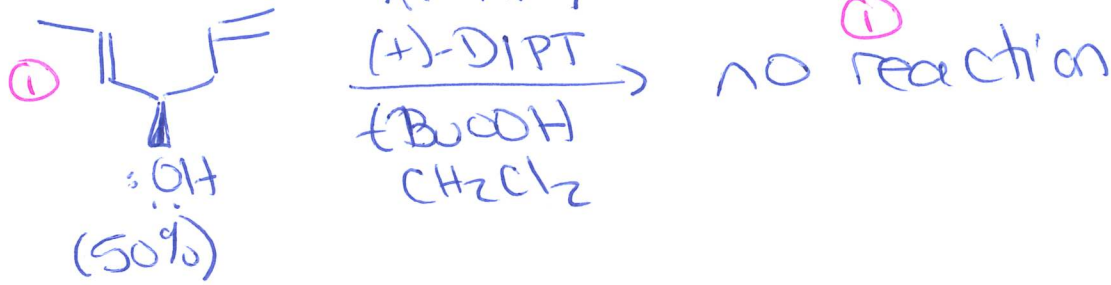
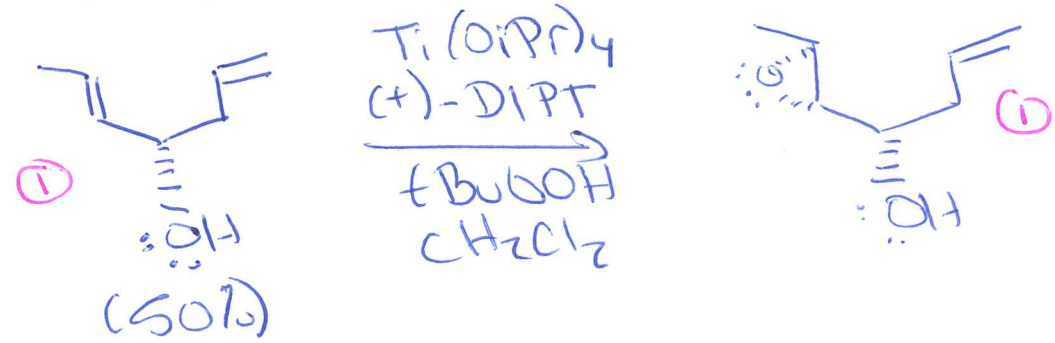
1. (a) The reactive alkene is part of an allylic alcohol (=\-ÖH). The other alkene is not close enough to an OH group.

(b) (+)-DIPT

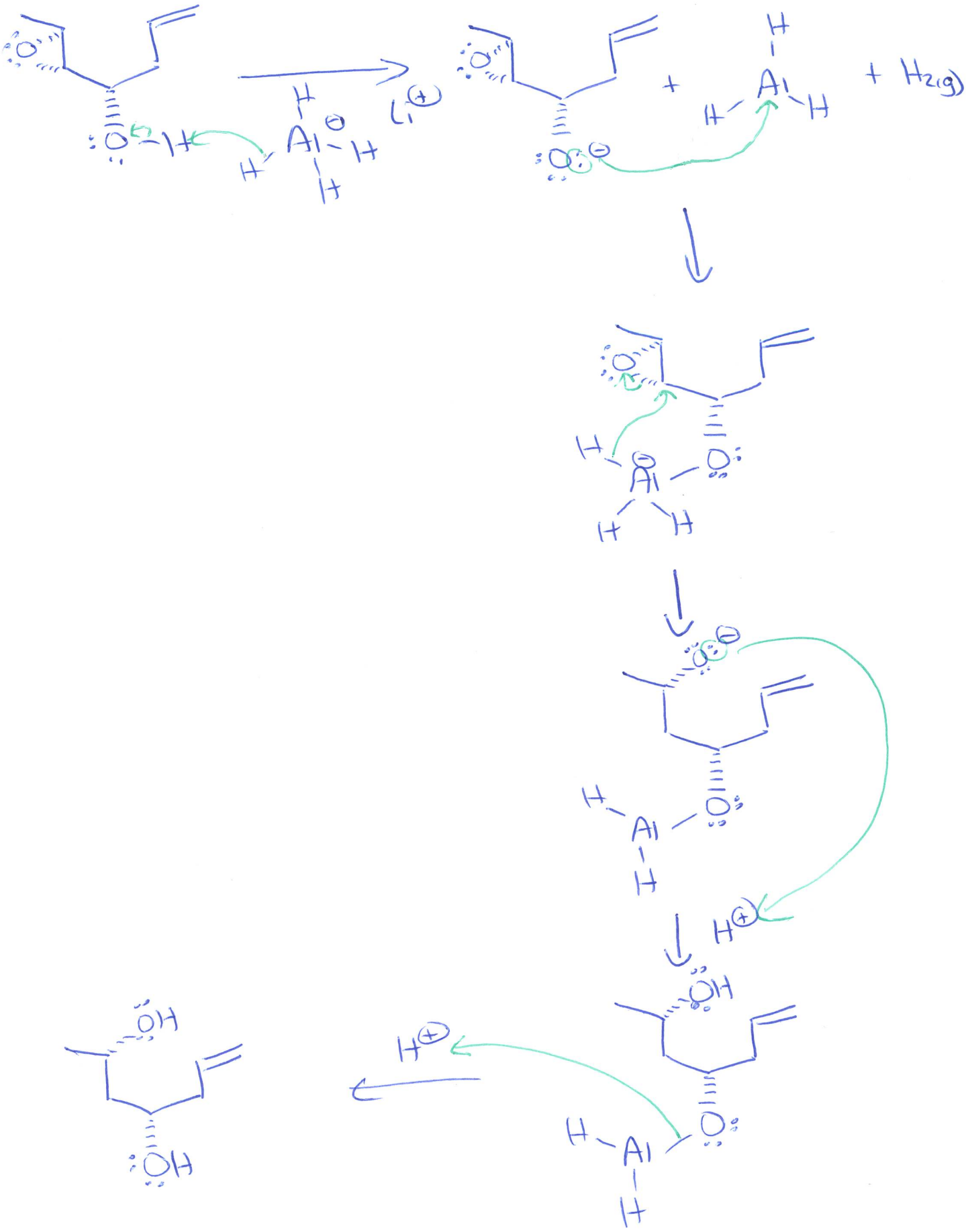
(c) In a kinetic resolution, a racemic mixture reacts with a chiral reagent such that one enantiomer reacts much faster than the other. Since the racemic mixture contains 50% of each enantiomer, the maximum possible yield would be 50%:



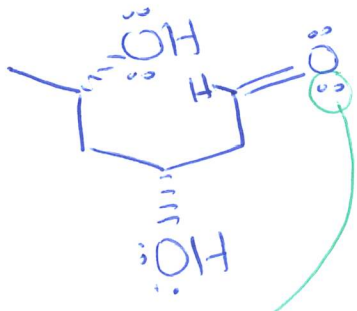
but



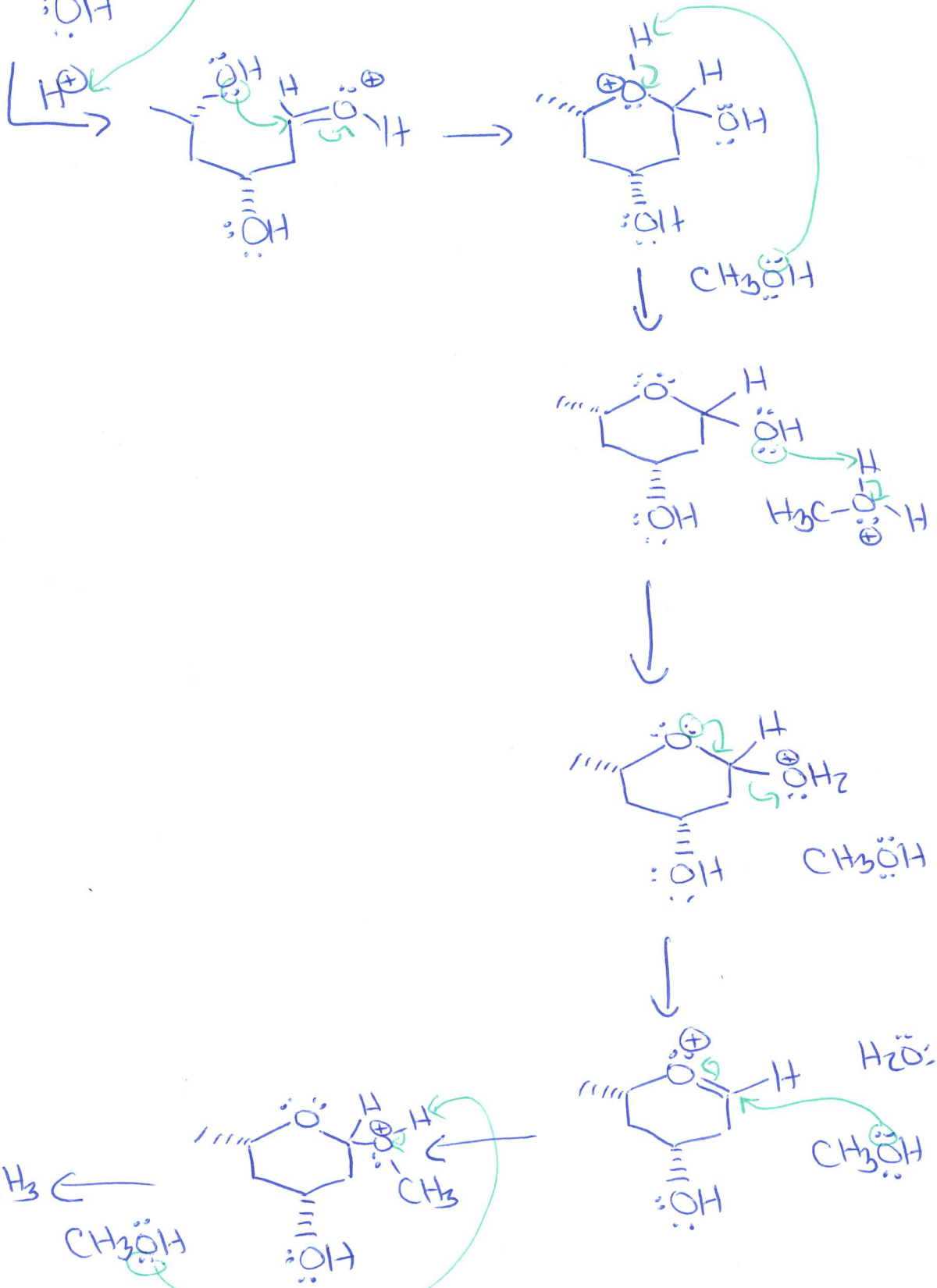
2.



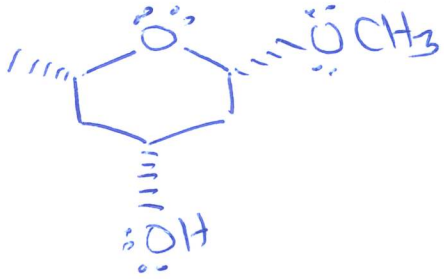
3. (a)



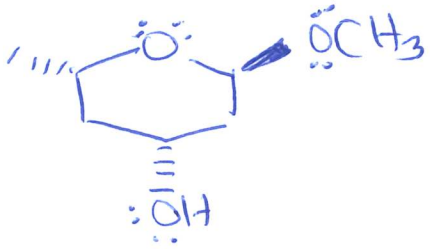
(b)



(c)

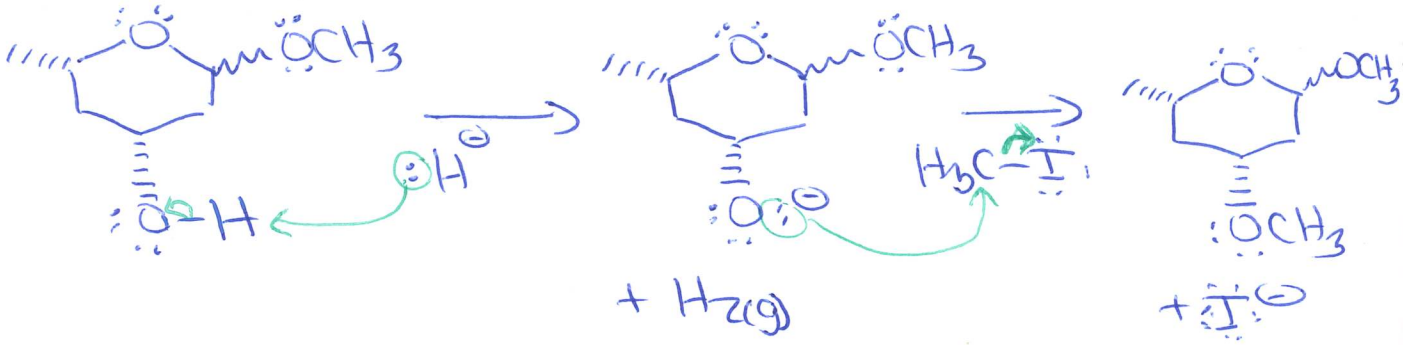


and

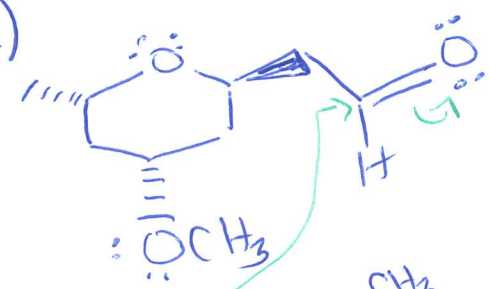


Both diastereomers must be capable of reacting w/ TMSOTf such that OCH_3 leaves and a planar oxonium ion is formed (the same one from either diastereomer).

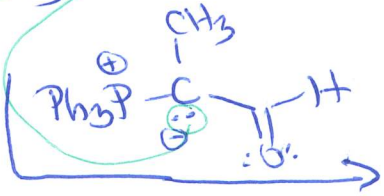
(d)

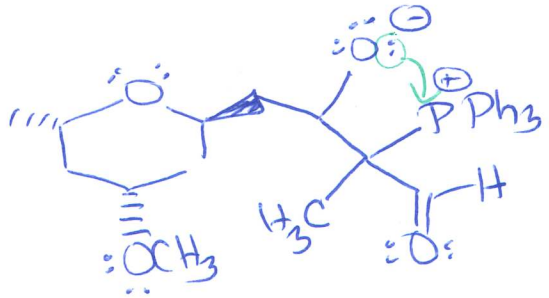


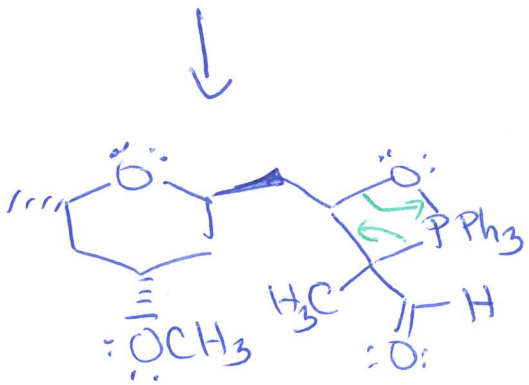
4. (a)

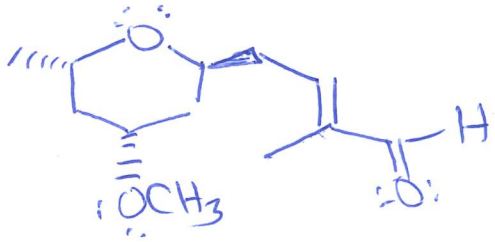


(b)

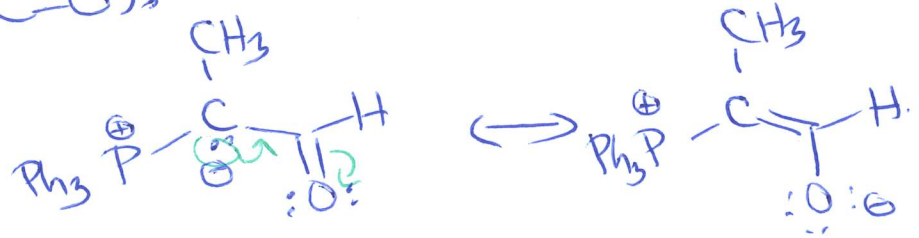




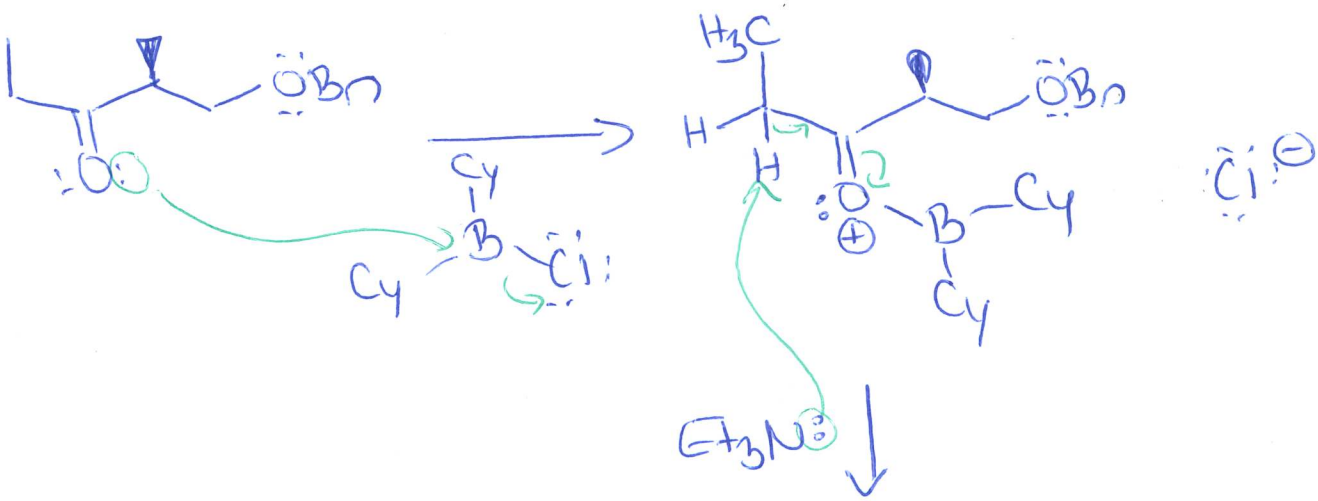




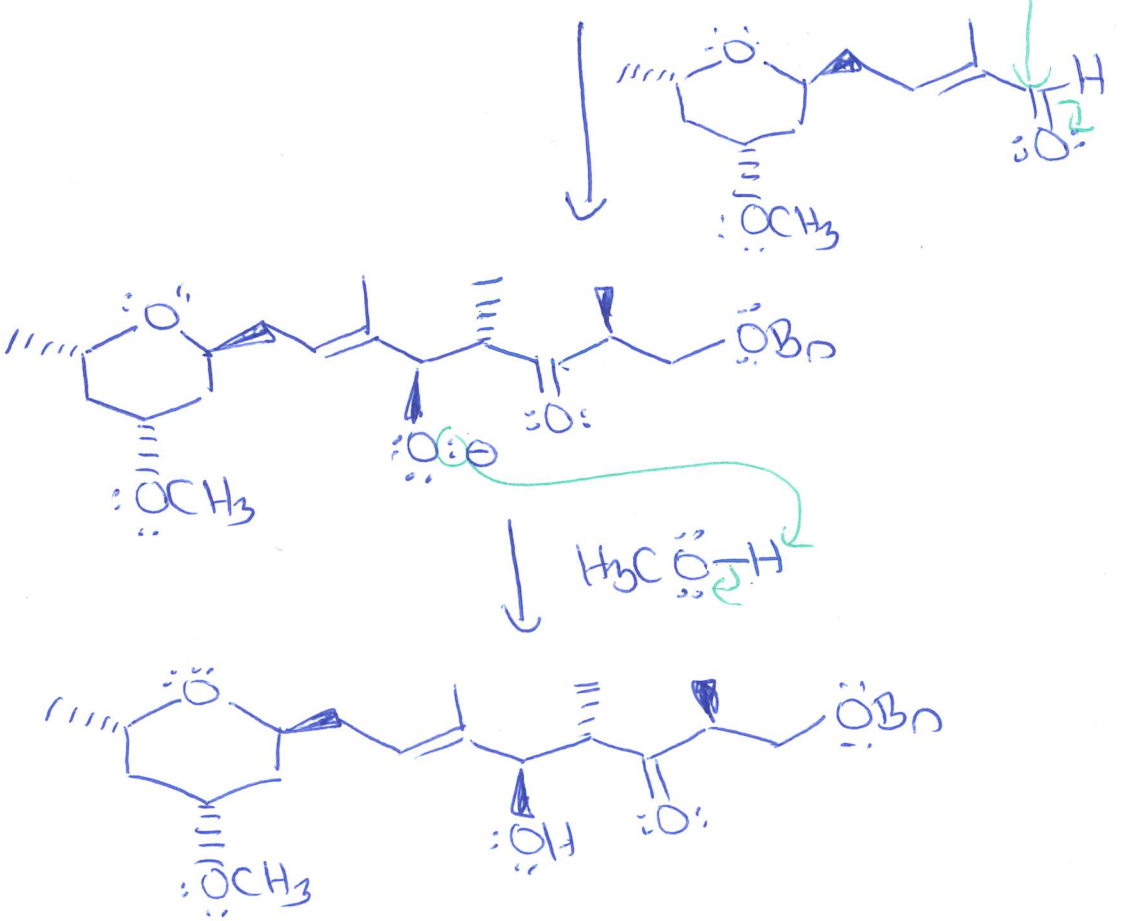
(c) The E configuration is because the ylide is resonance-stabilized (conjugated to C=O):



5. (a)

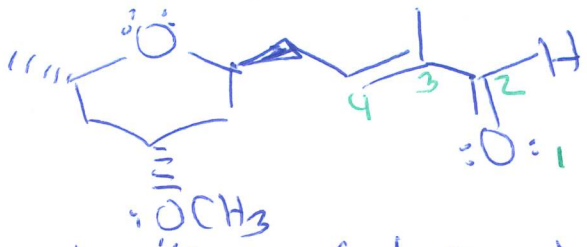


(b)



(c) Boron is much less electronegative than oxygen, so the enolate has a significant partial negative charge on both C and O. As such, it is a relatively hard (1) nucleophile.

Of the two potential electrophilic sites:



site 2 is harder (1) (closer to the oxygen atom so more positive charge) and since hard nucleophiles tend to attack (1) hard electrophilic sites, we expect a 1,2-addition (attack at site 2).

The boron atom also coordinates to the oxygen atom of the carbonyl group, holding the nucleophile and electrophile in the correct configuration for 1,2-addition.

6.

