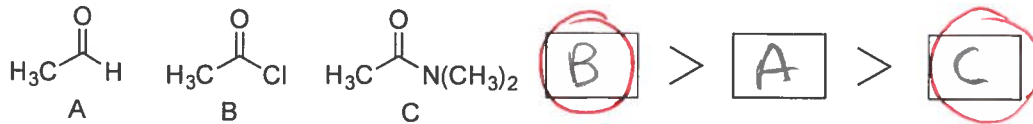


1 point each

1 (20 points + 1 point bonus). Final Exam, Chem 51C, Jarvo, Spring 18

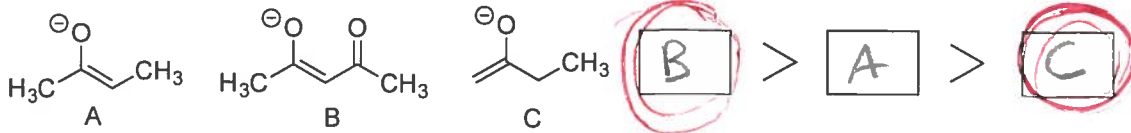
Initials: A

a. Rank fastest to slowest reaction with PhMgCl



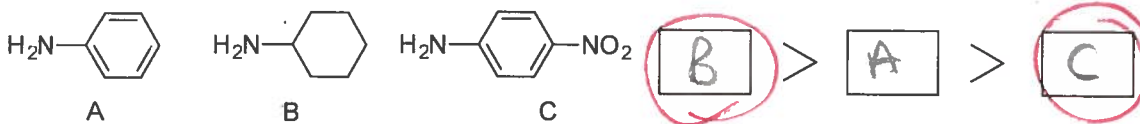
2

b. Rank the following enolates from most to least stable:



2

c. Most to least basic



2

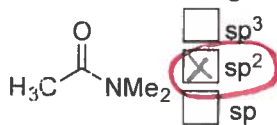
d. Highest to lowest oxidation state:



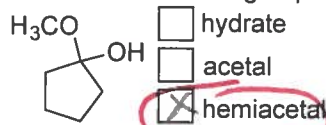
2

e. Check the appropriate box or boxes.

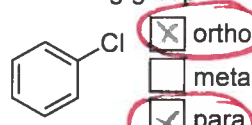
i. Hybridization of nitrogen:



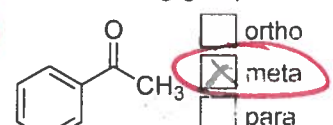
ii. Name of functional group



iii. Directing group

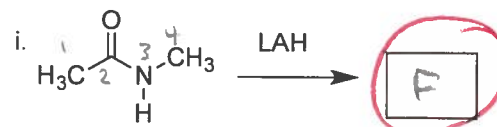
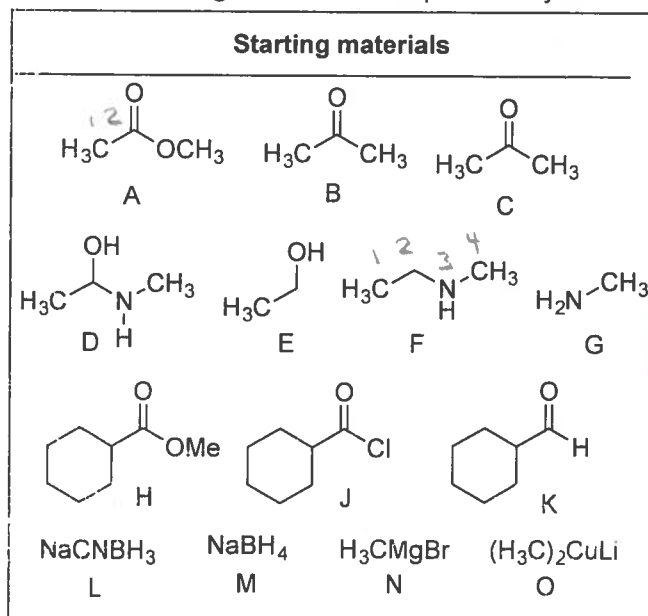


iii. Directing group



5

f. Fill in the starting materials to complete the syntheses



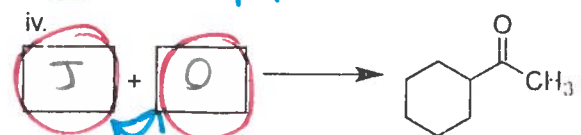
1



1



3



2

BONUS: What happens when you mix LiAlH<sub>4</sub> and H<sub>2</sub>O?

**a fire!** or H<sub>2</sub> + heat  
or explosion

1

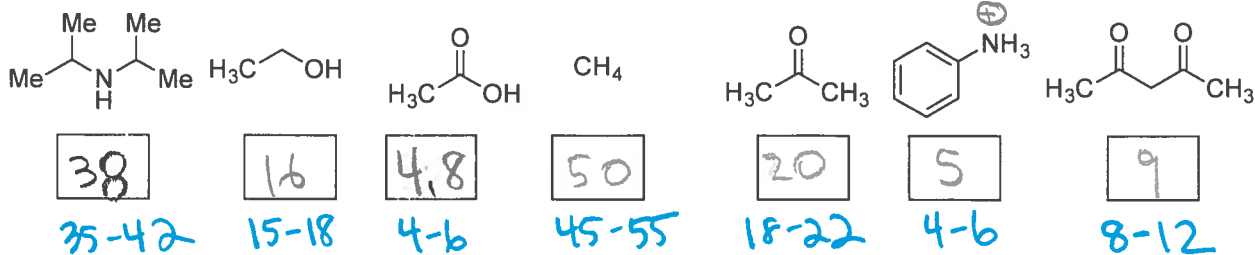
1201

1 point each box

2 (18 points + 1 point bonus)

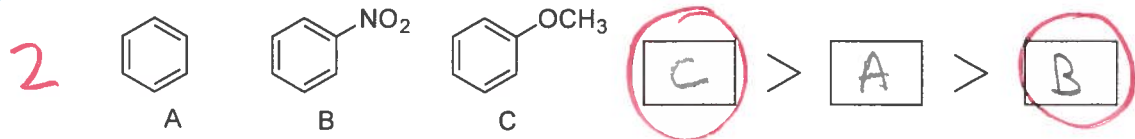
Initials: A

a. Provide pKa's for any 6 of the following compounds (if you do them all, we will count your best 6).



6 max  
ok range

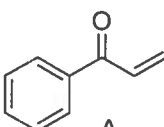
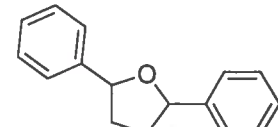
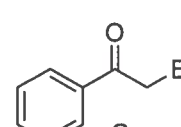
b. Rank fastest to slowest electrophilic aromatic substitution

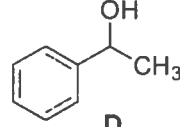
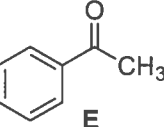
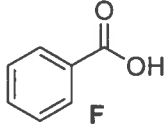


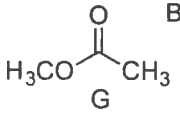
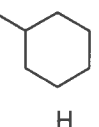
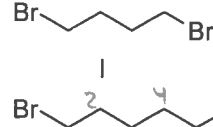
2

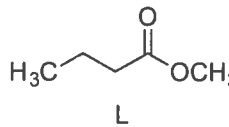
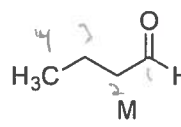
c. Fill in the starting materials to complete the syntheses

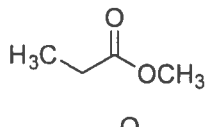
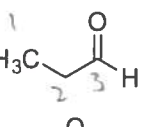
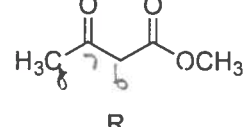
**Starting materials**

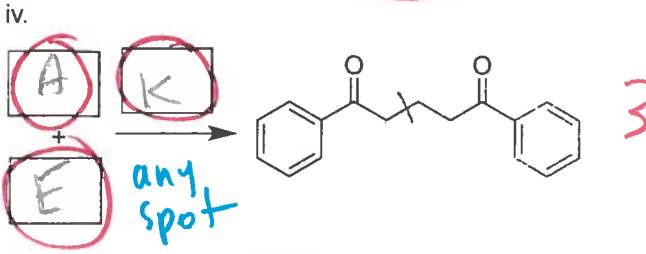
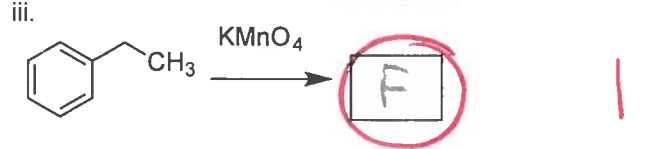
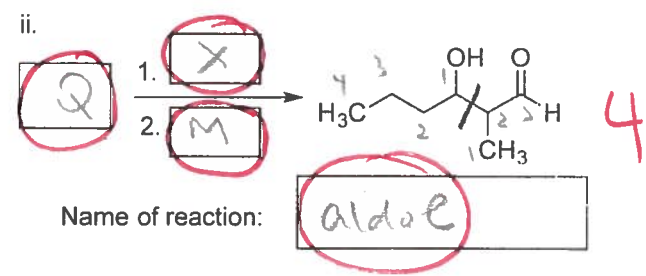
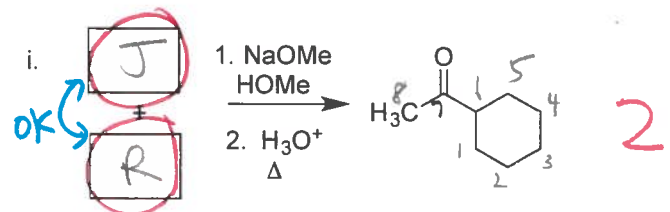
  

X: LDA, THF, -78 °C  
 K: NaOEt, HOEt  
 N: 1. O<sub>3</sub>, 2. DMS



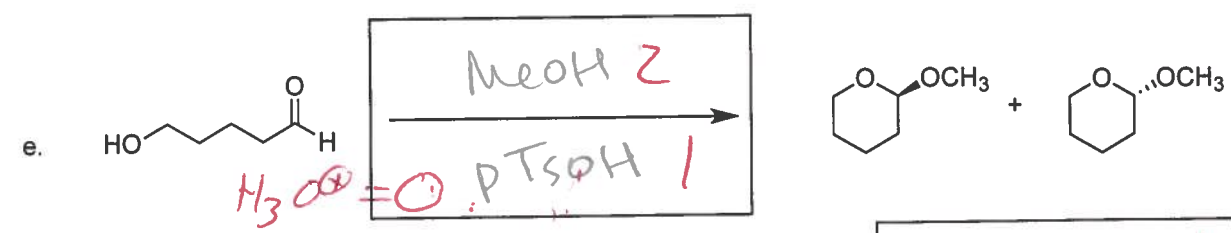
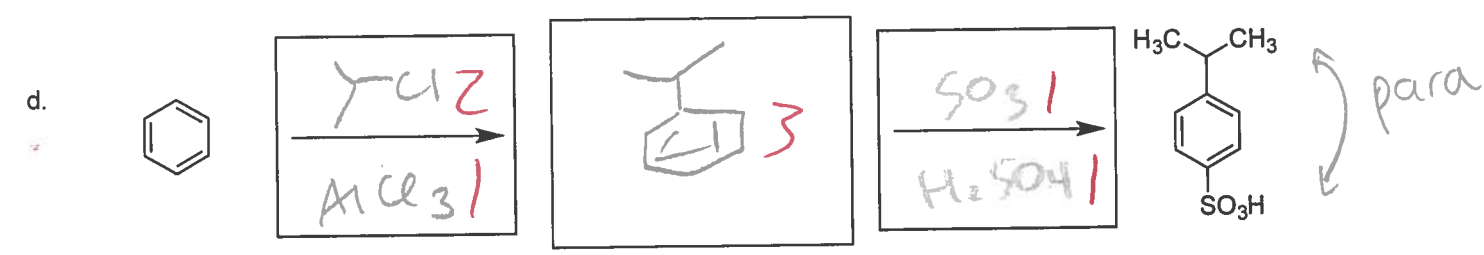
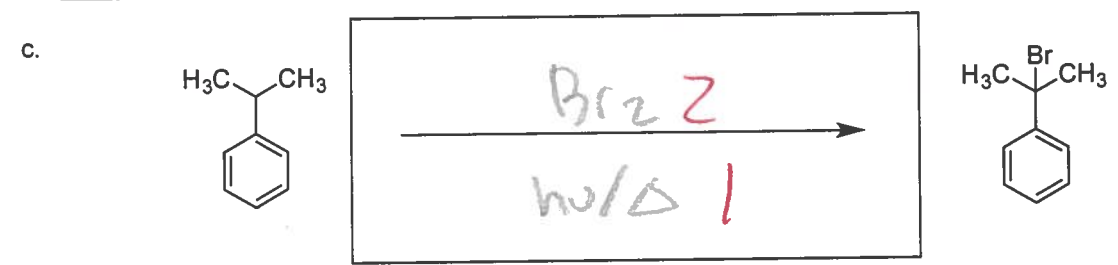
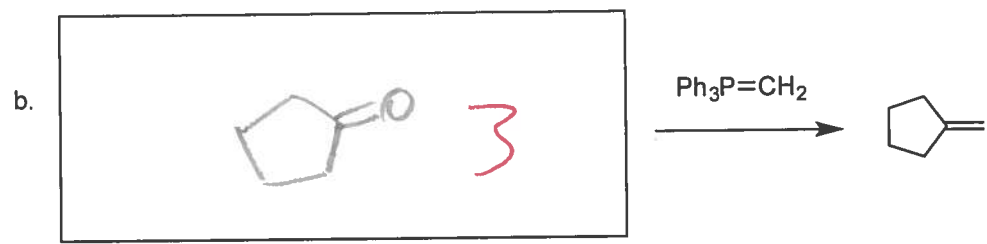
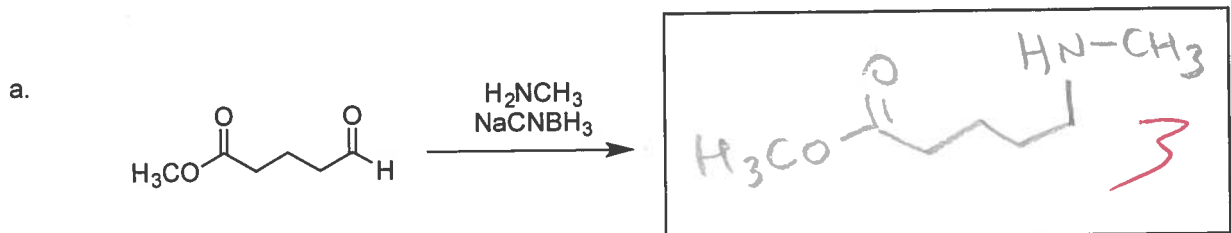
BONUS: What was your favorite song played at the beginning of lecture?

see song list

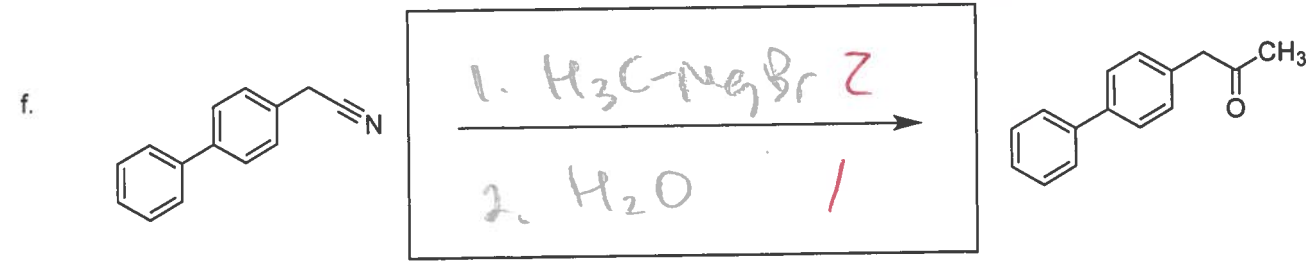
18+1

3. Fill in the boxes with the appropriate starting material, reagent or major product (24 points).  
Show stereochemistry where appropriate

Initials: C

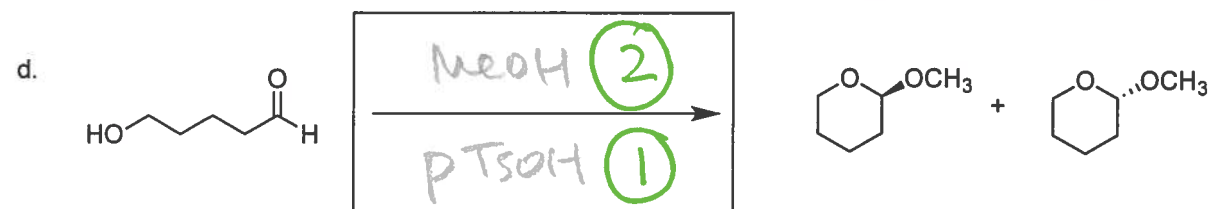
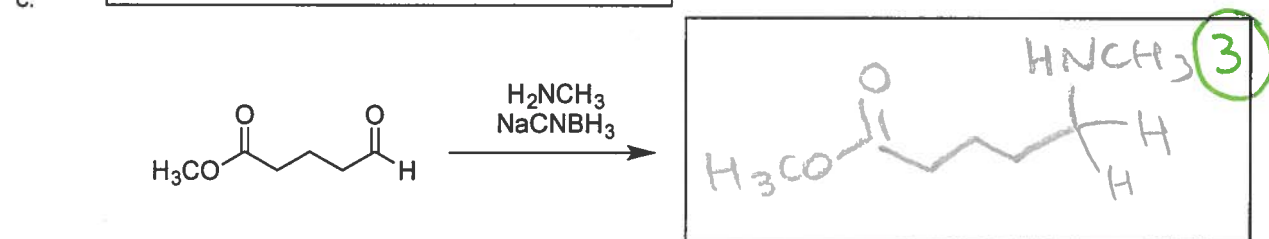
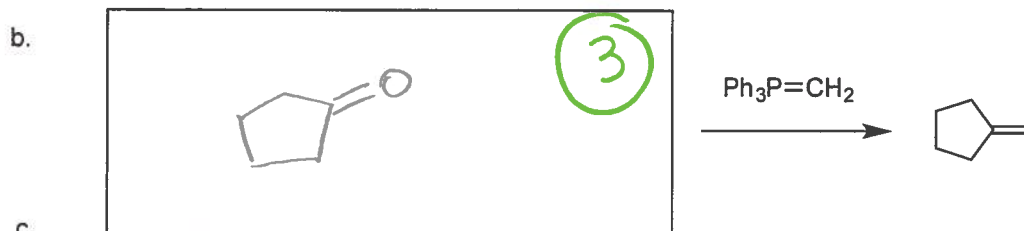
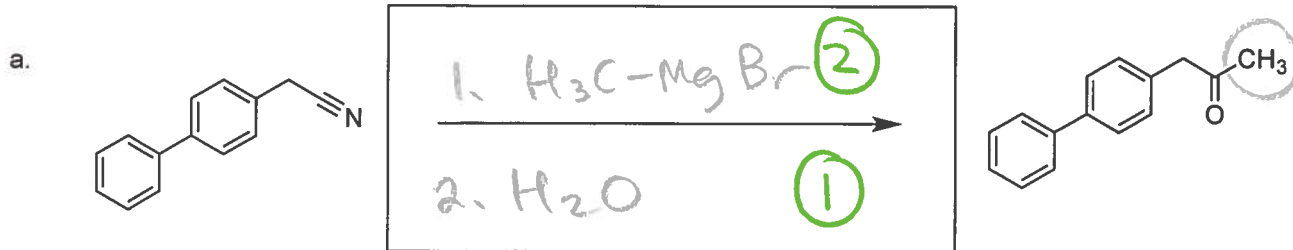


Is this reaction an oxidation, reduction, or neither? neither



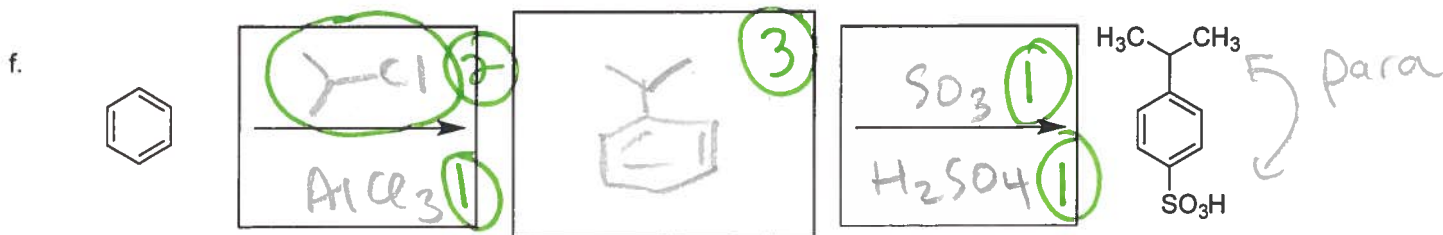
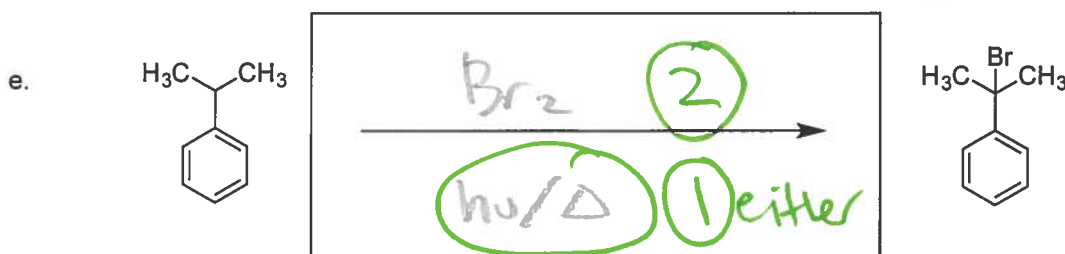
4. Fill in the boxes with the appropriate starting material, reagent or major product (24 points).  
Show stereochemistry where appropriate

Initials: D



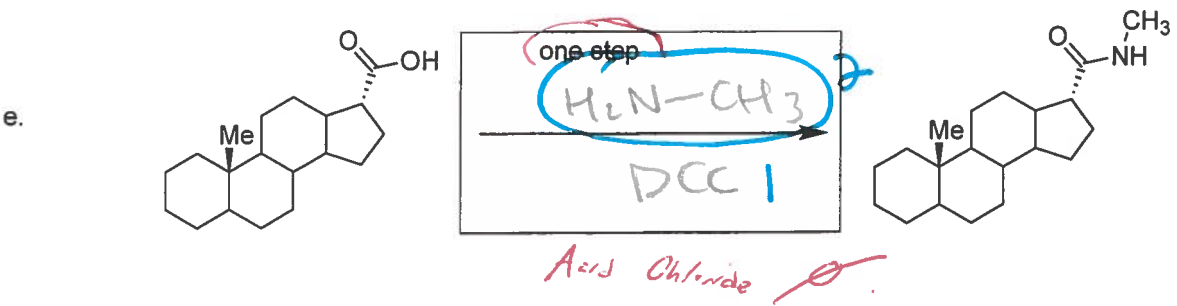
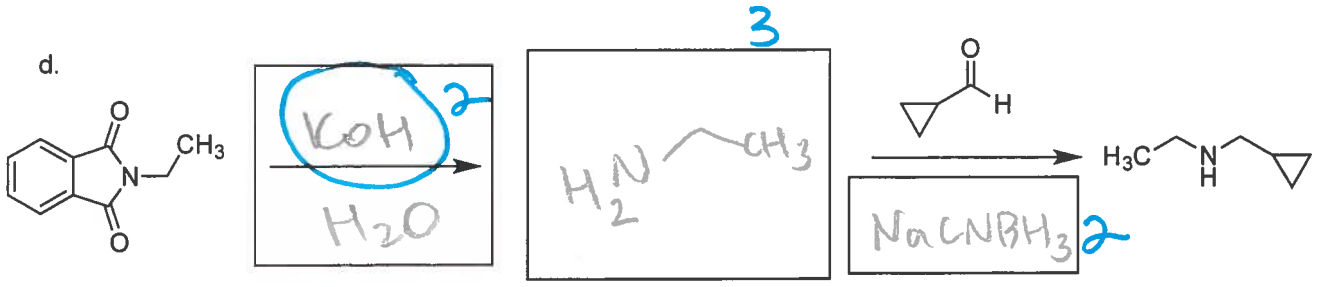
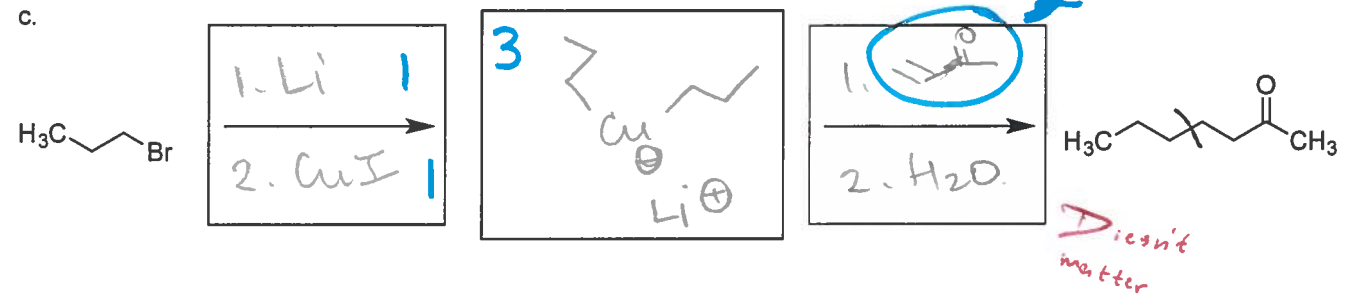
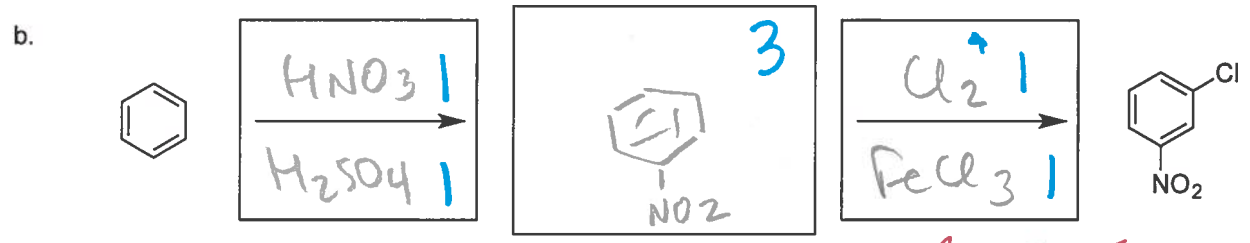
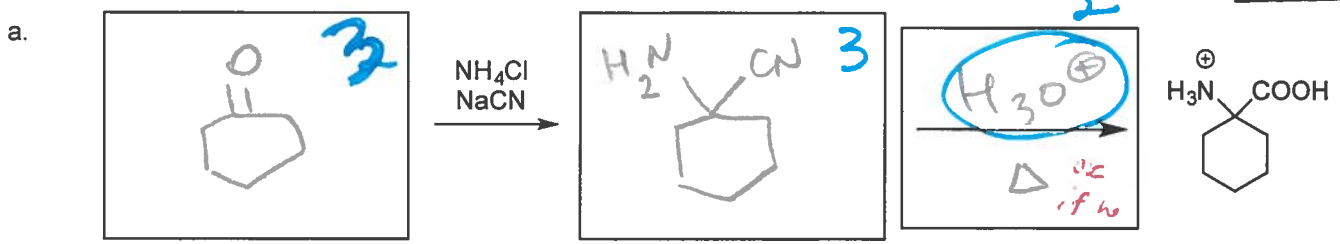
Is this reaction an oxidation, reduction, or neither?

neither (1)



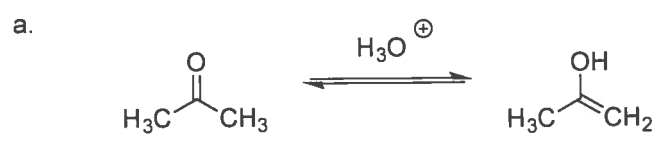
4. Fill in the boxes with the appropriate starting material, reagent or major product (85 points).  
 Show stereochemistry where appropriate

Initials: C



Initials: A

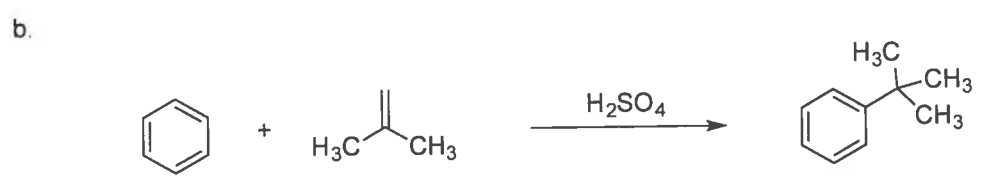
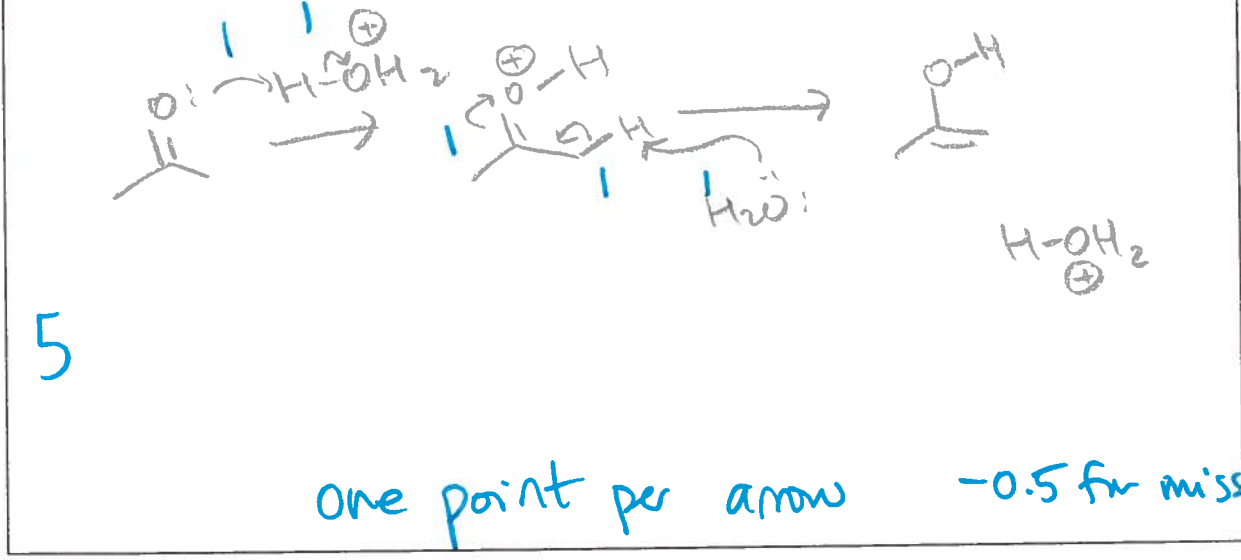
5. (12 points) Provide an arrow-pushing mechanism.



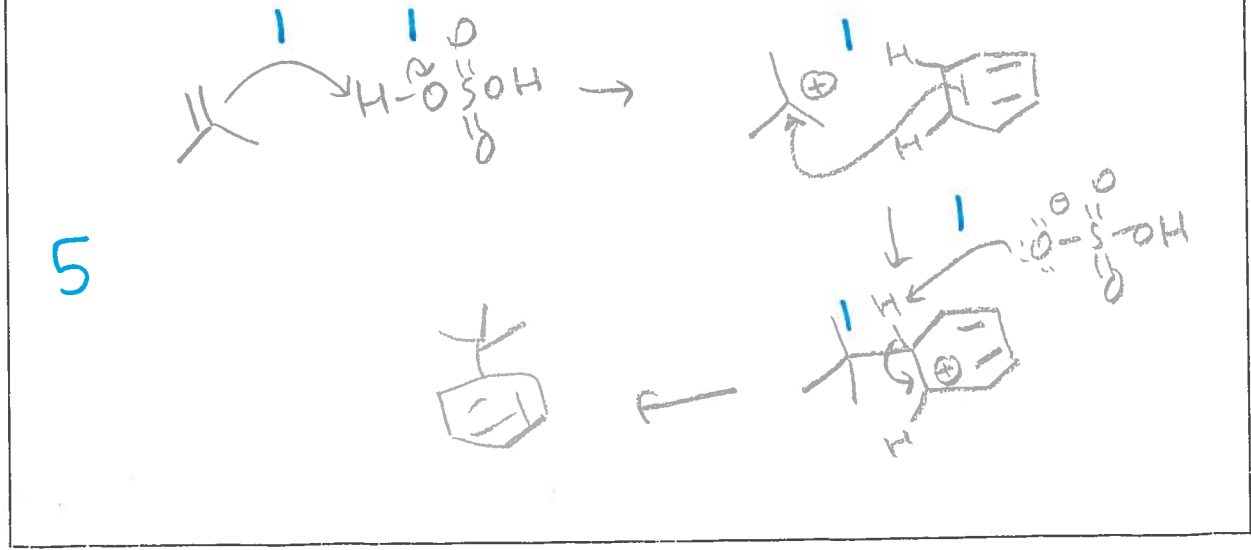
What is the relationship between the starting material and product?

tautomers |

Mechanism:



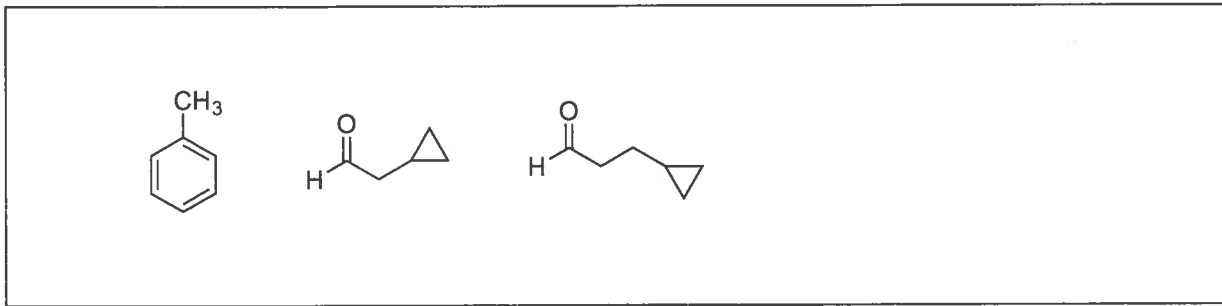
Mechanism:



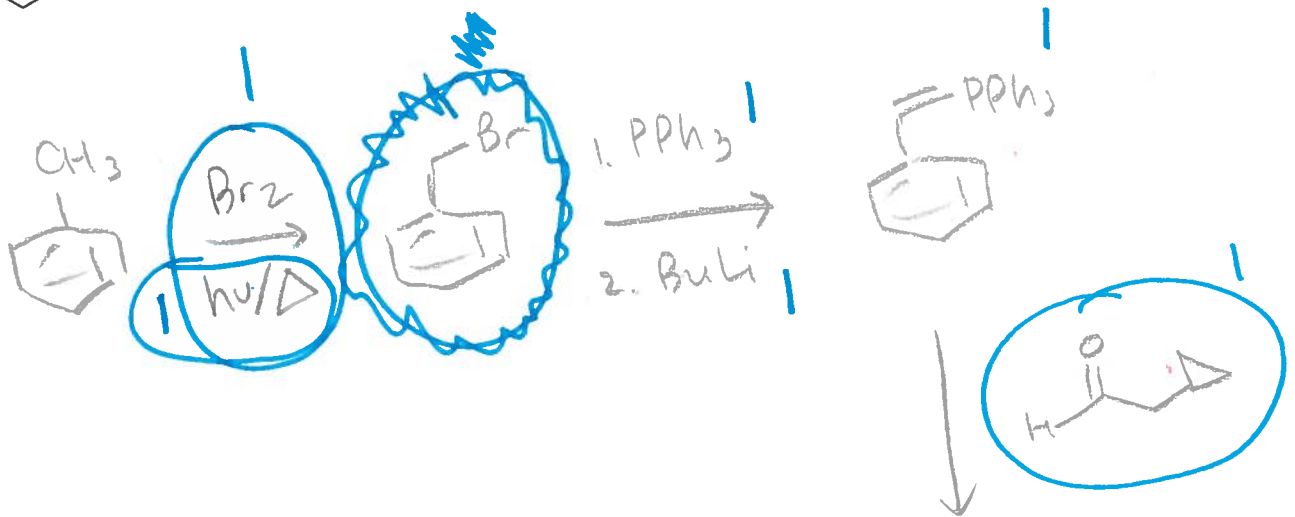
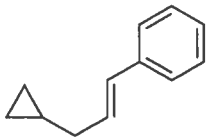
Initials: A

6. (6 points) Propose a synthesis of the target below.

All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.



Target



"brominate" = 2

"Wittig" = 3

correct aldehyde = 1

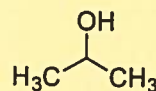
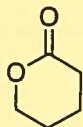
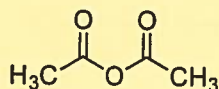
6

6. (4 points) Propose a synthesis of the target below.

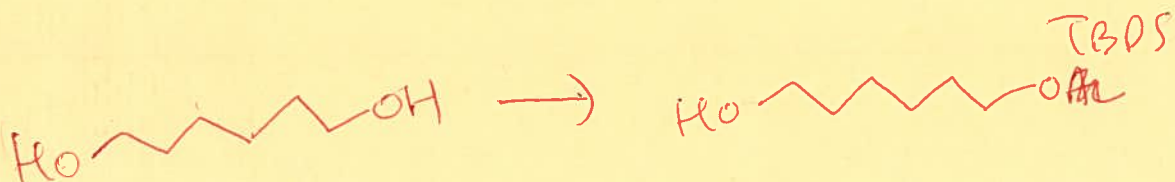
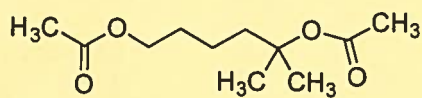
Initials: \_\_\_\_\_

All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.

Starting Materials:



Target



Perfect but start in diol = 2 pts.

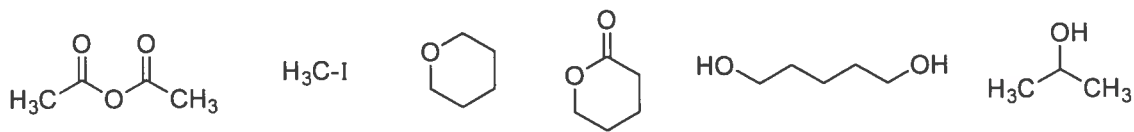


Initials: A

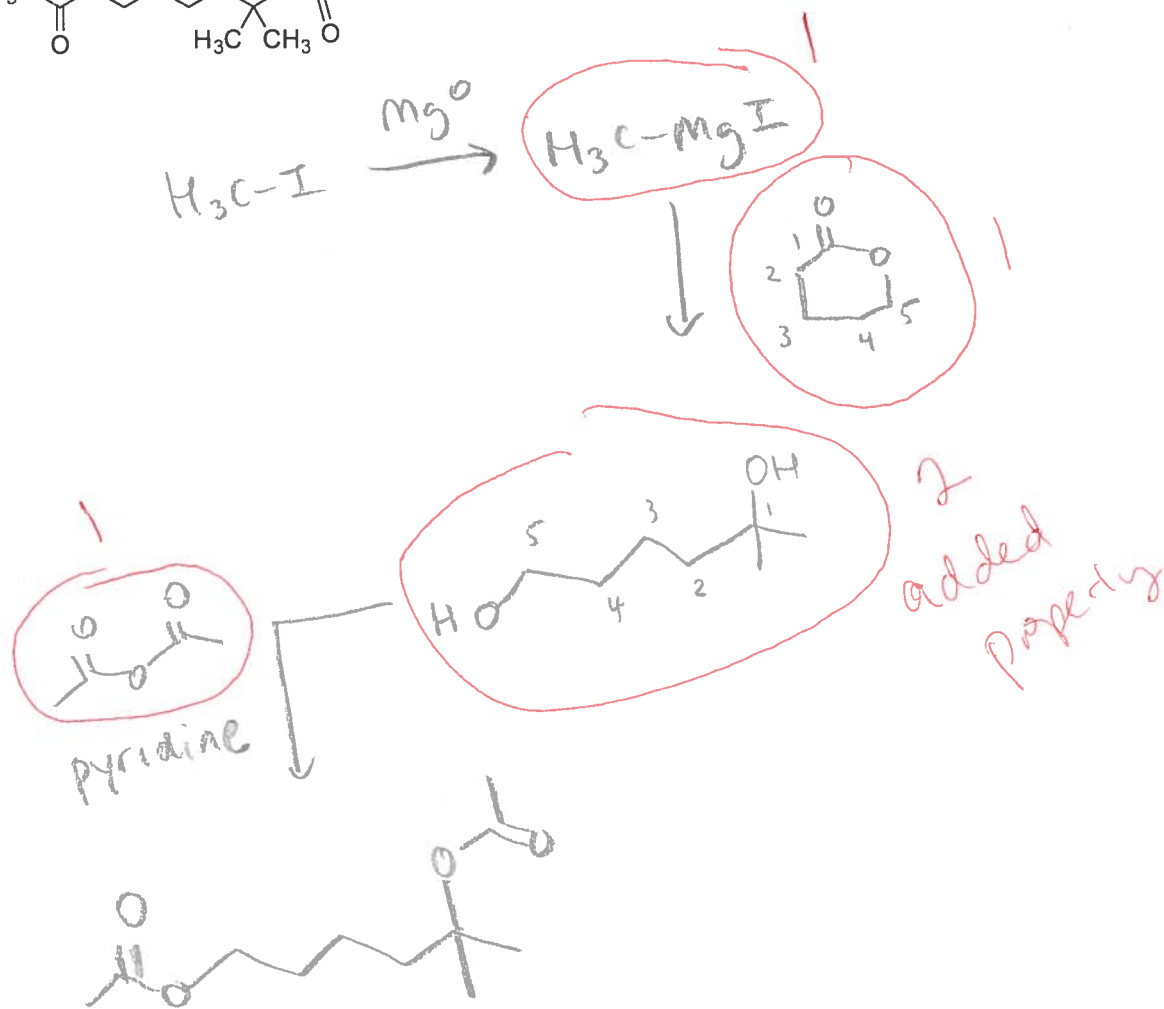
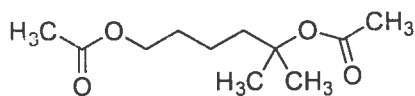
7. (4 points) Propose a synthesis of the target below.

All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.

Starting Materials:



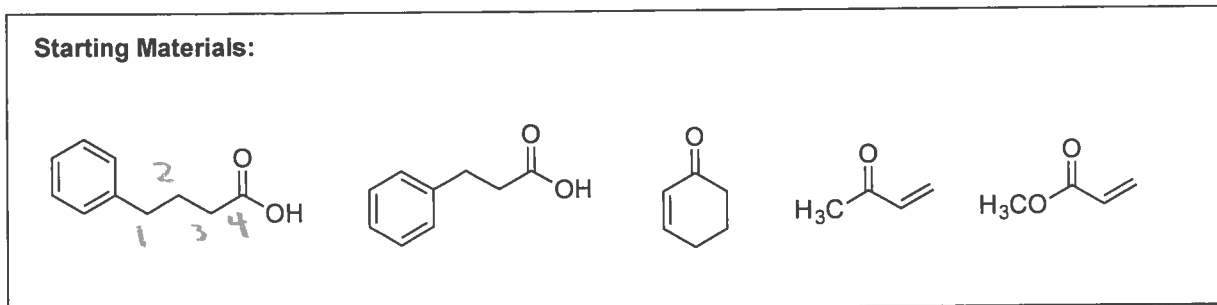
Target



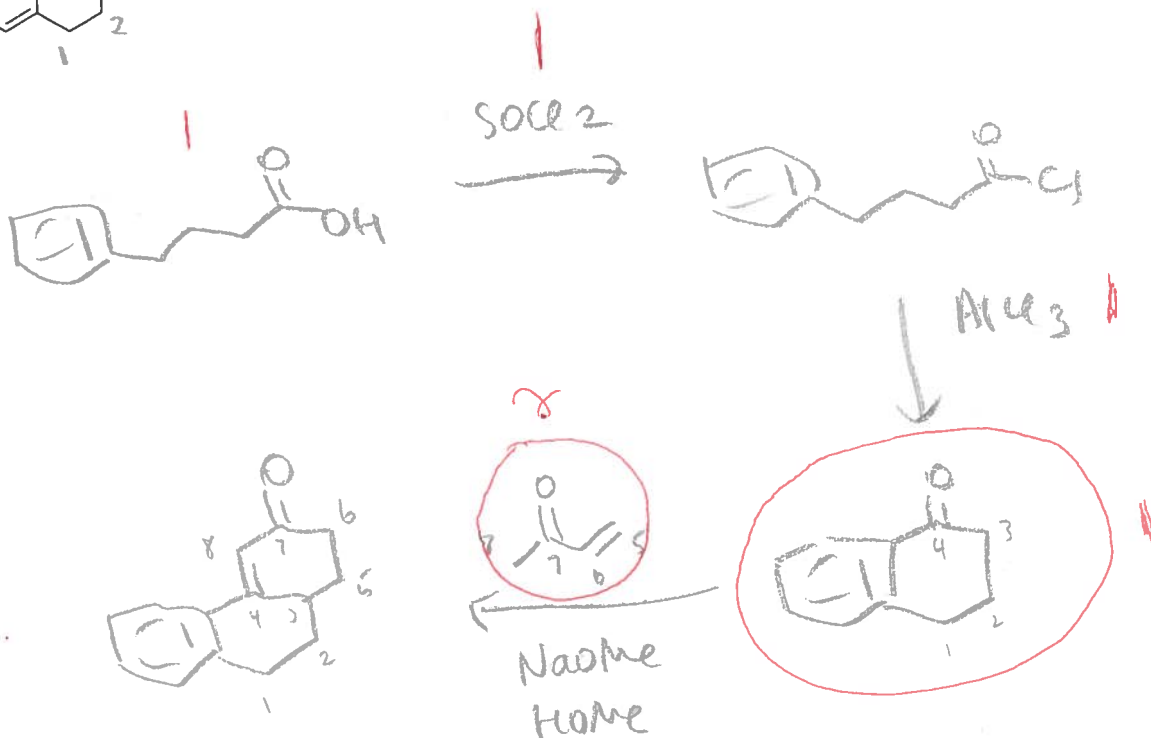
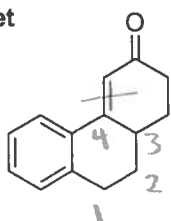
Initials: A

8. (6 points) Propose a synthesis of the target below.

All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.



Target

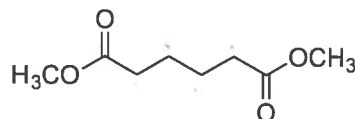
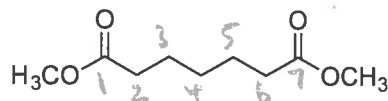
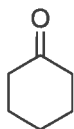
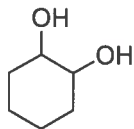


9. (6 points) Propose a synthesis of the target below.

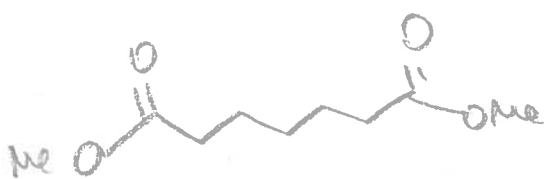
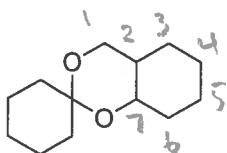
Initials: A

All carbons must come from the starting materials provided, you can use any reagent you wish.  
**YOU CAN IGNORE STEREOCHEMISTRY.**

Starting Materials:



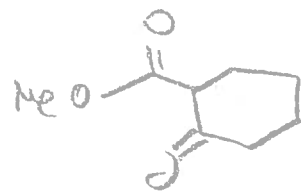
Target



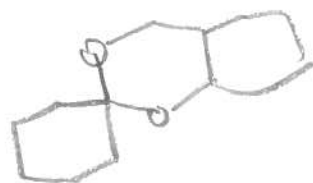
2  
Name

→  
Home

(Dieckman)



↓ LAH 2



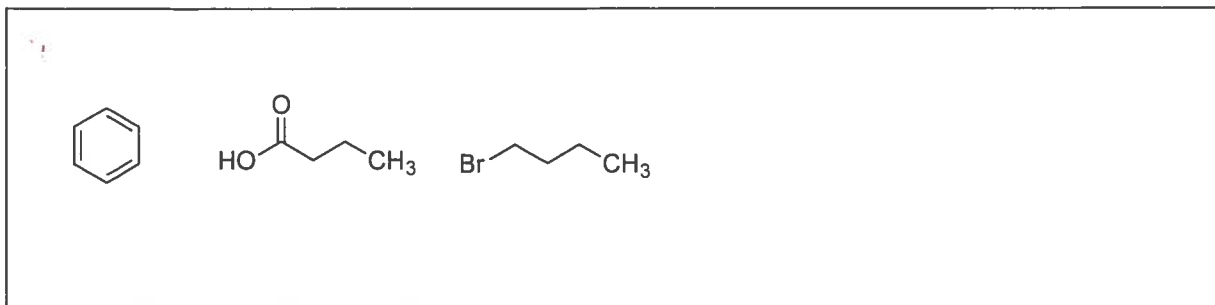
↑ PTsOH  
Any acid. 2



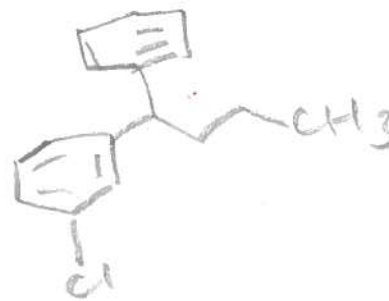
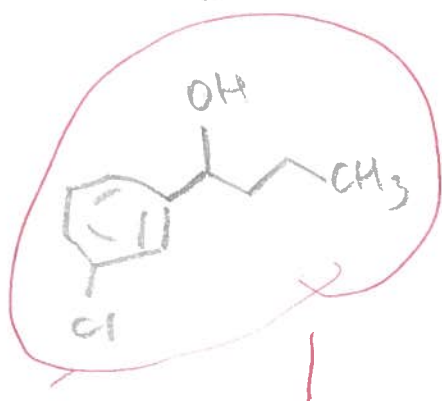
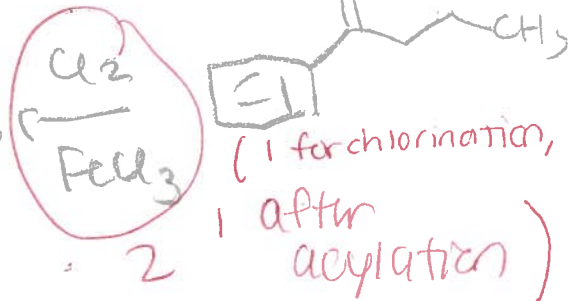
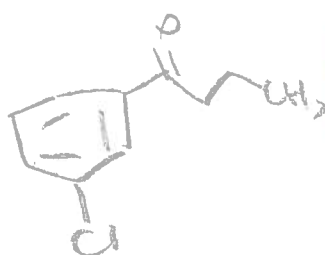
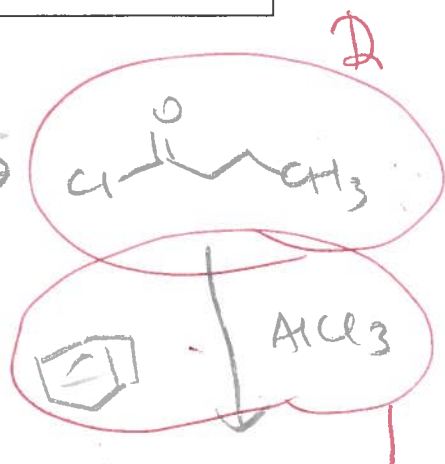
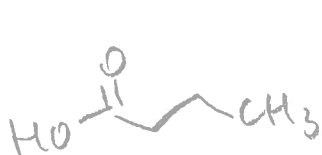
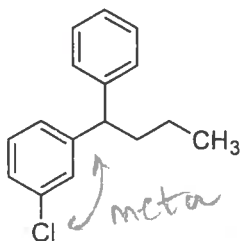
Initials: A

10. (8 points) Propose a synthesis of the target below.

All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.



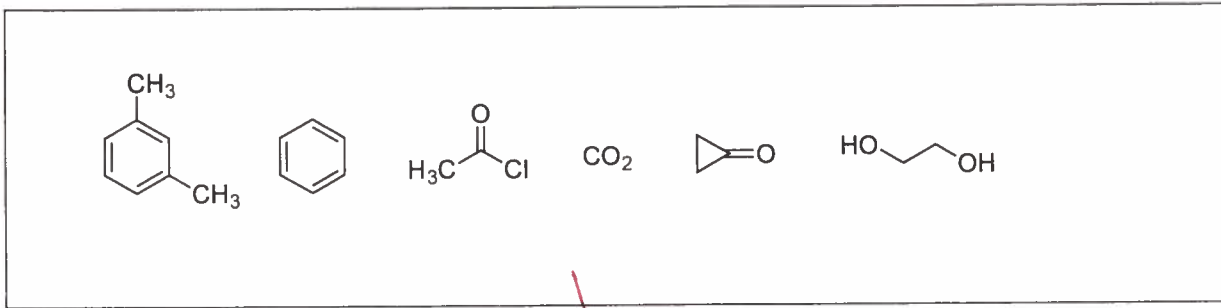
Target



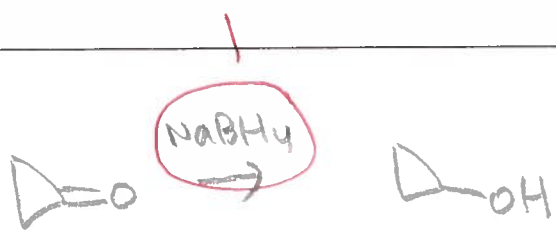
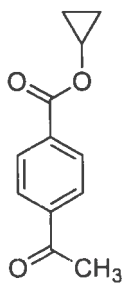
Initials: A

11. (10 points) Propose a synthesis of the target below.

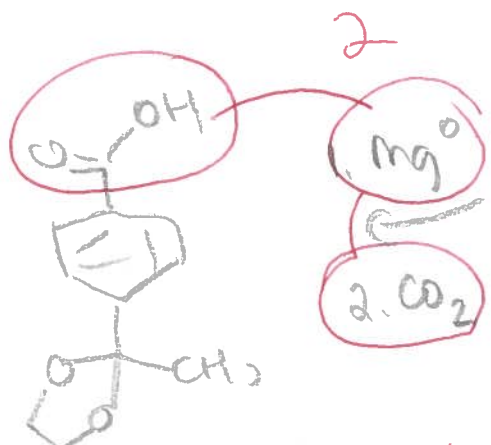
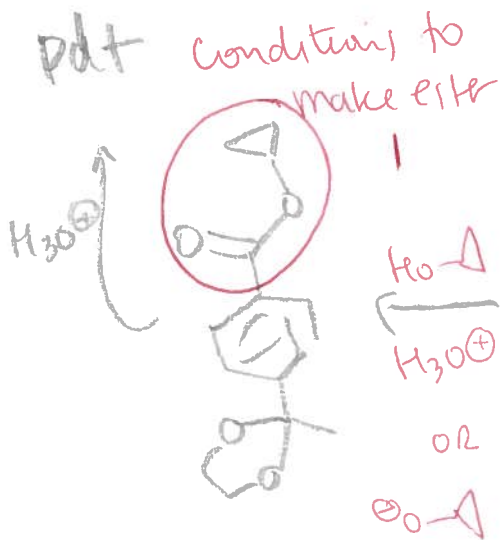
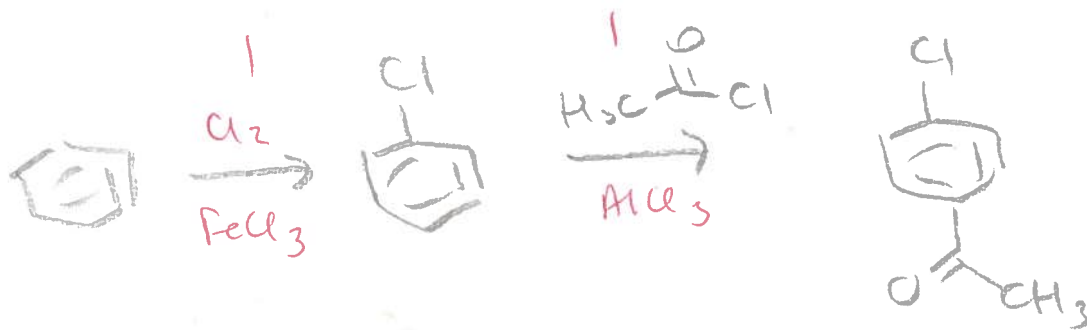
All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.



Target



need para 2



Protect during Grignard 2