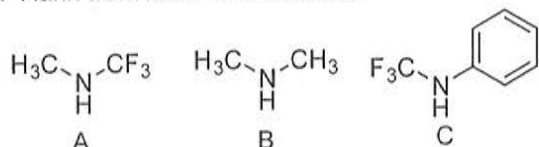
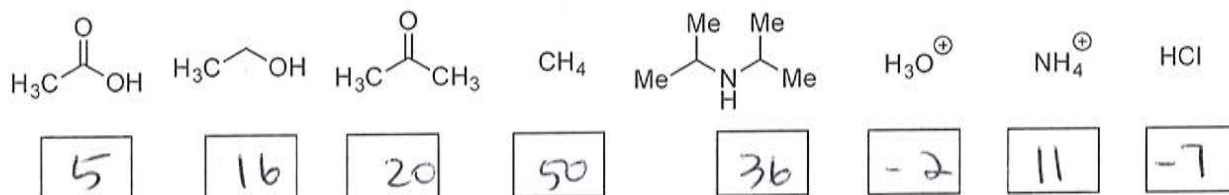


1 (22 points)

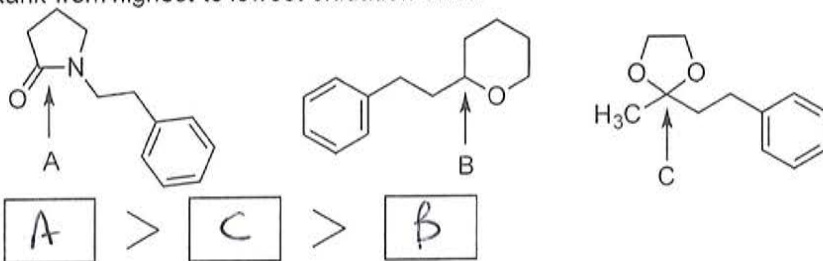
a. Rank from most to least basic:



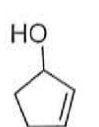
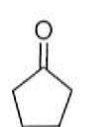
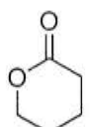
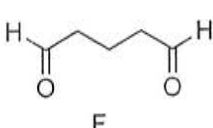
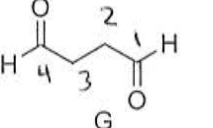
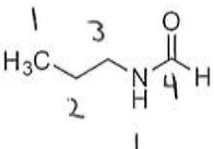
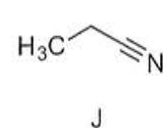
b. Provide pKa's for any 6 of the following compounds (if you do them all, we will count your best 6).

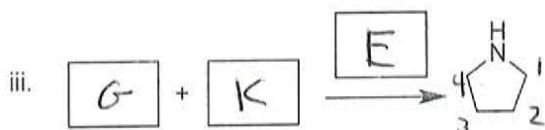
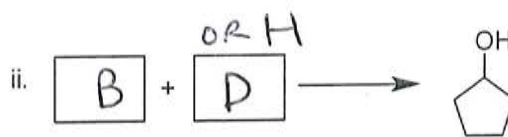


c. Rank from highest to lowest oxidation state:



d. Fill in the starting materials to complete the syntheses

Starting materials			
			$\text{NaBH}_4$ $\text{NaBH}_3\text{CN}$ D                  E
			$\text{LiAlH}_4$ H
			$\text{NH}_3$ K

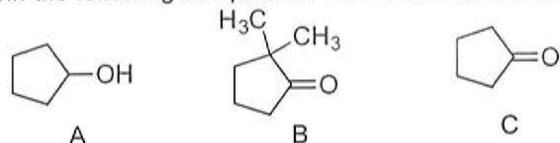


Name of reaction:  $\boxed{\text{reductive amination}}$

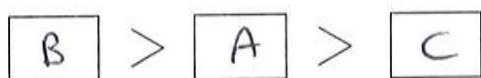
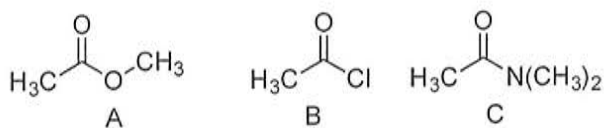
Initials: \_\_\_\_\_

2 (16 points).

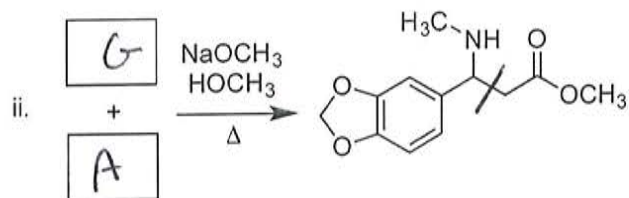
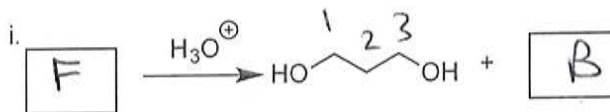
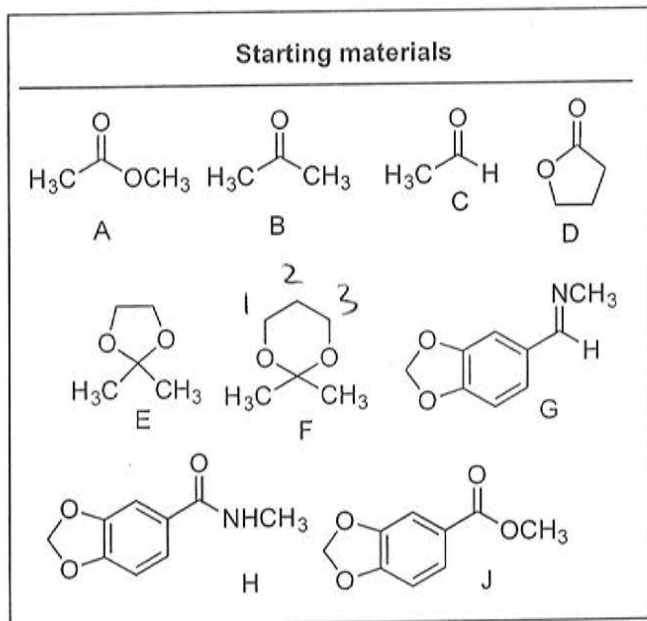
a. Rank the following compounds from fastest to slowest reaction with PhLi:



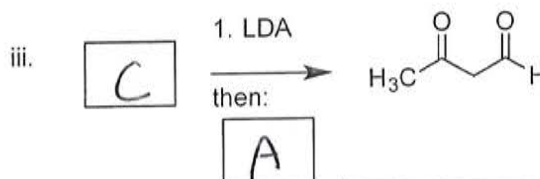
b. Rank fastest to slowest reaction with PhMgBr.



c. Fill in the starting materials to complete the syntheses



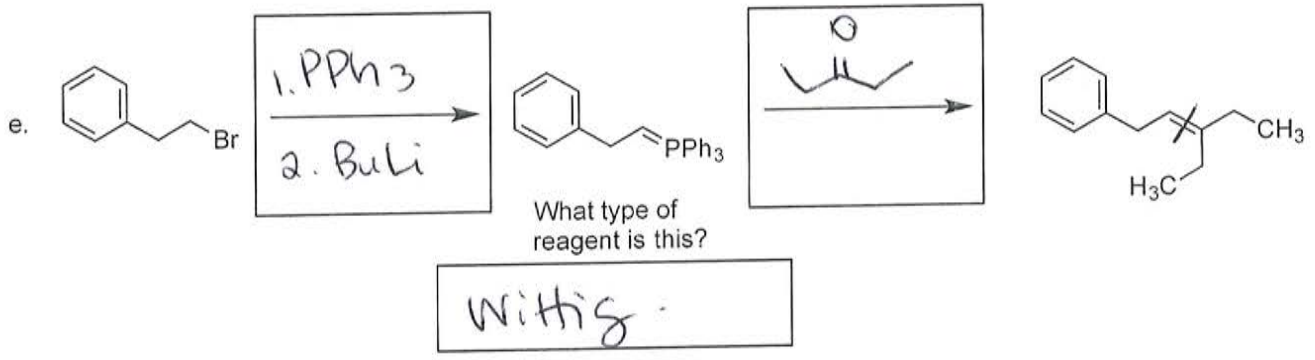
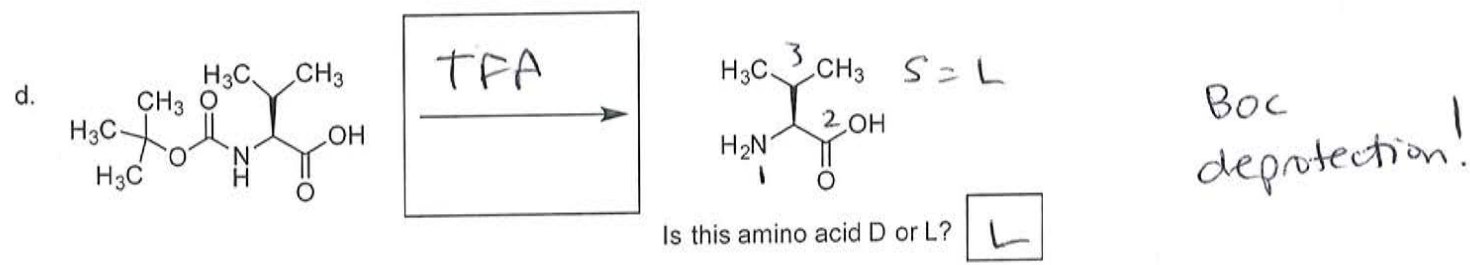
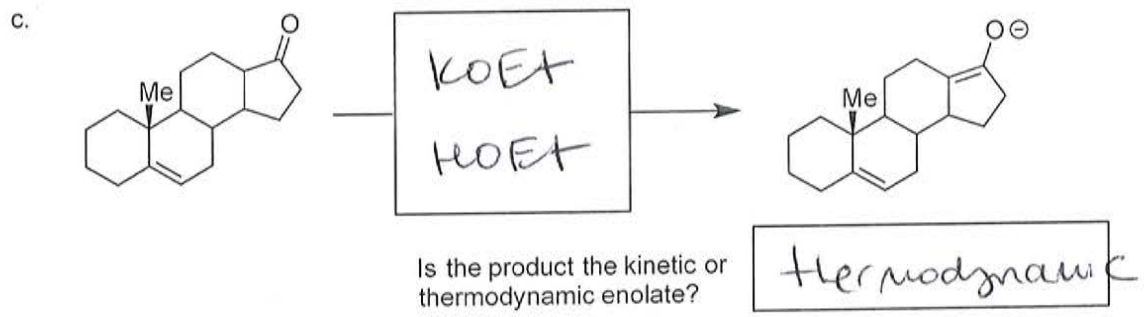
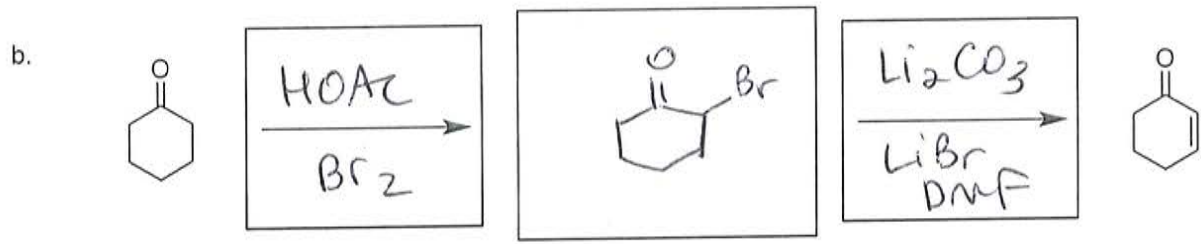
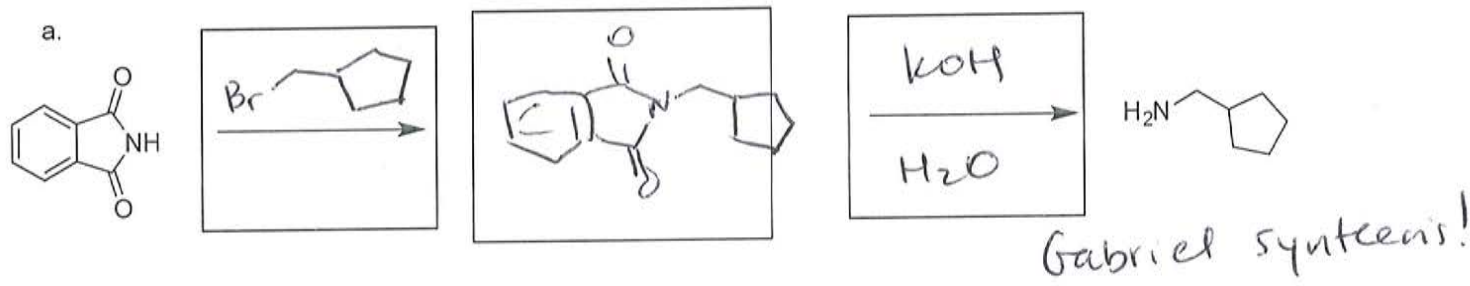
Name of reaction: Mannich



Name of reaction: Claisen

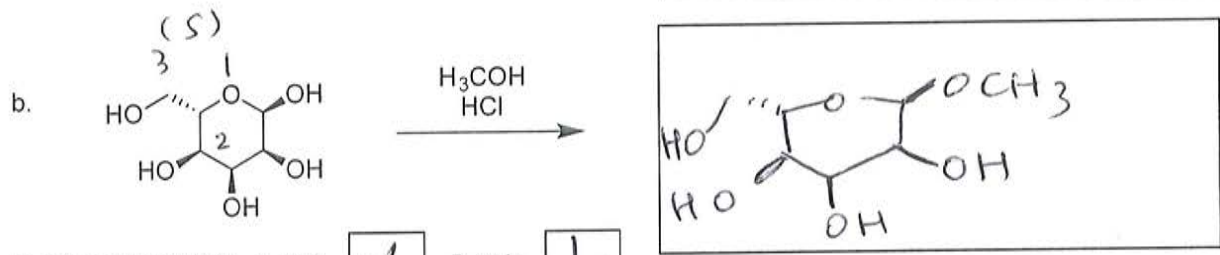
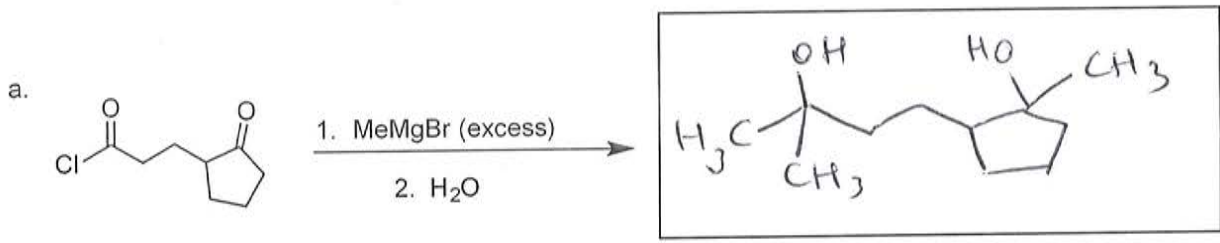
3. Fill in the boxes with the appropriate starting material, reagent or major product (31 points).  
 Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

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

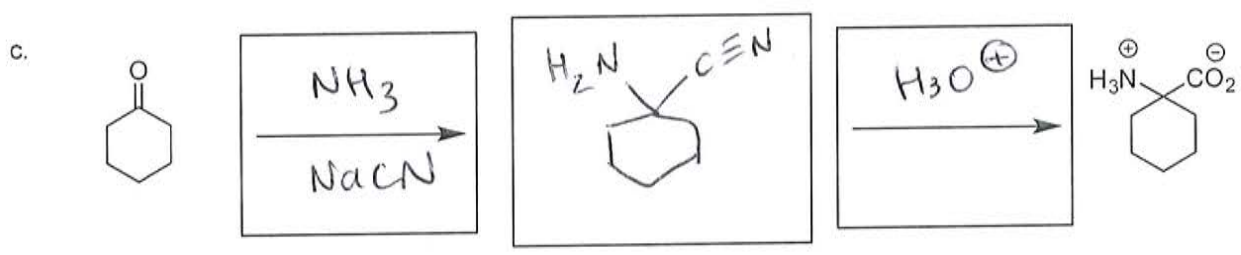


4. Fill in the boxes with the appropriate starting material, reagent or major product (26 points).  
 Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

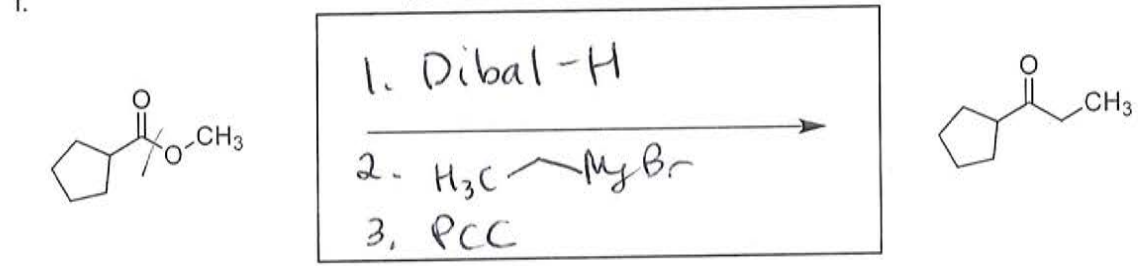
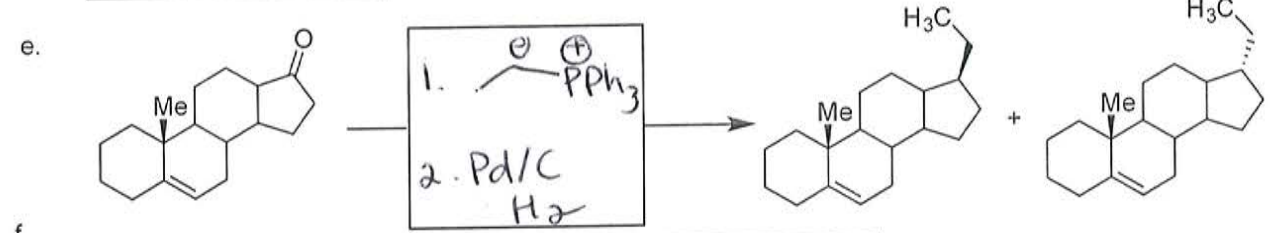
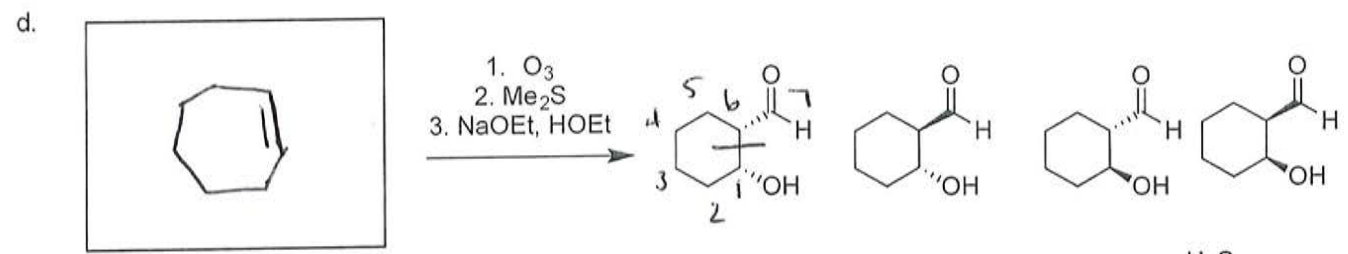
Initials: \_\_\_\_\_



Is this carbohydrate  $\alpha$  or  $\beta$ :  D or L:



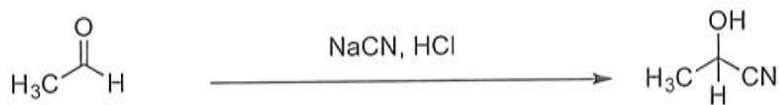
What is the name of this synthesis?



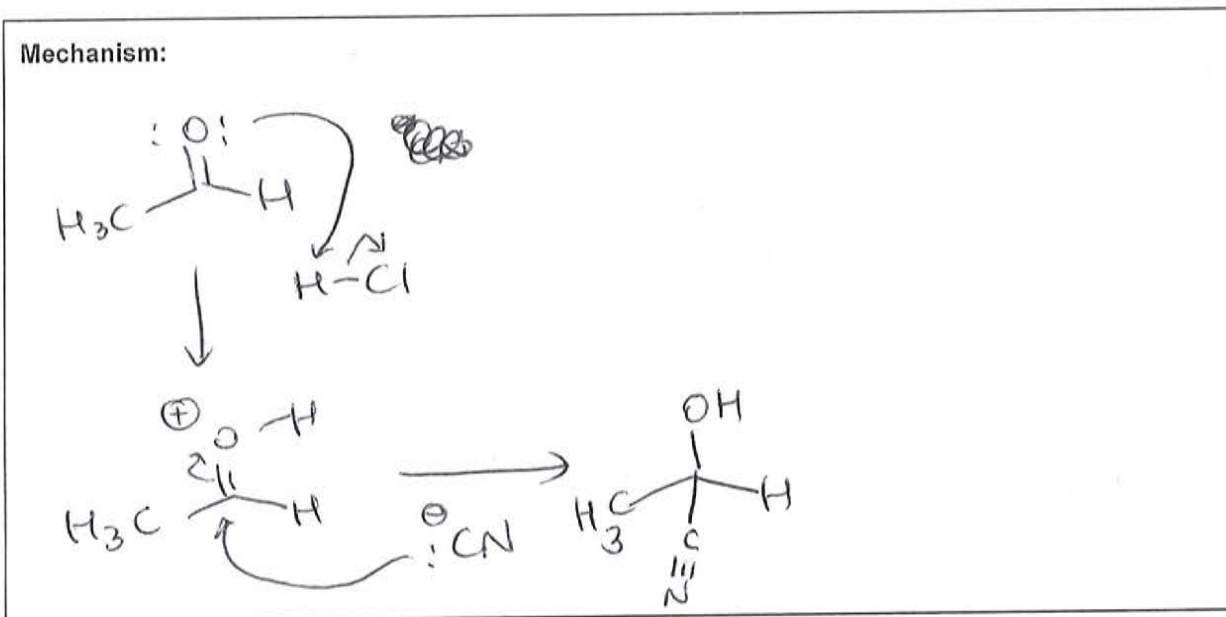
5. (12 points)

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

a. Provide an arrow-pushing mechanism.



Mechanism:



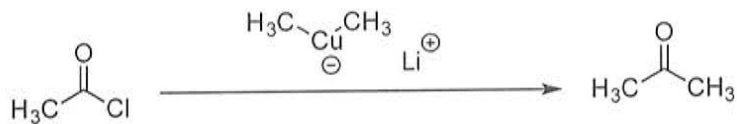
b. Match the names of the functional groups with labeled examples from the compounds.

acetal	<input type="text" value="E"/>		
aniline	<input type="text" value="D"/>		
$\beta$ -ketoester	<input type="text" value="A"/>		
imine	<input type="text" value="M"/>		
lactone	<input type="text" value="J"/>		
phenol	<input type="text" value="F"/>		

6. (13 points) Provide an arrow-pushing mechanism.

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

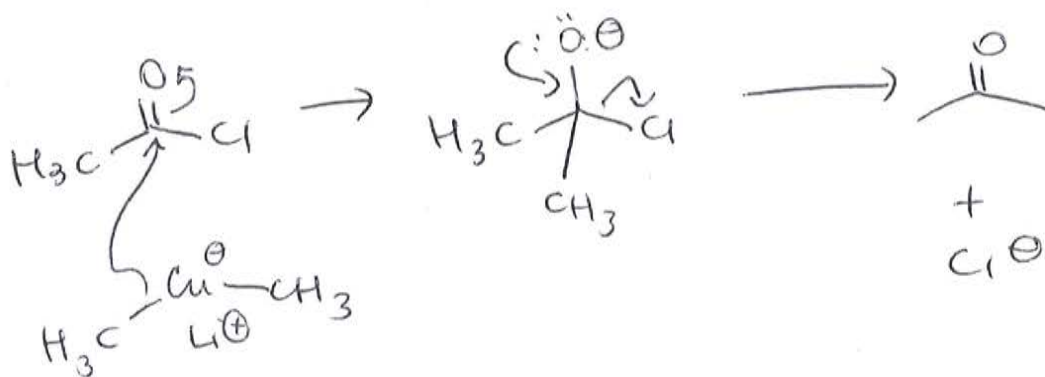
a.



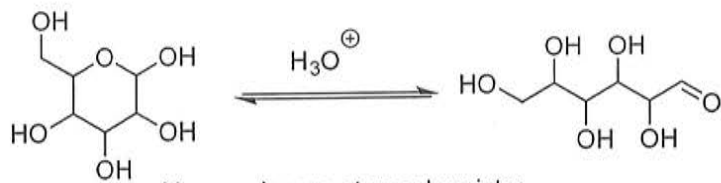
What named type of reagent is  $(\text{H}_3\text{C})_2\text{CuLi}$ ?

cuprate

Mechanism:



b.

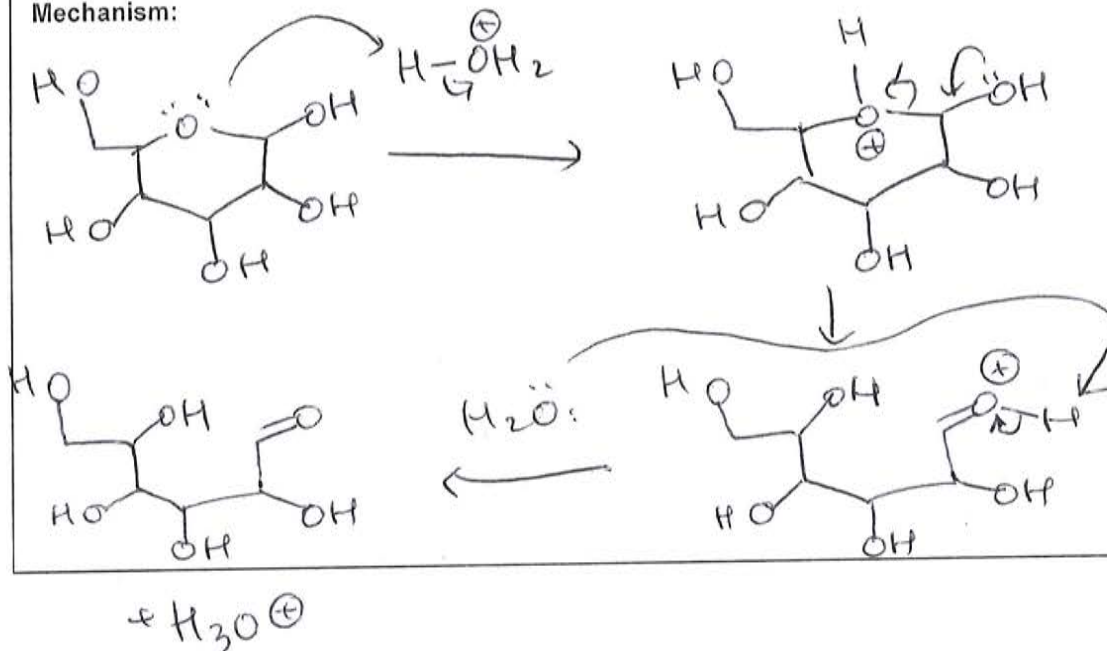


Is this reaction an oxidation, reduction, or neither?

neither.

You can ignore stereochemistry.

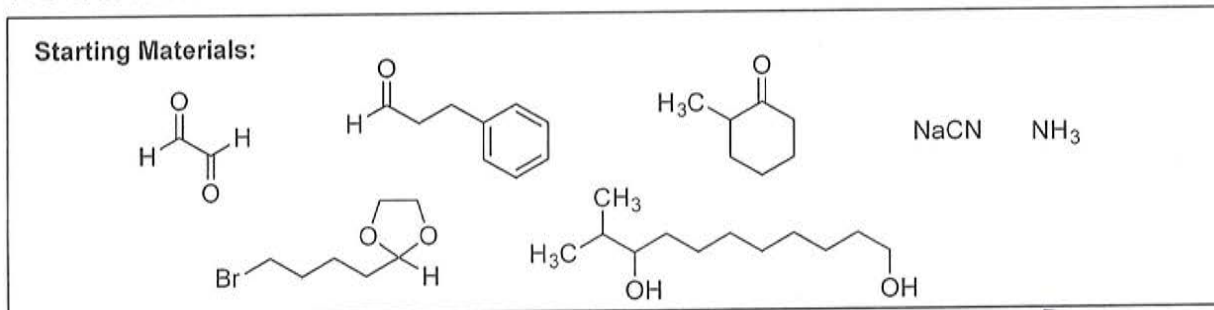
Mechanism:



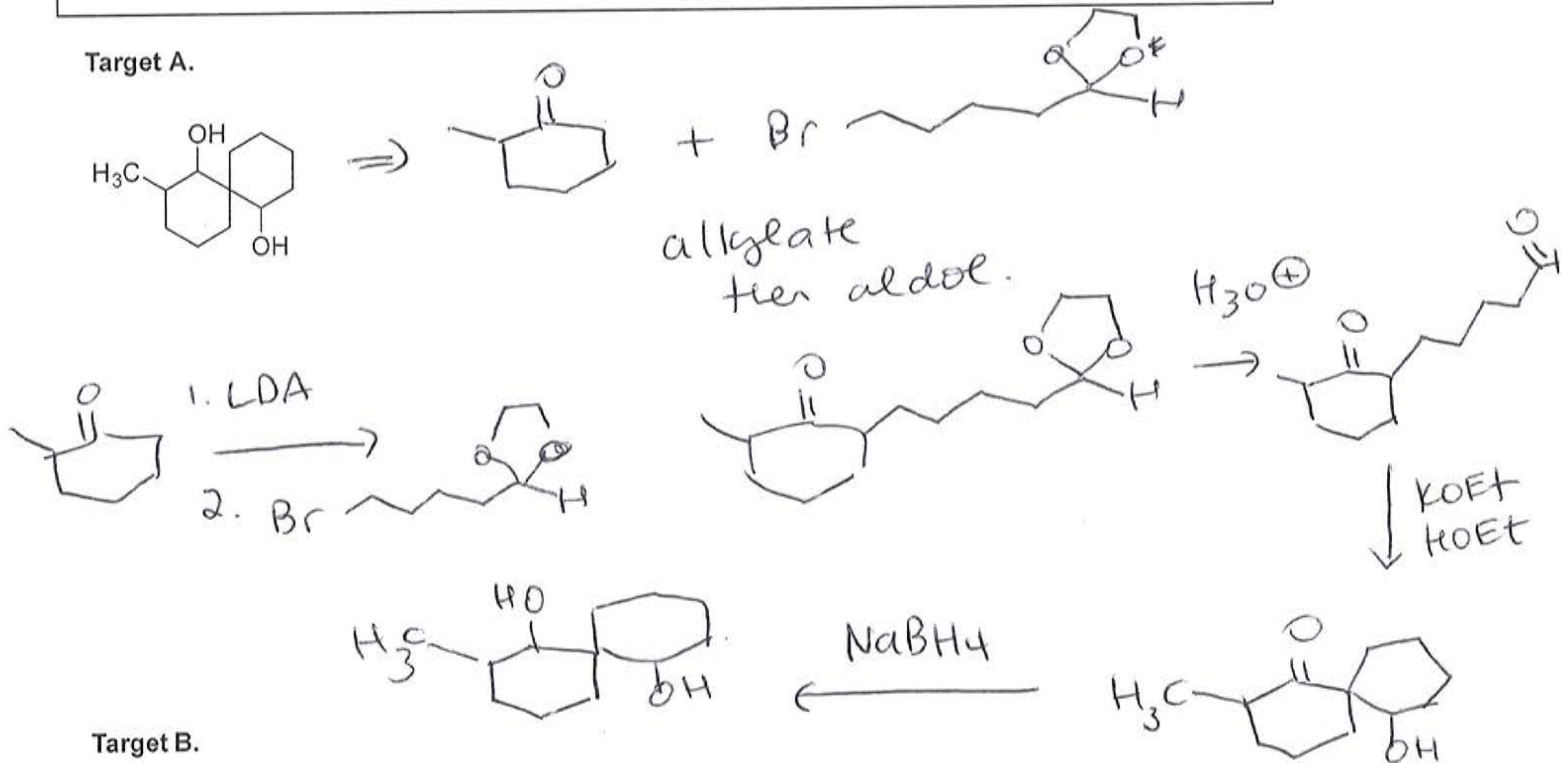
Initials: \_\_\_\_\_

7. (16 points) Propose syntheses of the targets below.

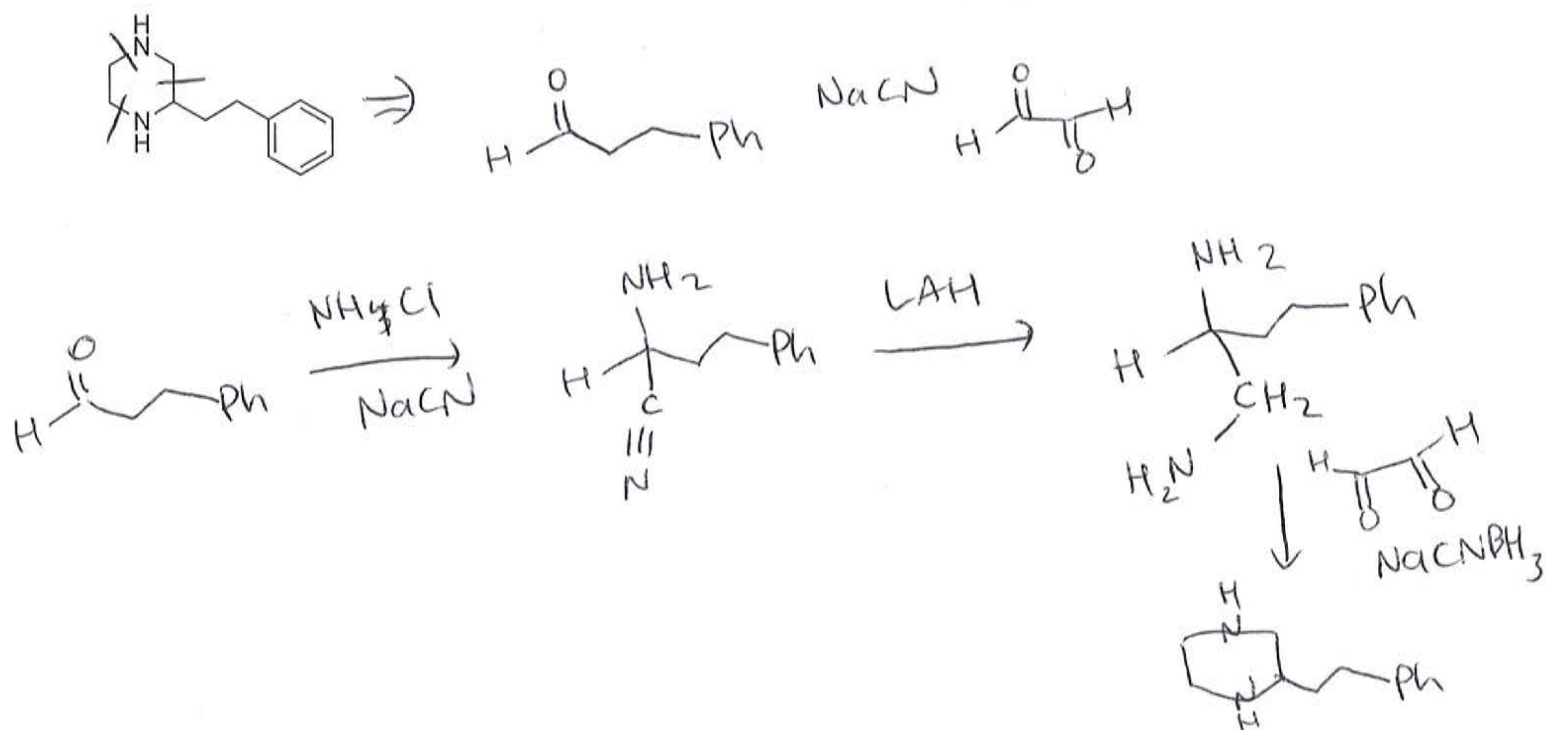
All carbons must come from the starting materials provided, you can use any reagent you wish.  
**YOU CAN IGNORE STEREOCHEMISTRY.**



**Target A.**



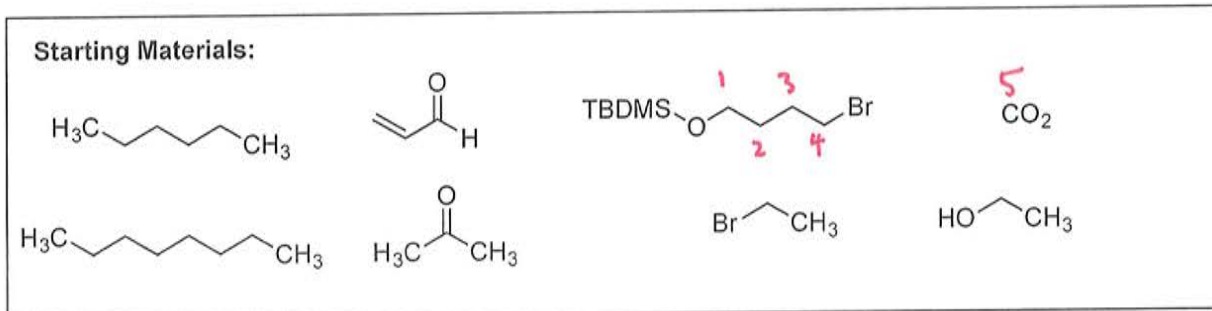
**Target B.**



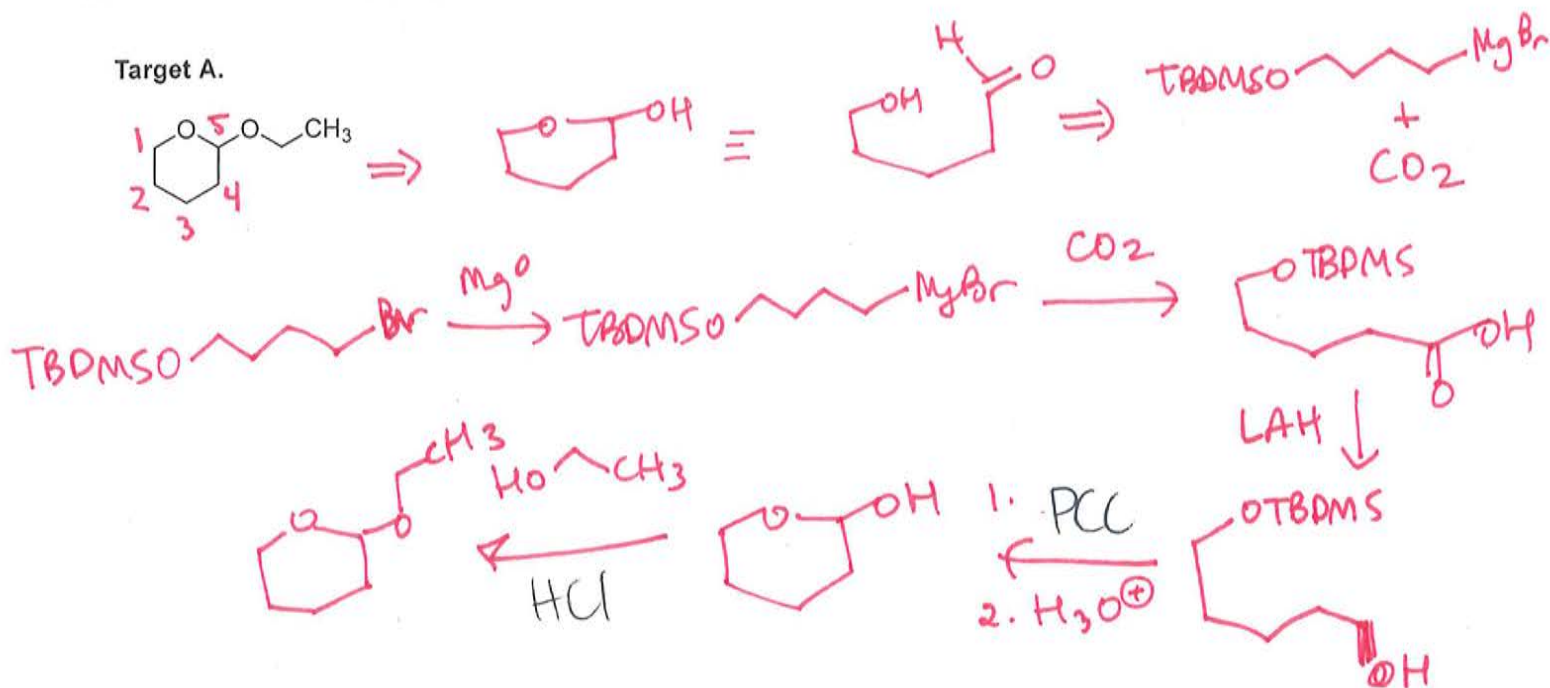
8. (16 points) Propose syntheses of the targets below.

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

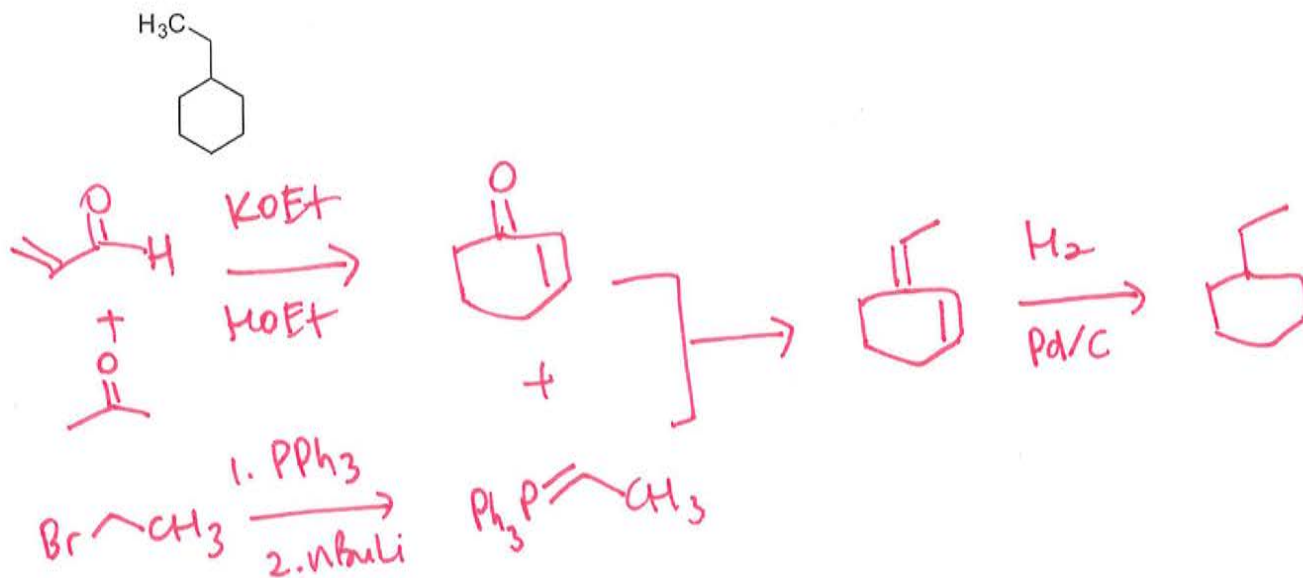
All carbons must come from the starting materials provided, you can use any reagent you wish.  
YOU CAN IGNORE STEREOCHEMISTRY.



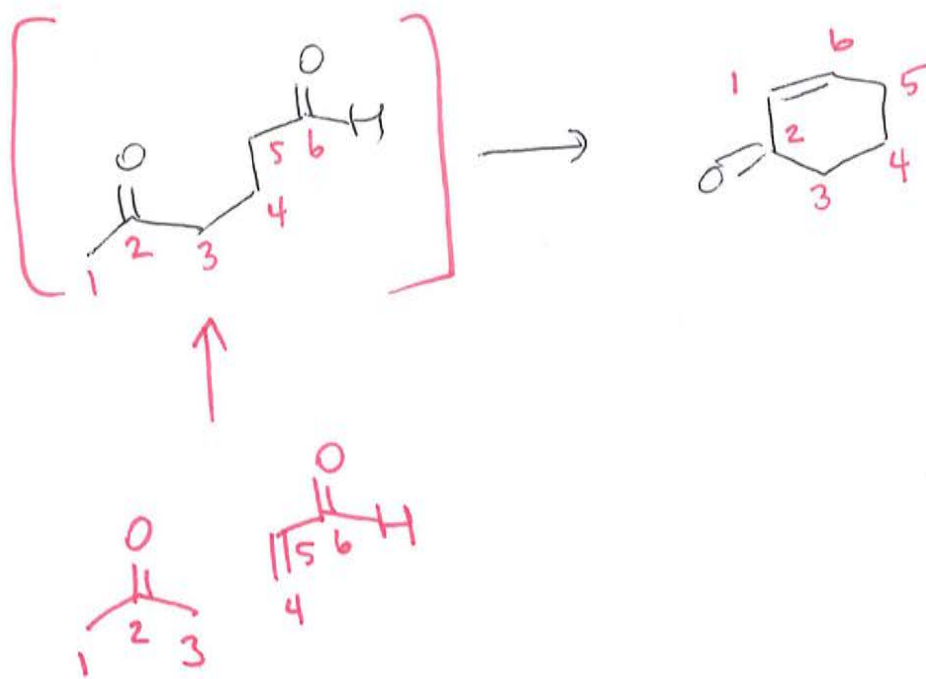
Target A.



Target B.







Robinson from target 8B