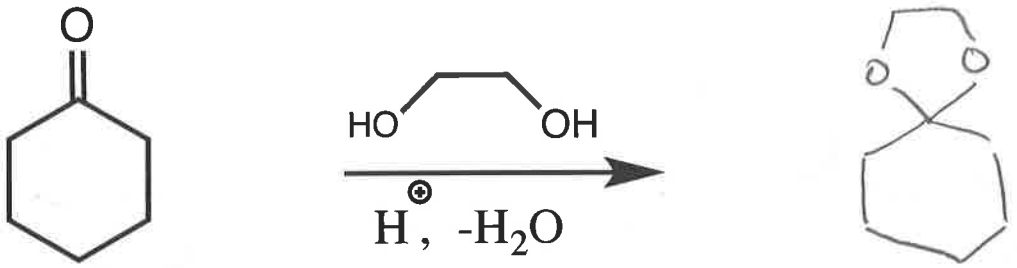
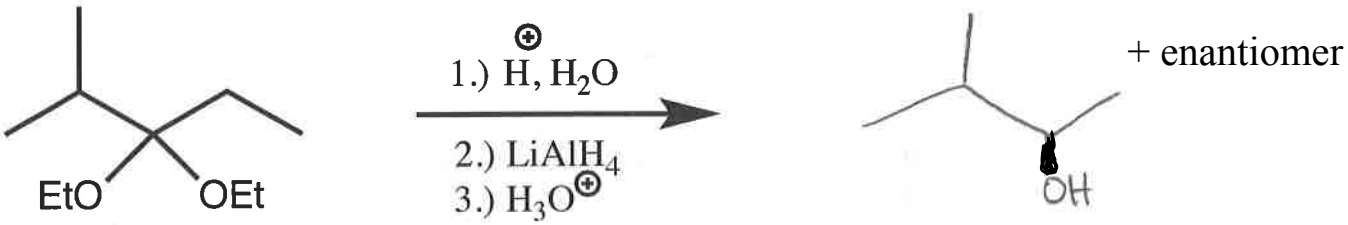
Carbonyls #3: Predicting the Products of Reactions of Carbonyls (No Mechanisms ☺)

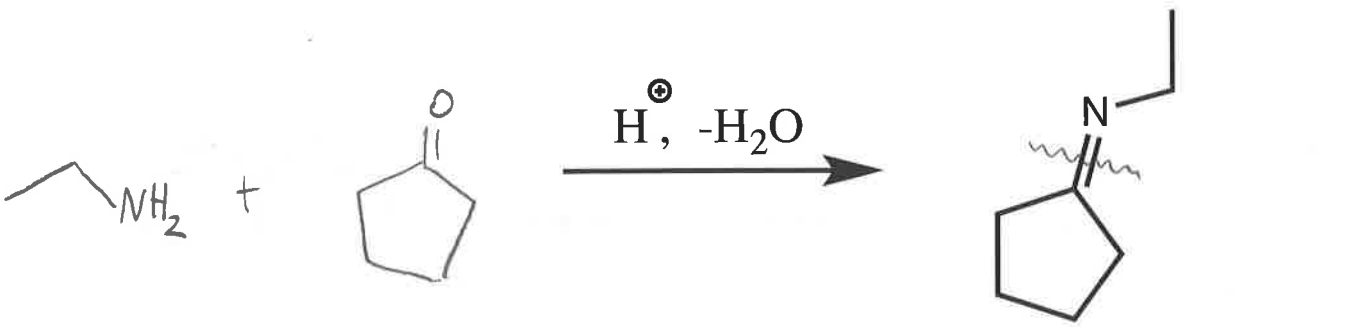
So I owe you all an apology. I know that last worksheet was crappy, but please, please, please do me and you a favor and do it over and over until you want to throw up. Don't actually puke, but do the worksheet and the mechanisms a lot. It'll make you so much better at any problem regarding this material—I promise.

Okay, but moving on. There are no mechanisms in this worksheet (YAS), just Complete the Reaction problems. I want you guys to get familiar with seeing the reagents and practice predicting the products with these reactions, so let's jump right into it ☺.

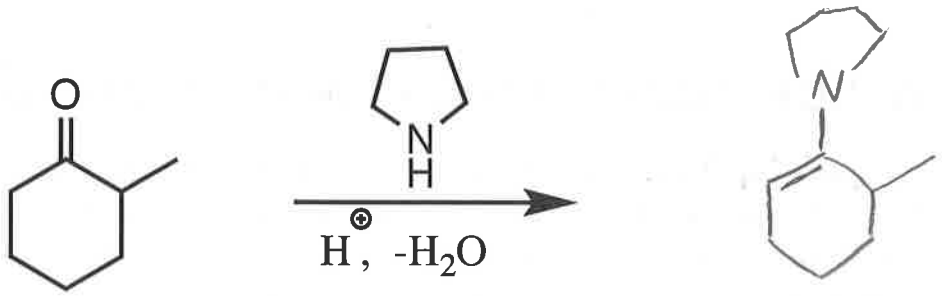
1.) Predict the major organic product:

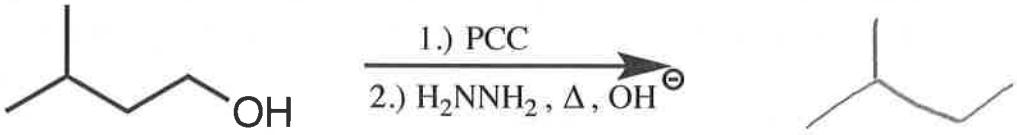


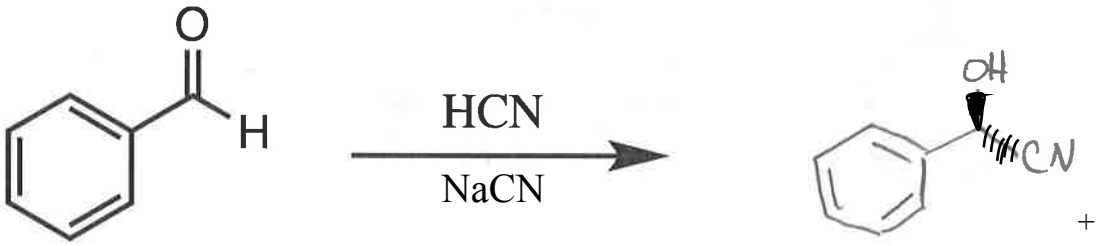




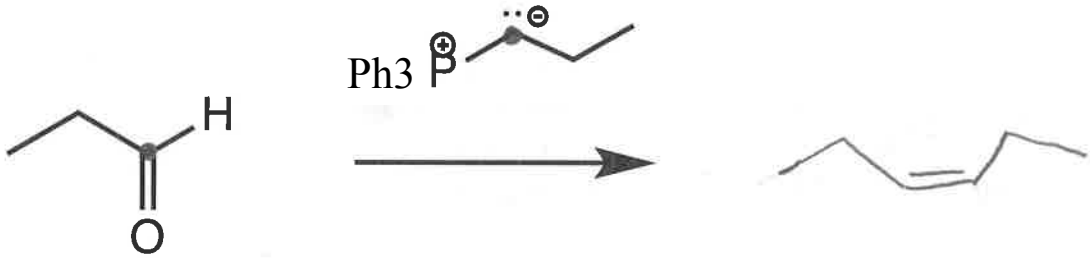
Give both the amine and carbonyl

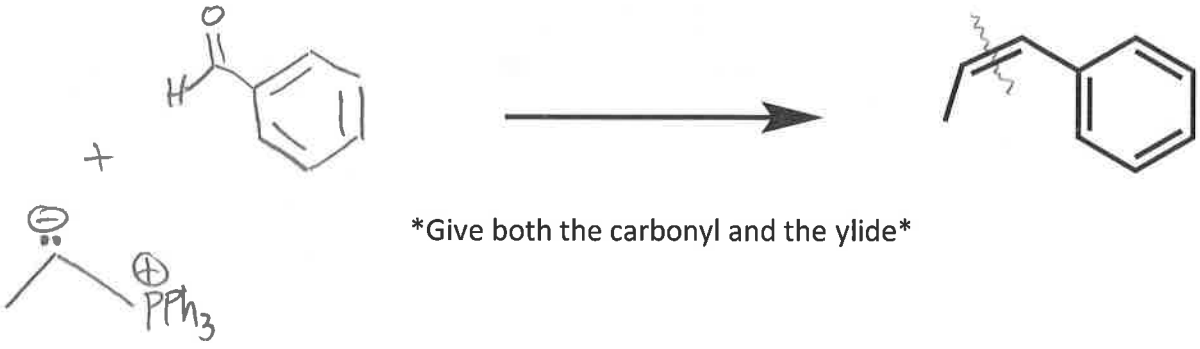




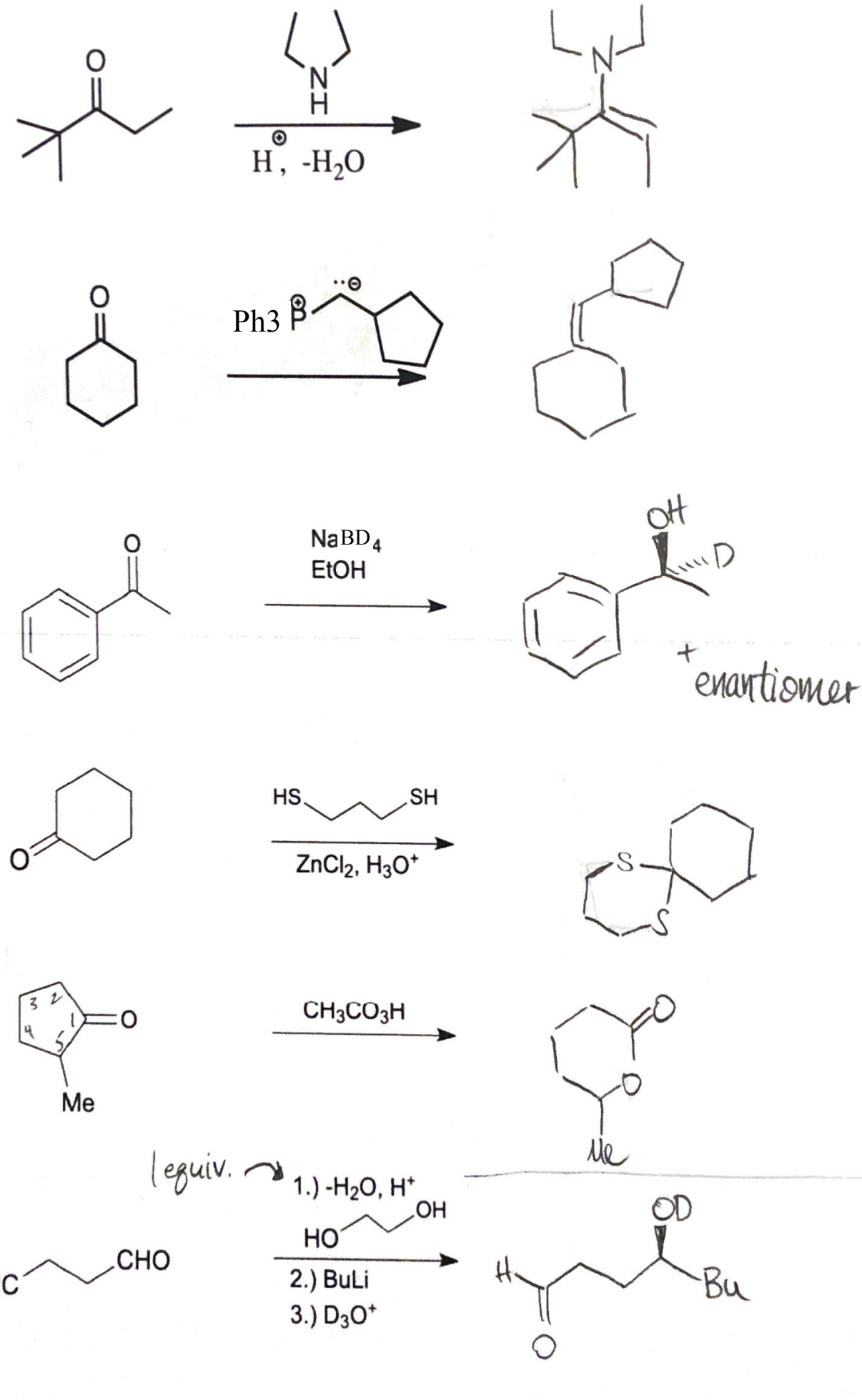


+ enantiomer



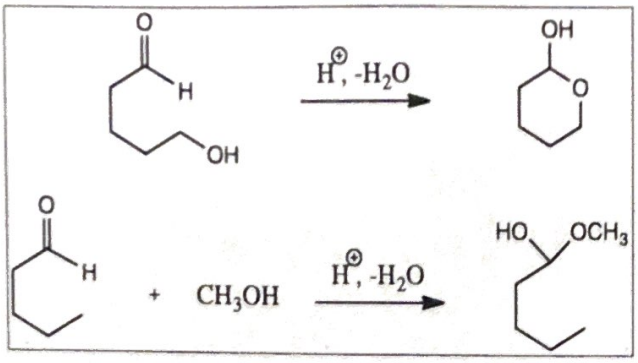


Give both the carbonyl and the ylide


H, -H2O
Ph3
NaBD4
EtOH
+ enantiomer
HS
SH
ZnCl2, H3O+
3° > 2°
Me
CH3CO3H
1 equiv.
1.) -H2O, H+
HO
OH
2.) BuLi
3.) D3O+
OHC
CHO
Bu

2.) Okay, good job with those reactions. I know there are a lot of them, but practice will make identifying all the new ones easier come test time. Okay, now time for a concept question:

When the two hemiacetal formation (halfway to an acetal) reactions (shown below) are performed, the intramolecular reaction is faster and more favorable than the intermolecular one: **Why is that the case?**



Rxn (1.) is intramolecular: 1 reactant → 1 product

Rxn (2.) is intermolecular: 2 reactants → 1 product

$$\Delta S_{Rxn\ 1} > \Delta S_{Rxn\ 2}$$

3.) Alright, gang. To wrap up this worksheet, I have a mechanism question for you. Now, while we haven't explicitly talked about this, I know you have the organic skillz to figure this one out.

Draw the arrow pushing mechanism detailing the transformation displayed below:
***I know this looks whack, but two hints: protonate the carbonyl & don't forget about EAS**