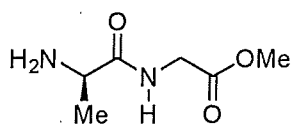
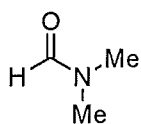


Worksheet 5, Chem 51C, Jarvo

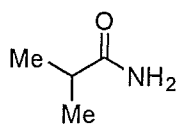
1. a. Label each amide as 1°, 2°, or 3°



2°



3°



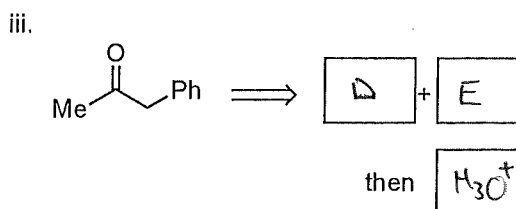
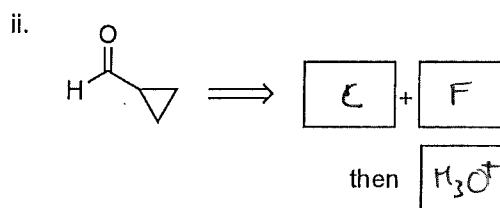
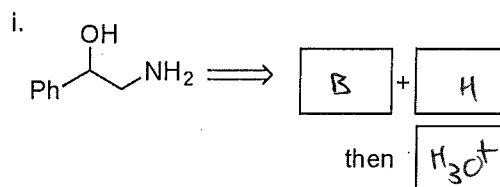
1°

b. Fill in the correct nucleophile and electrophile from the table to complete the retrosyntheses.

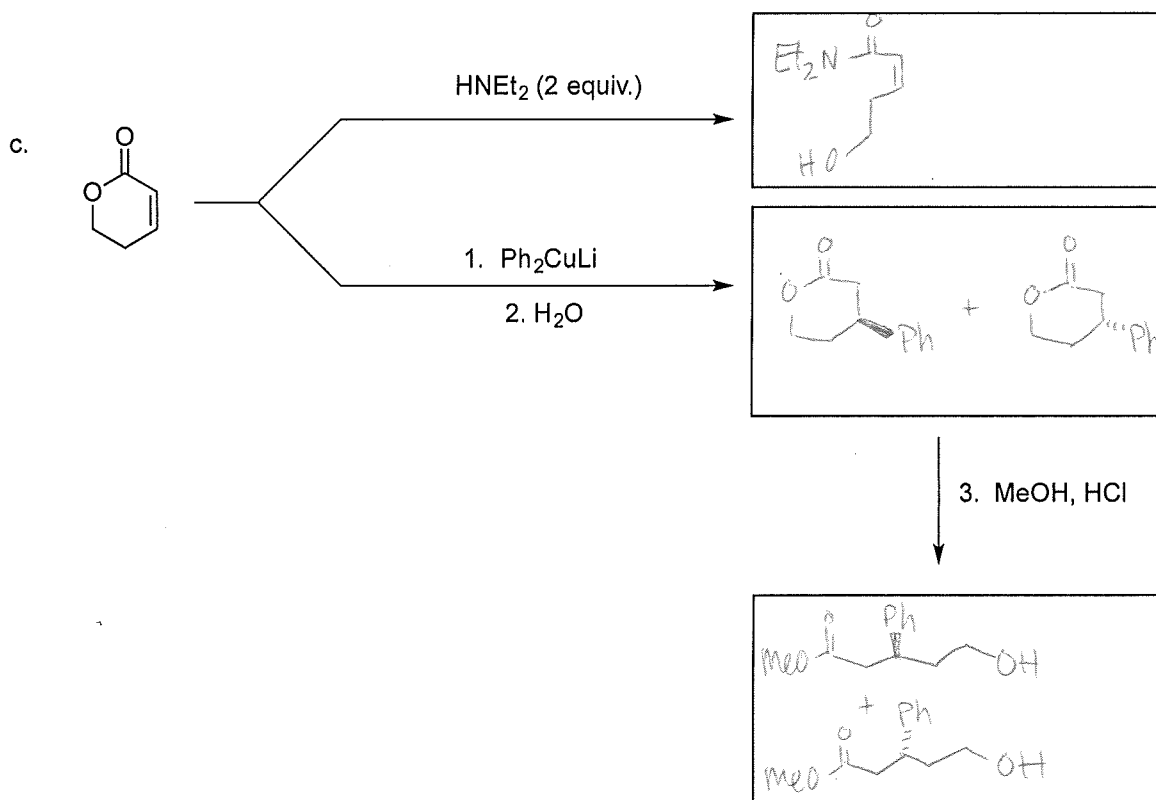
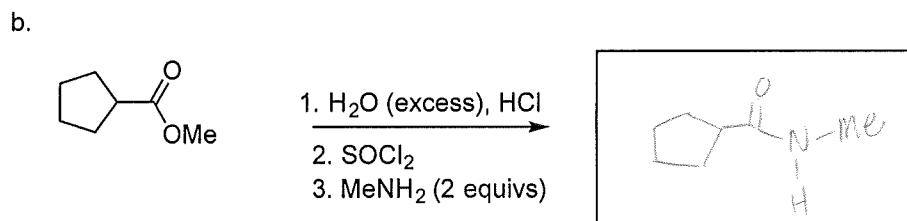
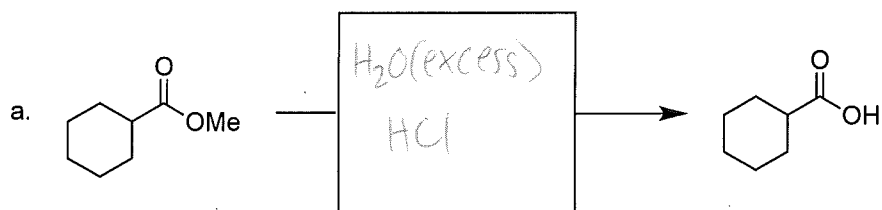
Nucleophiles		Electrophiles	
A	NaOH	E	
B	LiAlH <sub>4</sub>	F	
C	DIBAL-H	G	
D	MeMgBr	H	
		I	

I H<sub>3</sub>O<sup>+</sup>

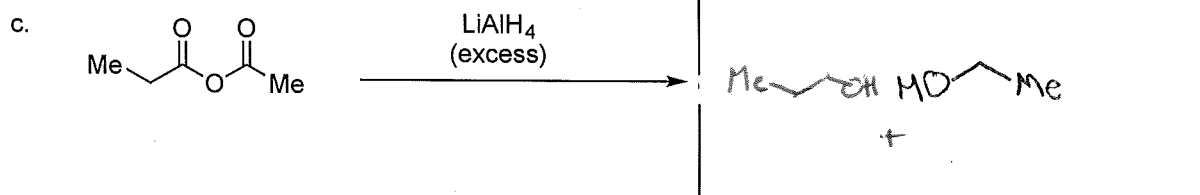
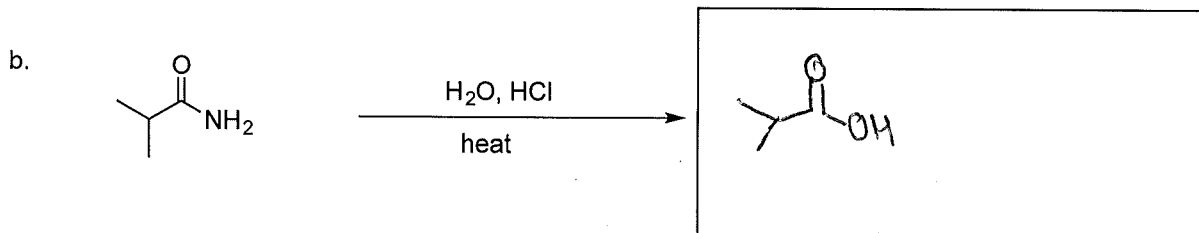
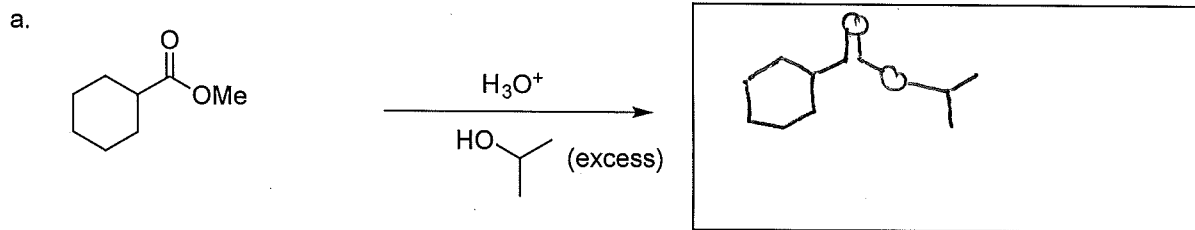
Products



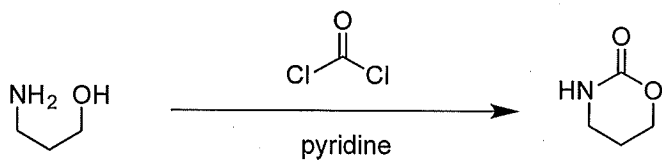
2. Fill in the boxes with the appropriate starting material, reagent or major product.  
 Show stereochemistry where appropriate



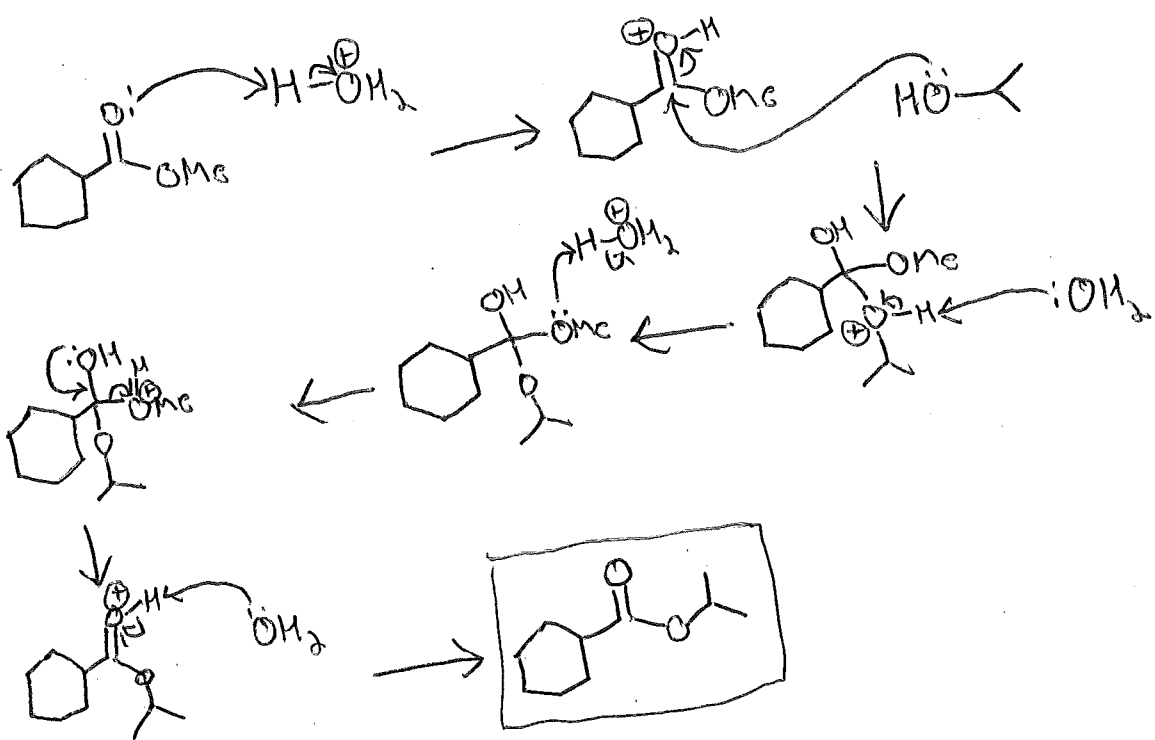
3. Fill in the blank and provide an arrow-pushing mechanism.



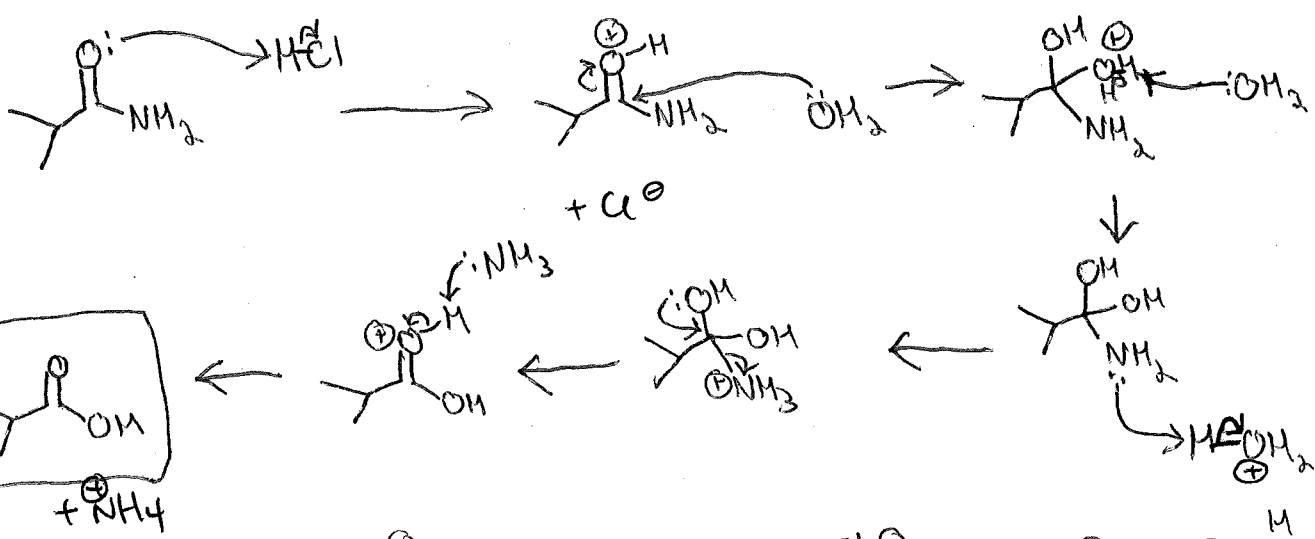
d. Provide an arrow-pushing mechanism



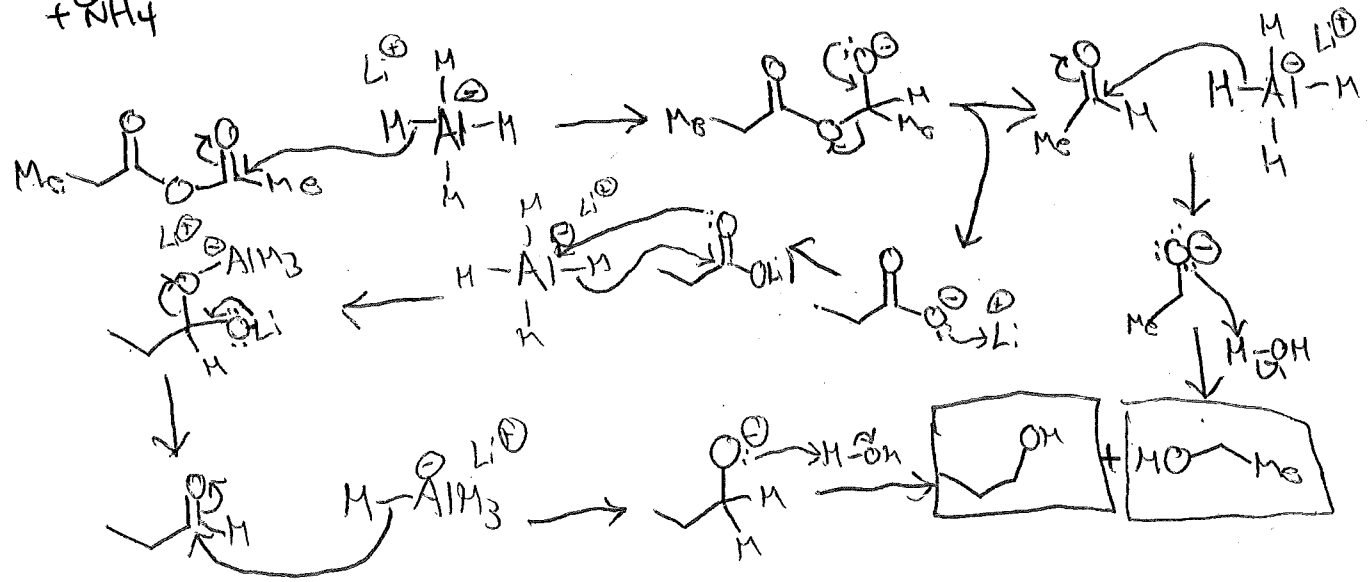
3 a



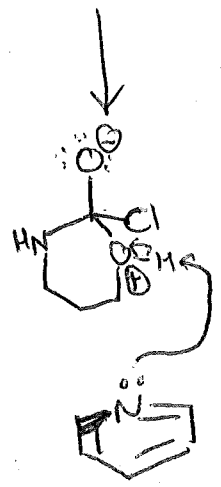
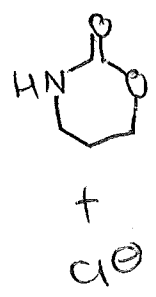
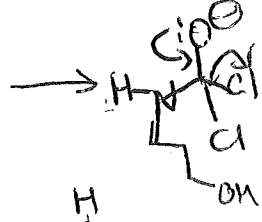
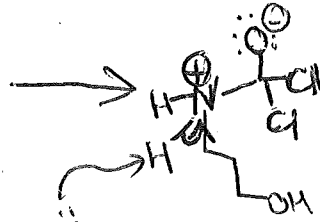
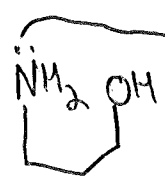
b



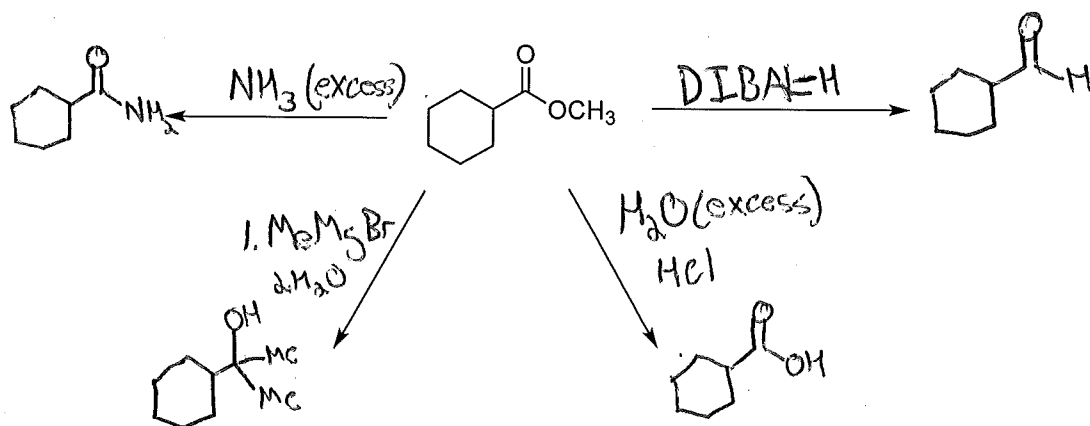
c



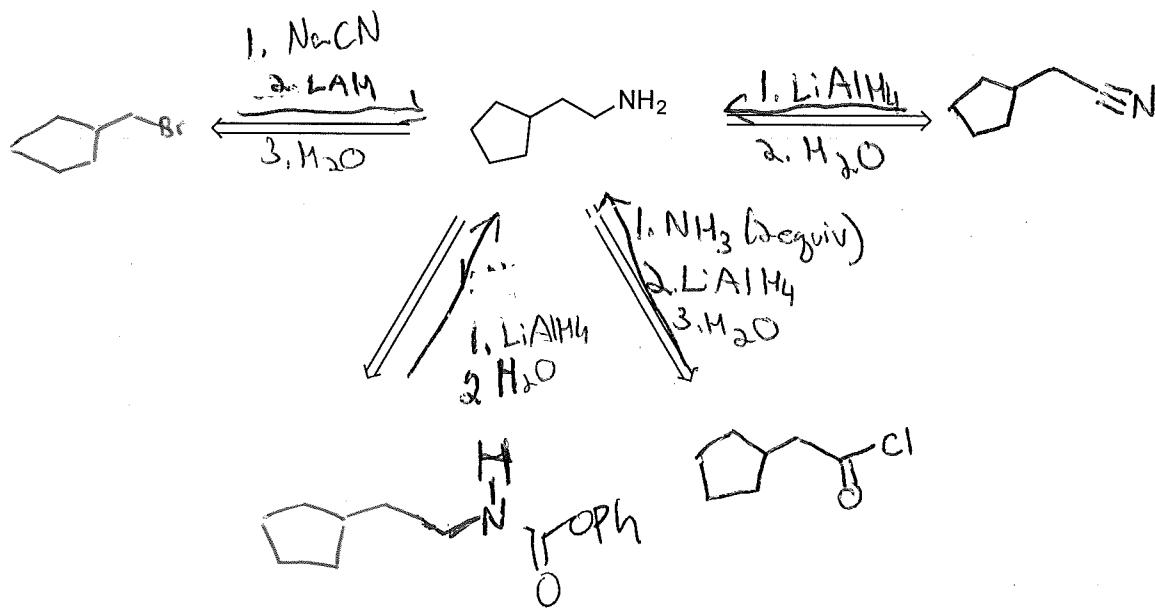
3



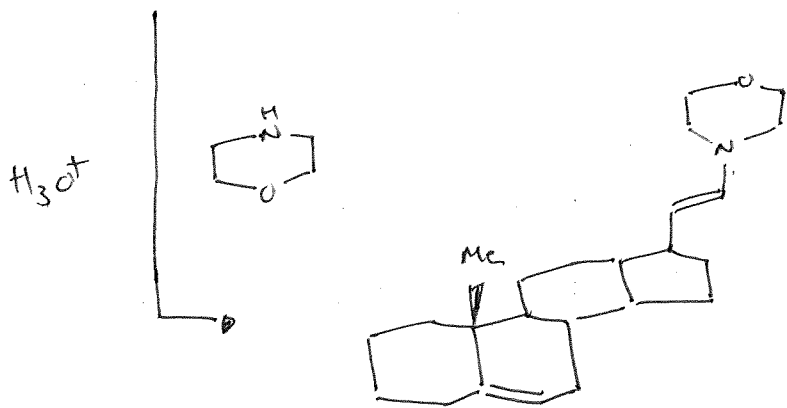
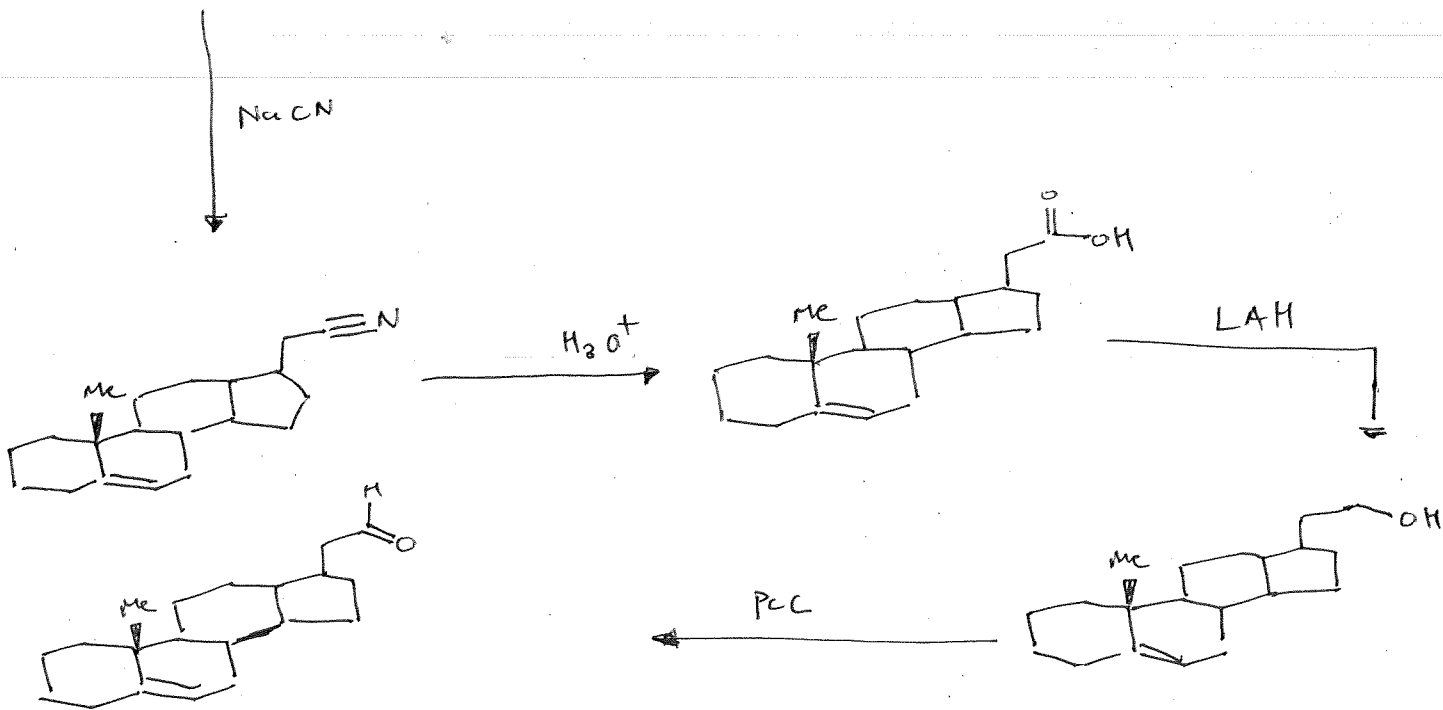
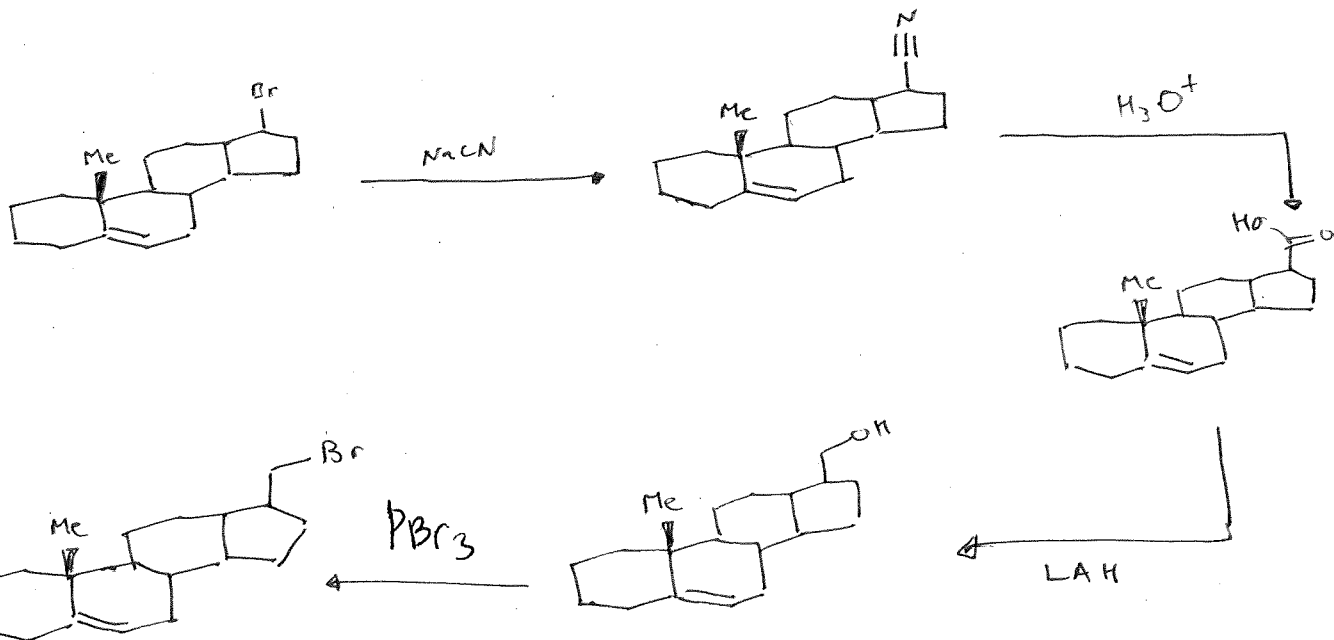
4. Show at least four different transformations of the ester below below, each one generating a different functional group.



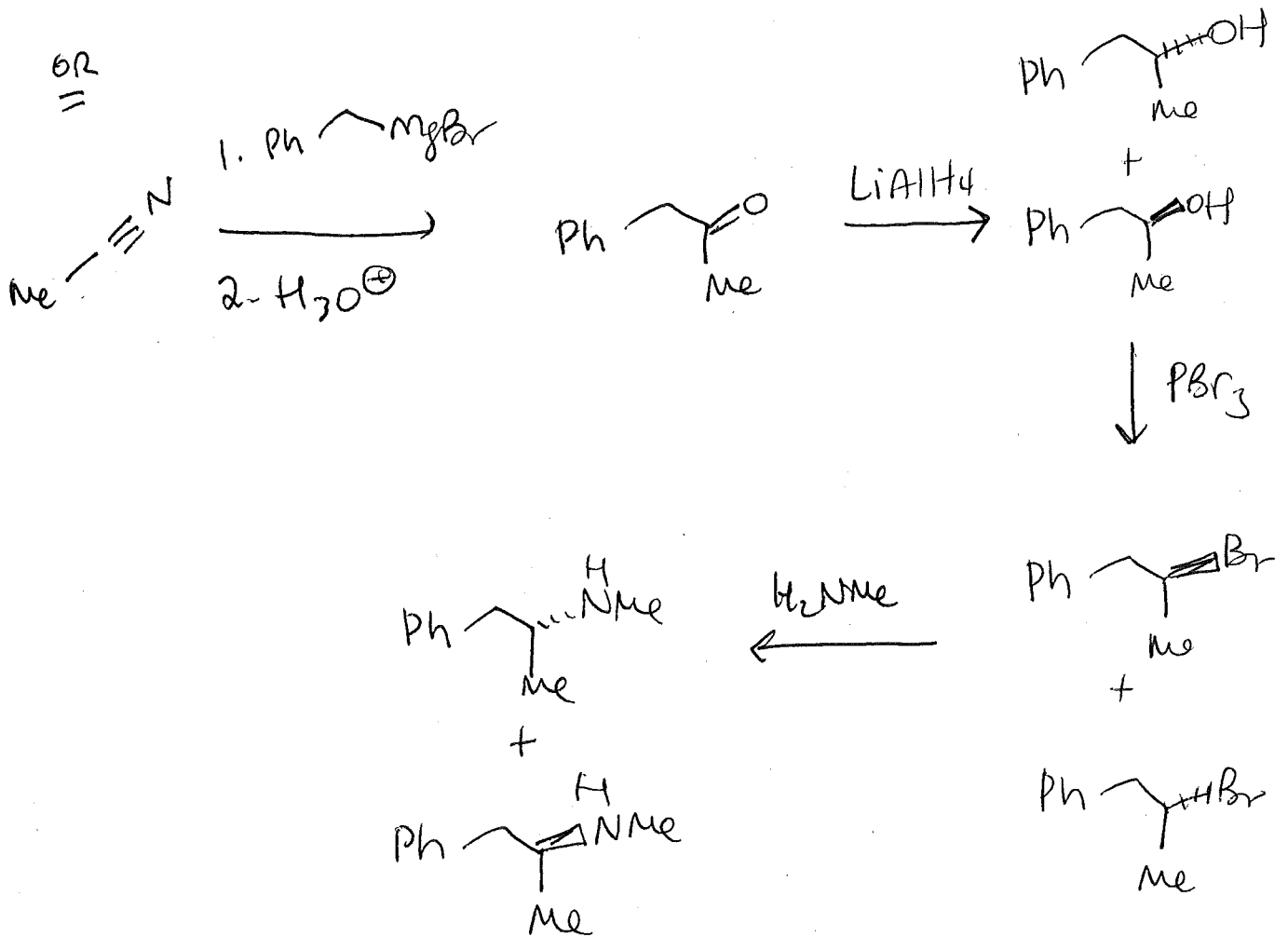
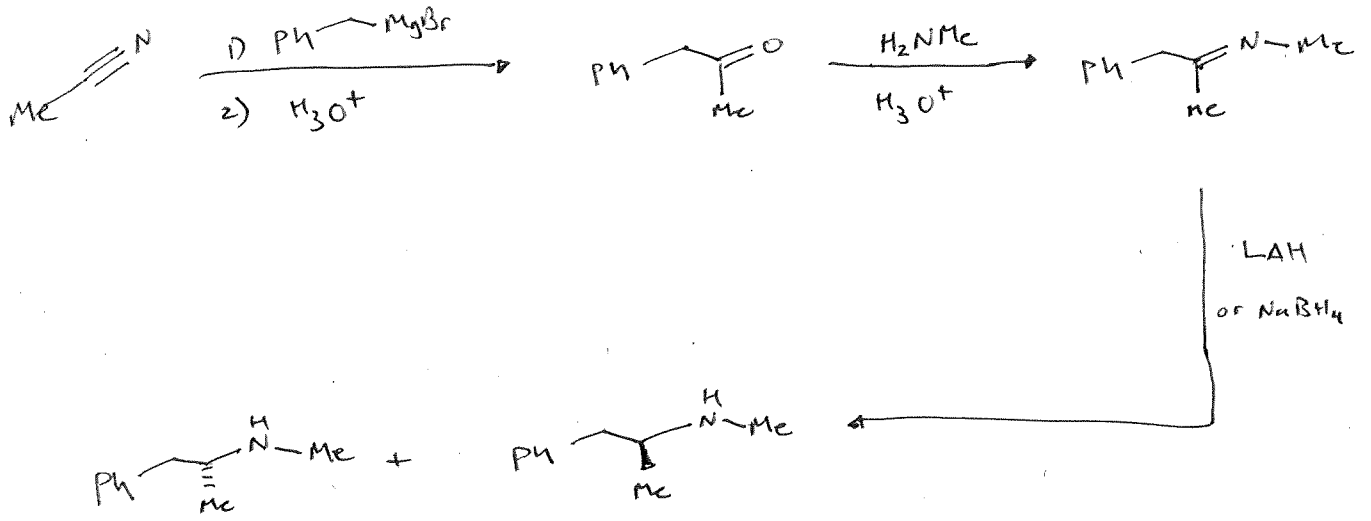
4. Show at least four different syntheses of the amine below below, each one from a different starting material.



5. a)

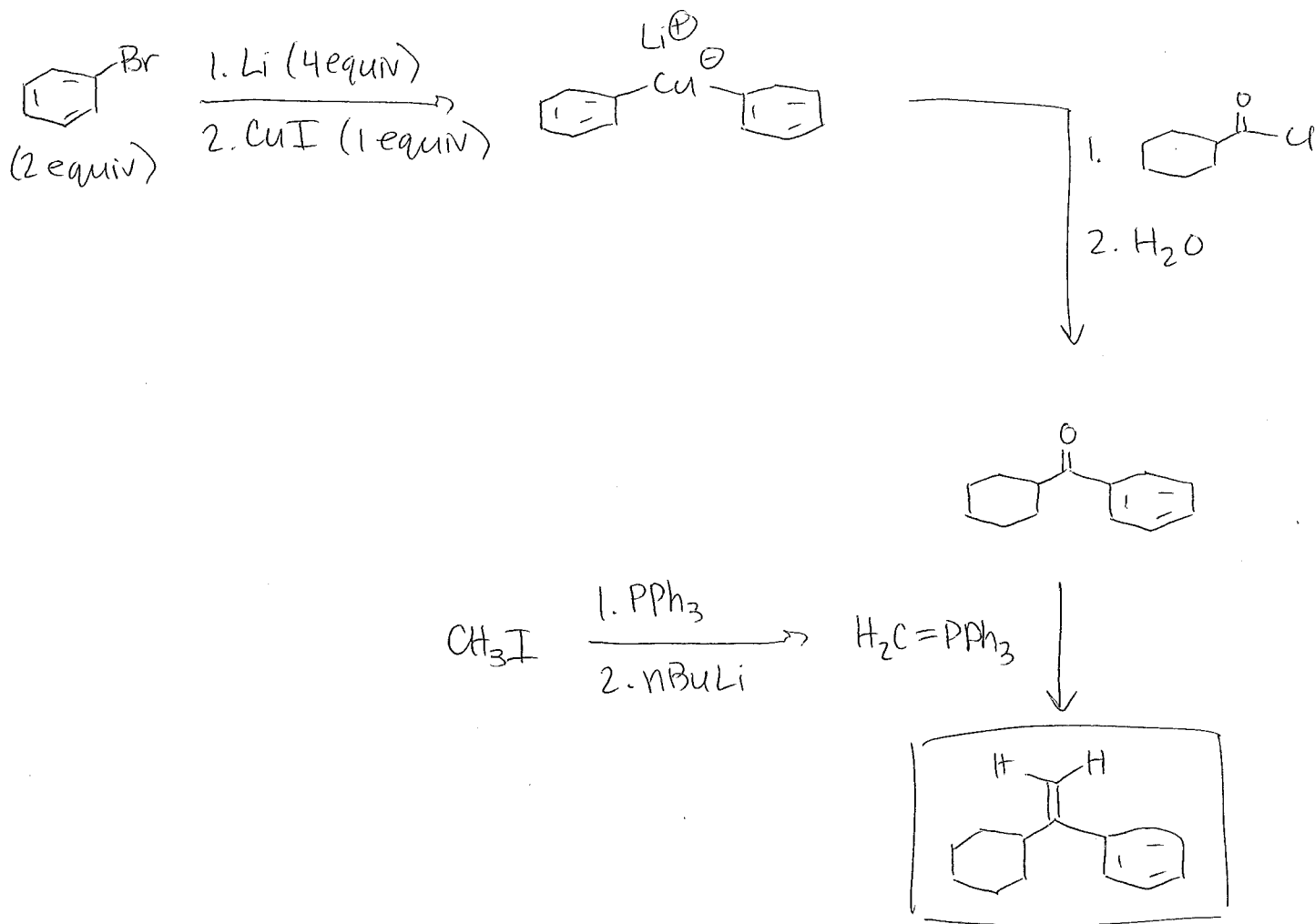


5. B.

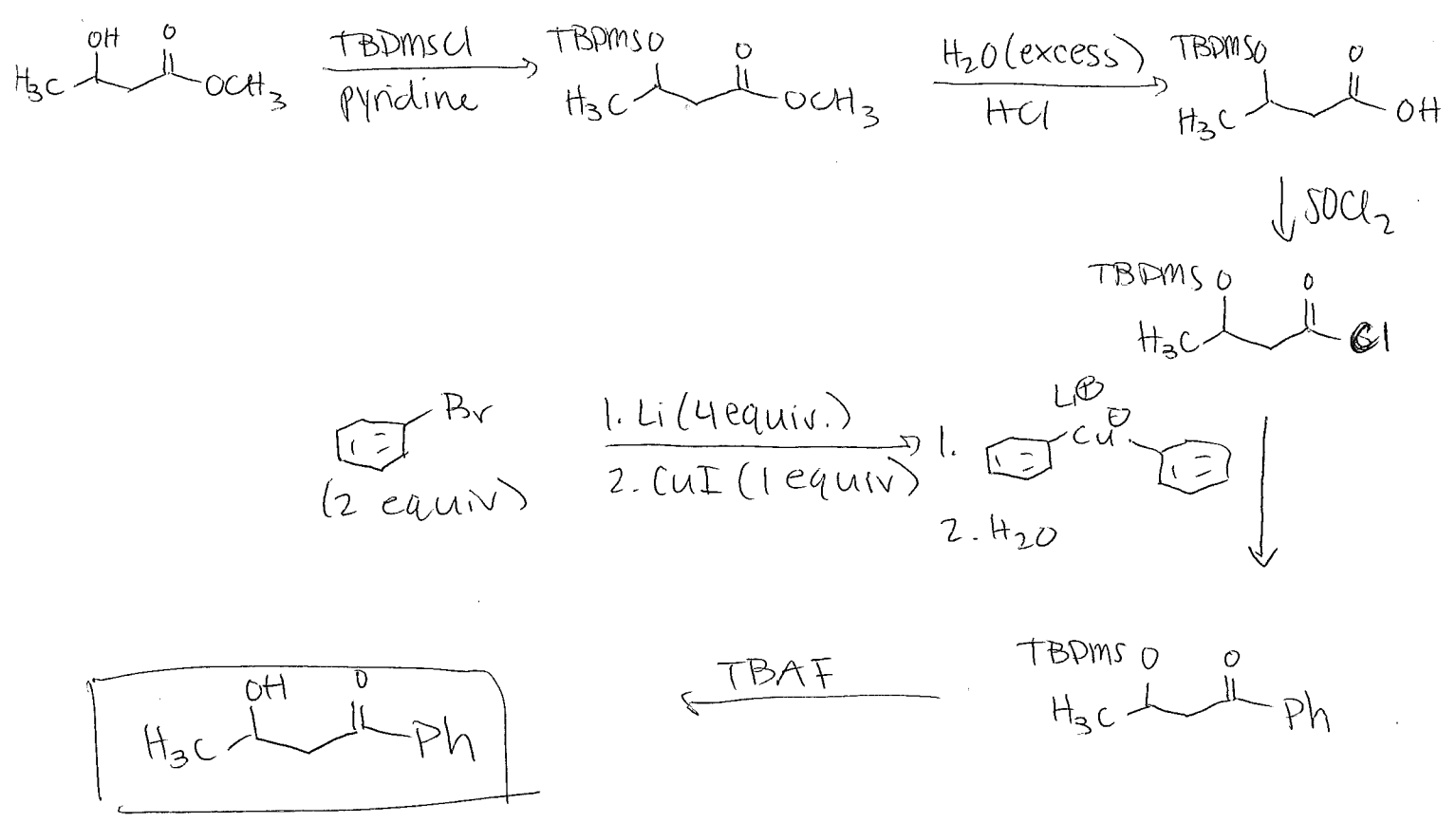




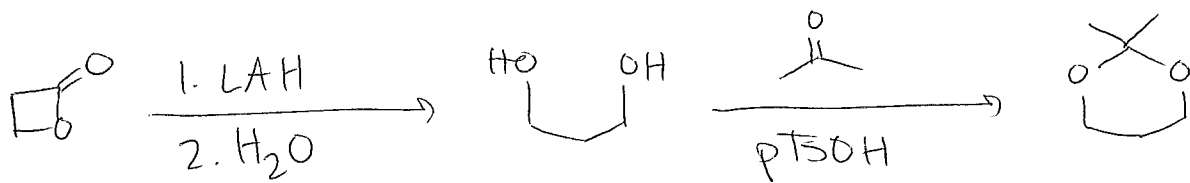
⑥ Target A:



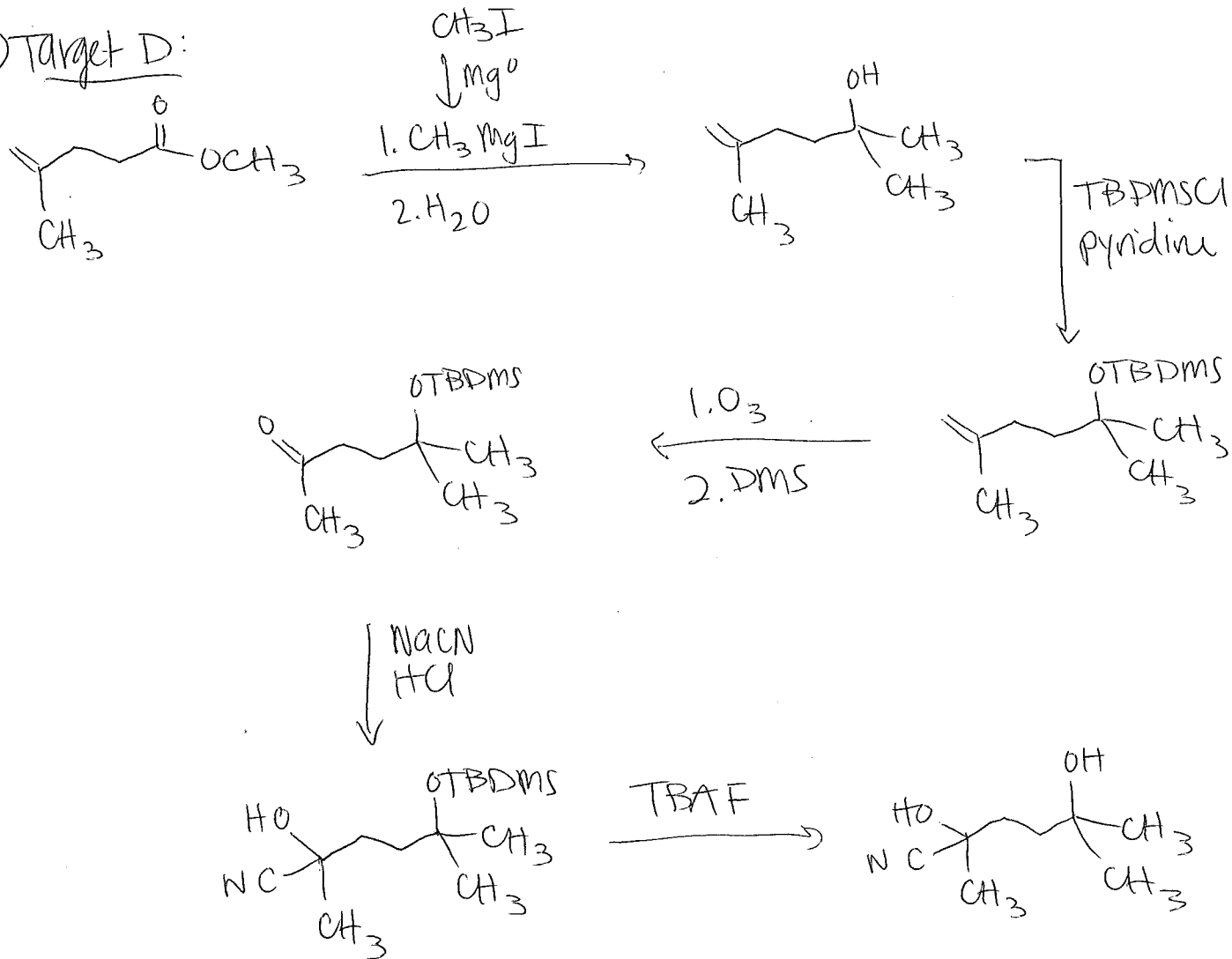
⑥ Target B:



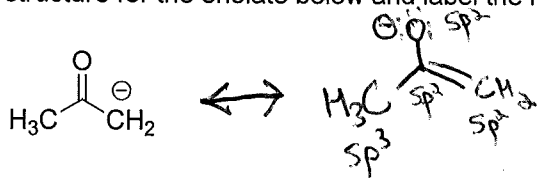
⑥ Target C:



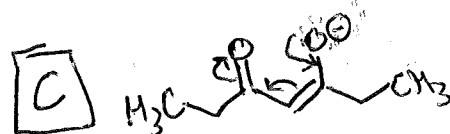
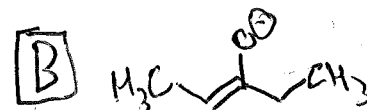
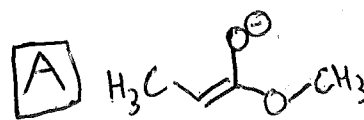
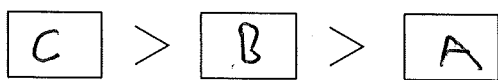
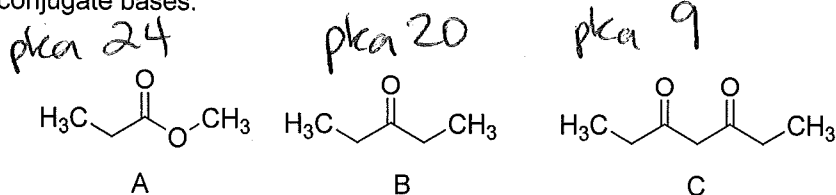
⑥ Target D:



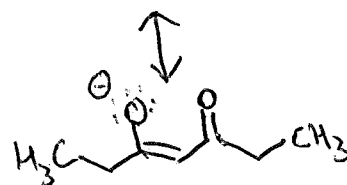
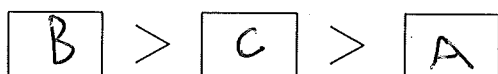
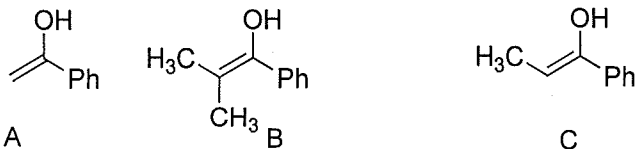
7 a. Draw a resonance structure for the enolate below and label the hybridization of each carbon and oxygen:



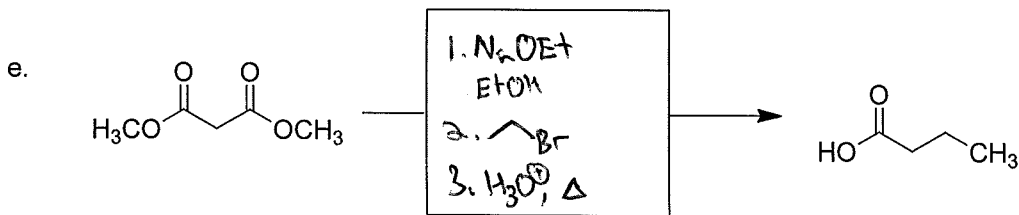
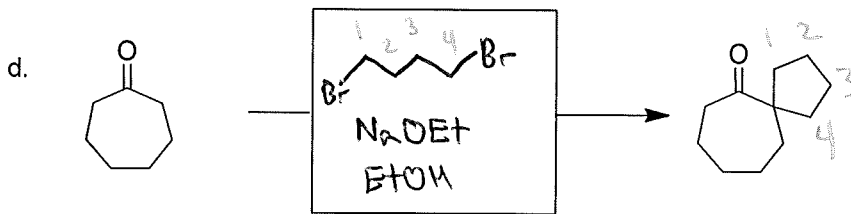
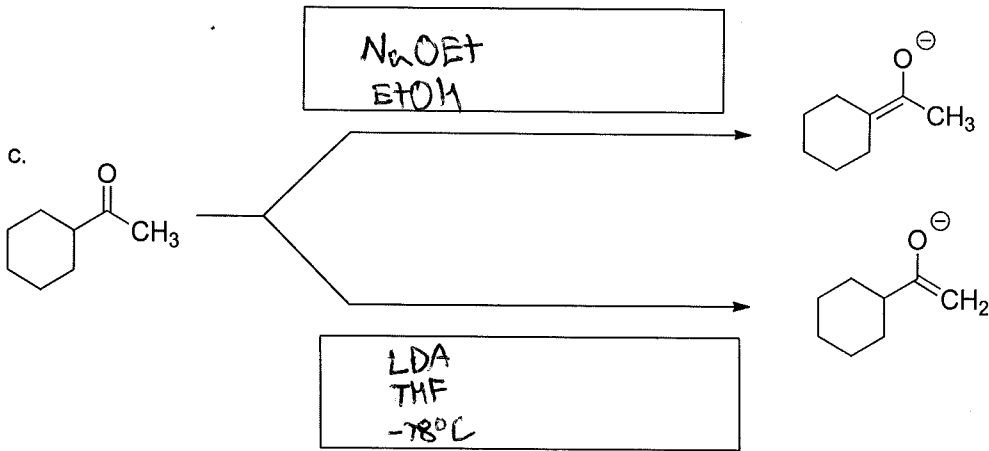
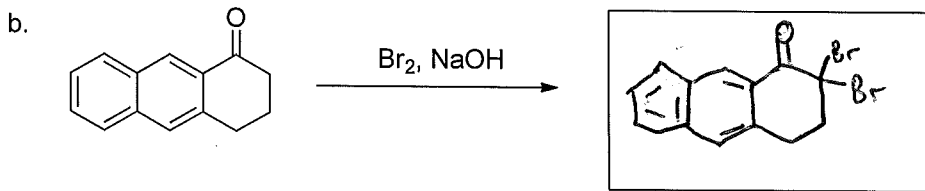
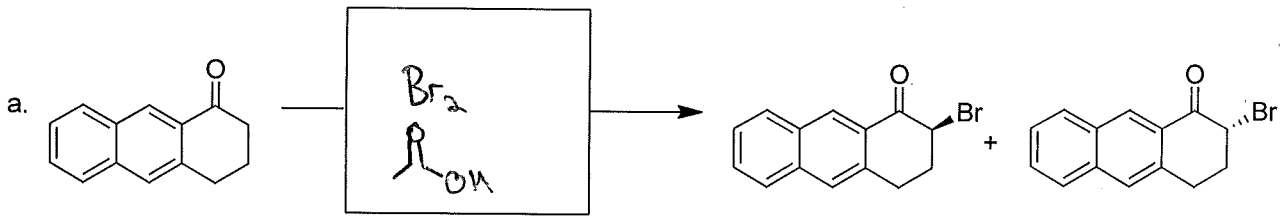
b. Rank the following from most to least acidic, label each with their pKa, and draw the corresponding conjugate bases:



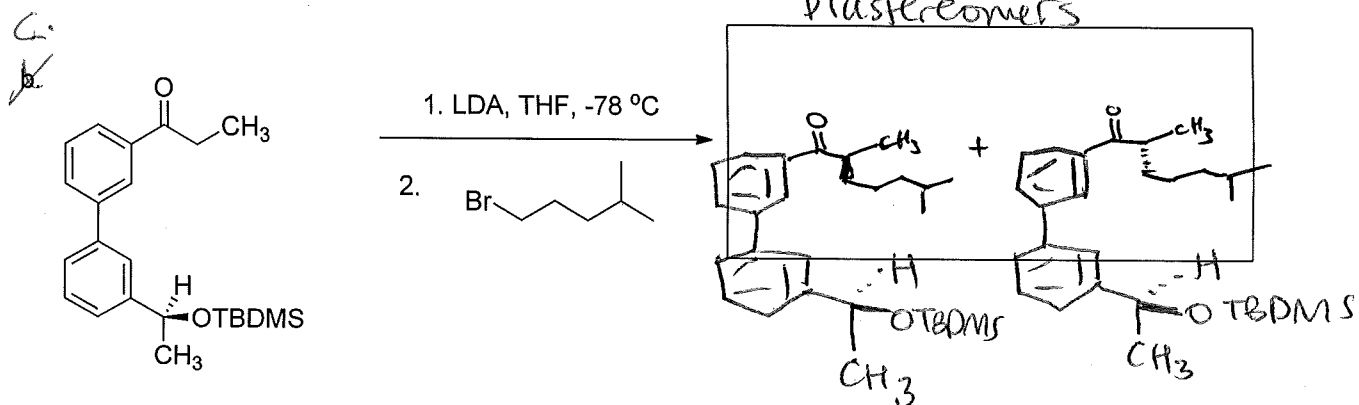
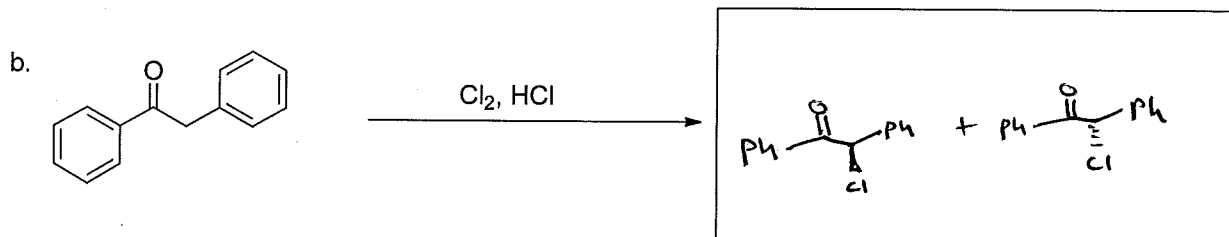
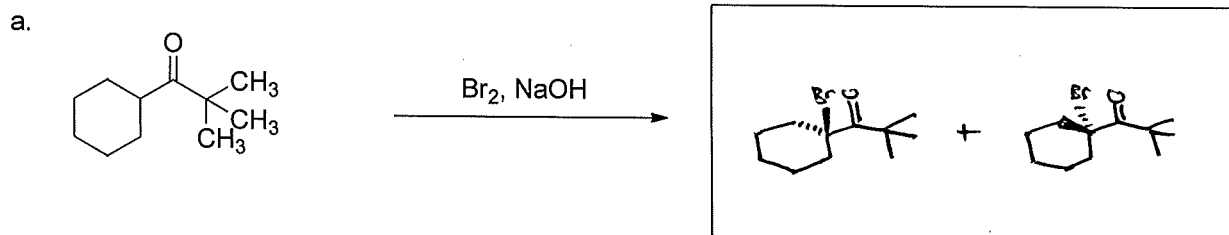
c. Rank the following enols from most to least stable:



8 Fill in the boxes with the appropriate starting material, reagent or major product. Show stereochemistry where appropriate



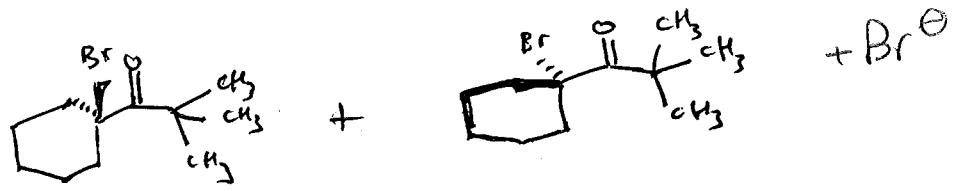
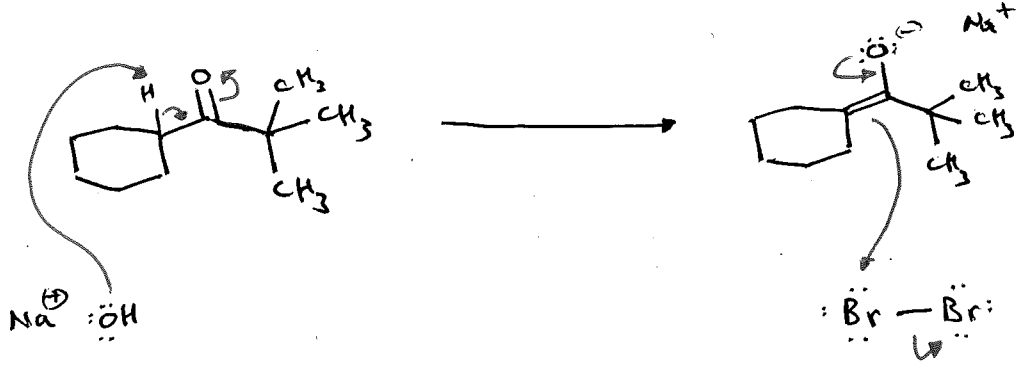
9 Fill in the blank and provide an arrow-pushing mechanism.



Note: for your arrow-pushing mechanism, feel free to abbreviate the starting material as  $\text{Ar-C}(=\text{O})\text{CH}_2\text{CH}_3$

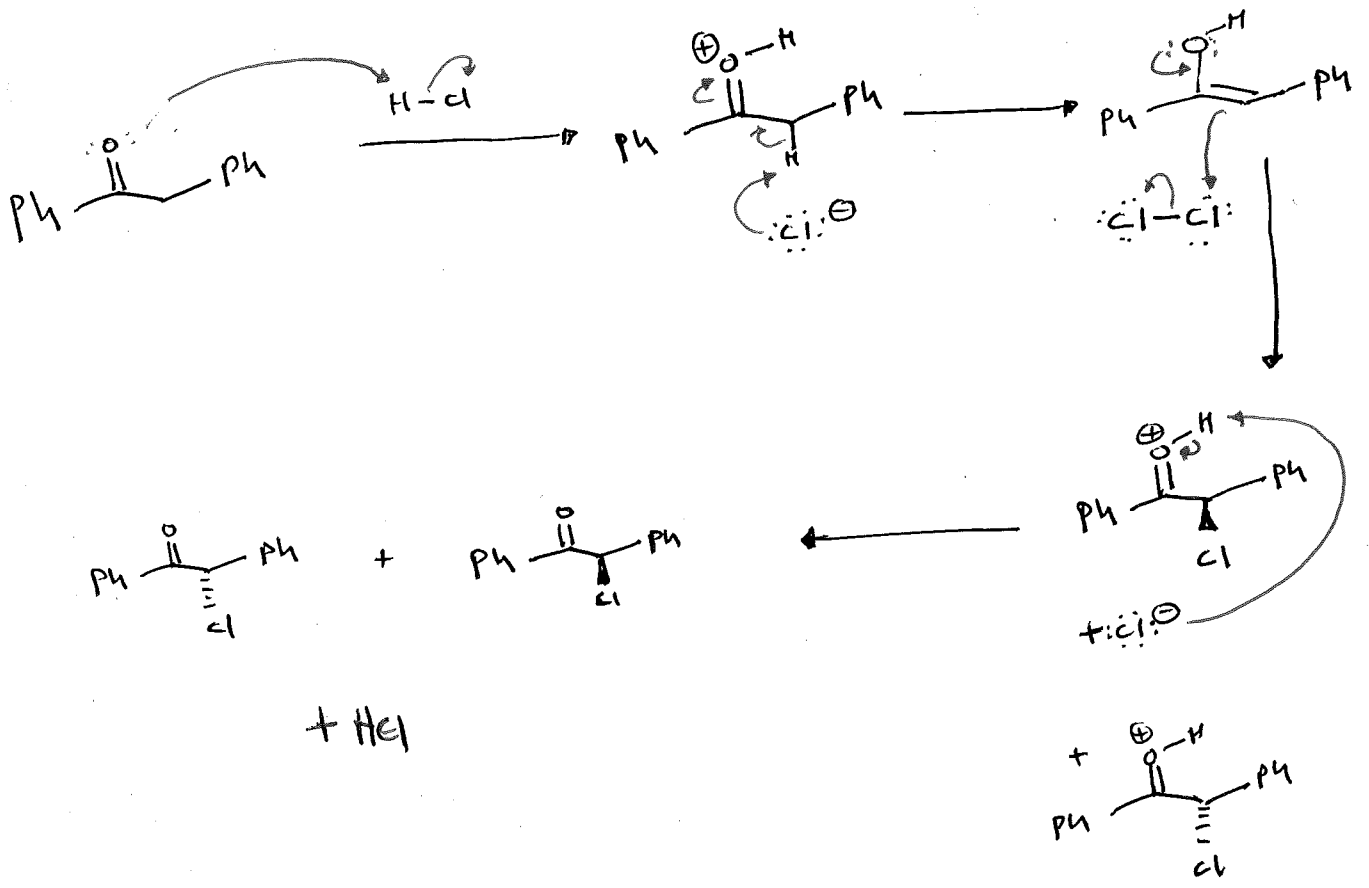
9

a)

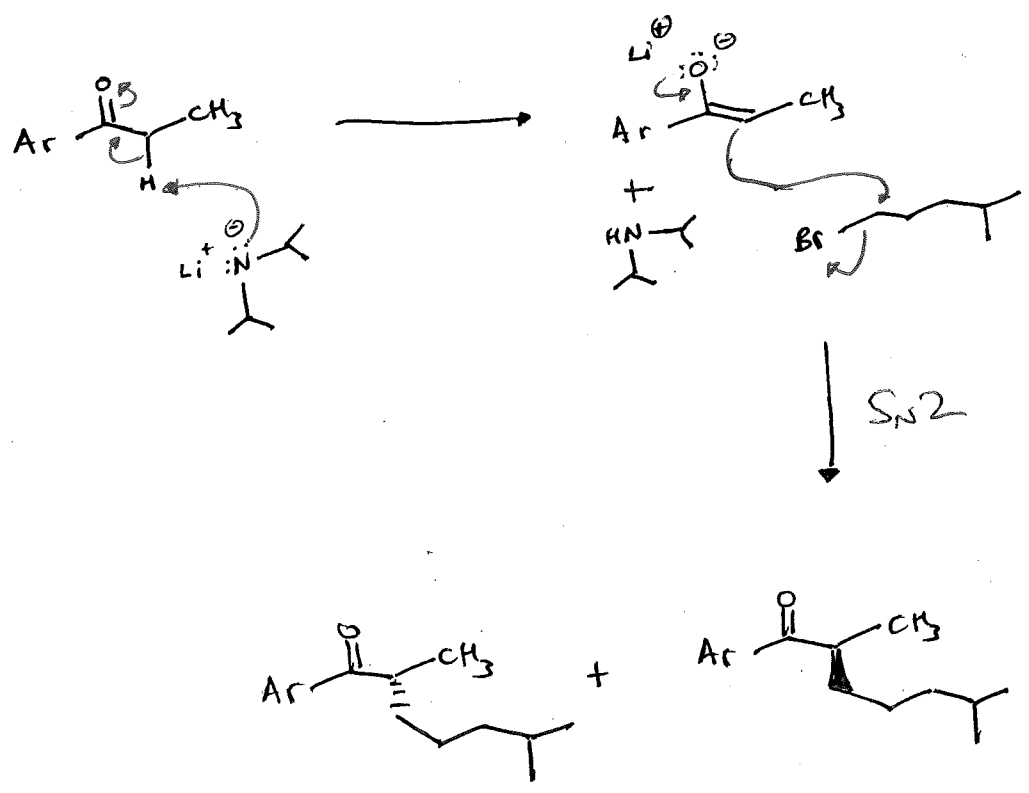


9

b)



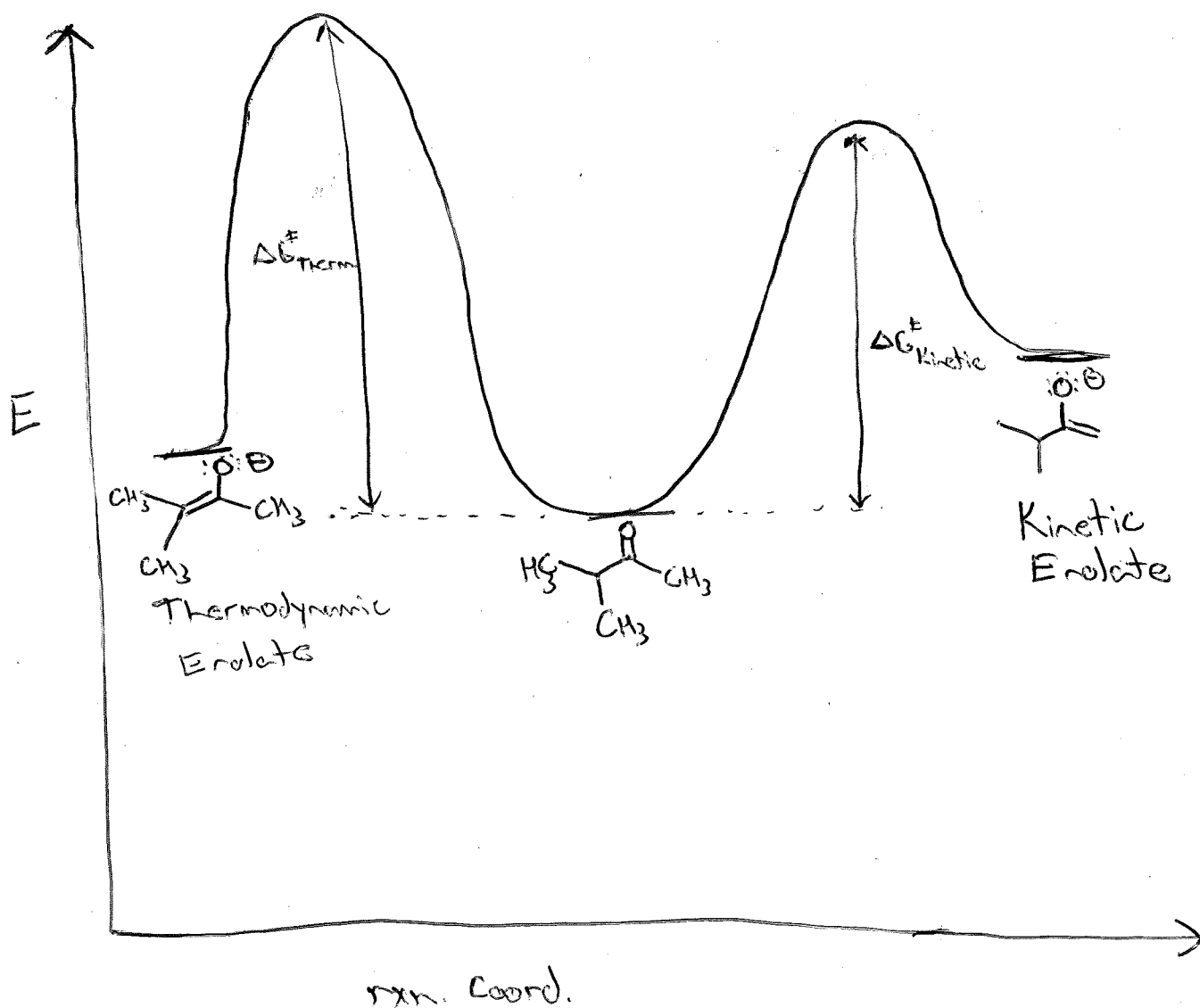
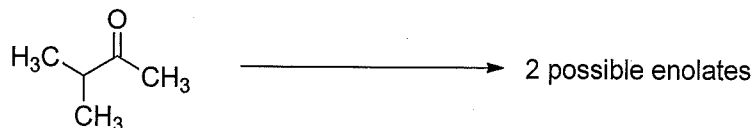
9 c)



10 Draw a reaction coordinate diagram that shows formation of the kinetic and thermodynamic enolates from the ketone below. Clearly draw and label:

- kinetic enolate
- thermodynamic enolate
- $\Delta G^\ddagger$  for formation of each enolate

What conditions would you employ to favor formation of the kinetic enolate? The thermodynamic enolate?



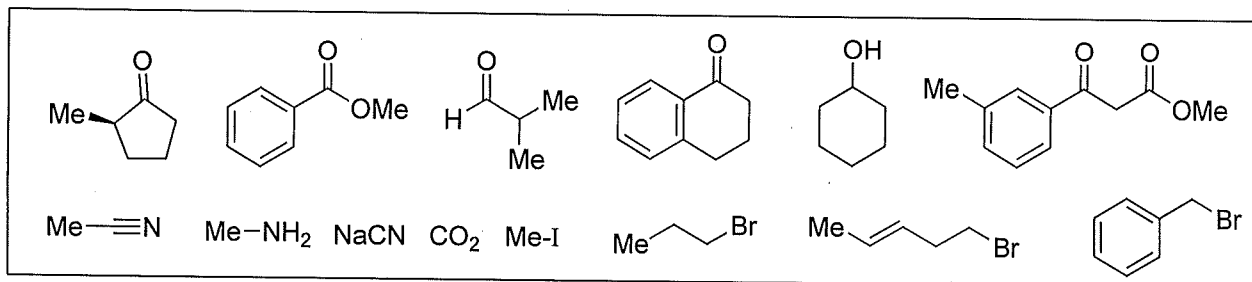
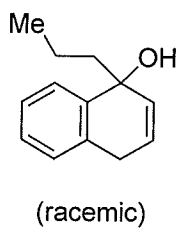
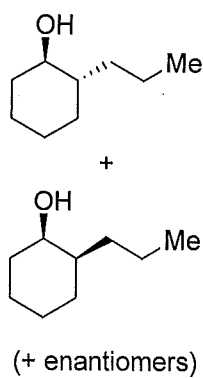
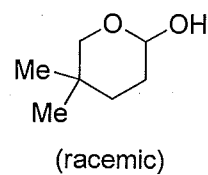
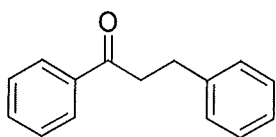
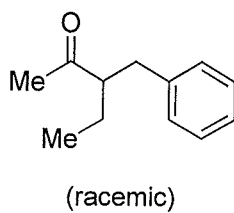
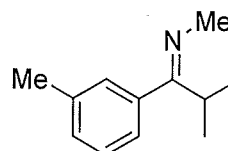
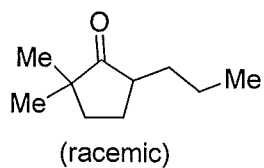
Kinetic: LDA, THF,  $-78^\circ\text{C}$

Thermodynamic:  $\text{NaOEt}$ , EtOH



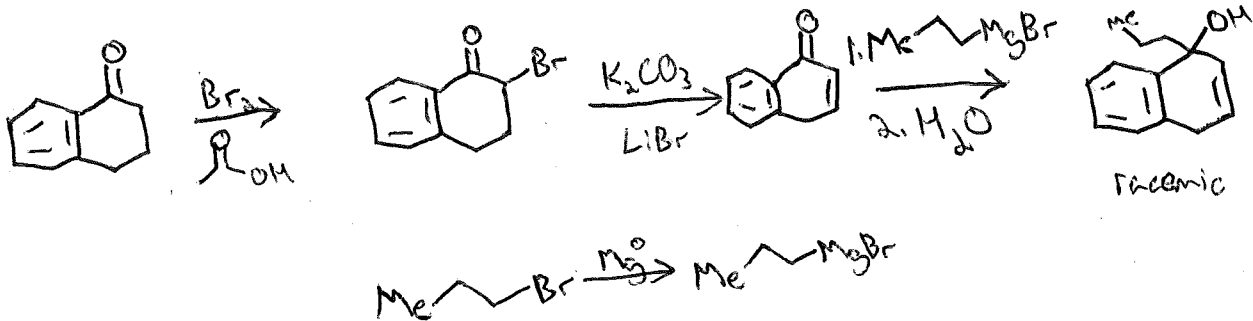
11

Propose syntheses of the targets shown below.

**All carbons** in the product must come from the starting materials provided, you can use any reagent you wish.**Target A.****Target B.****Target C.****Target D.****Target E.****Target F.****Target G.**

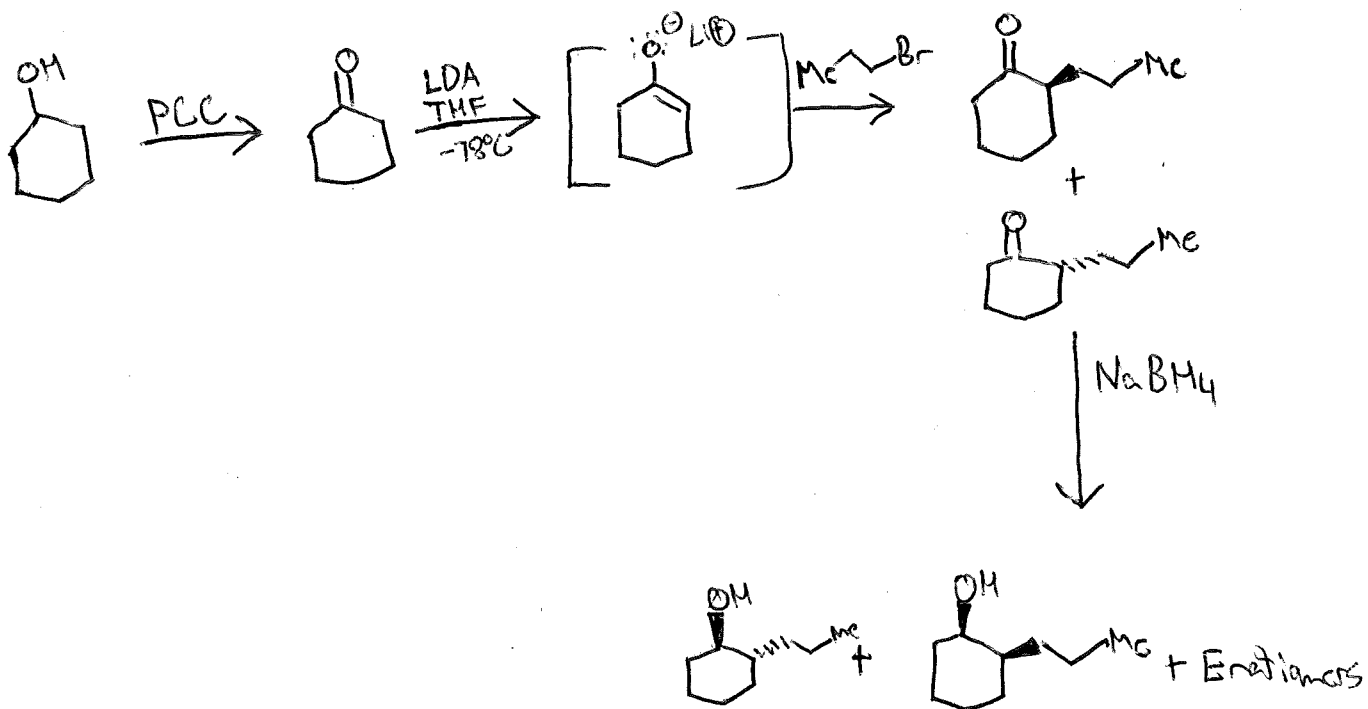
11

(a)

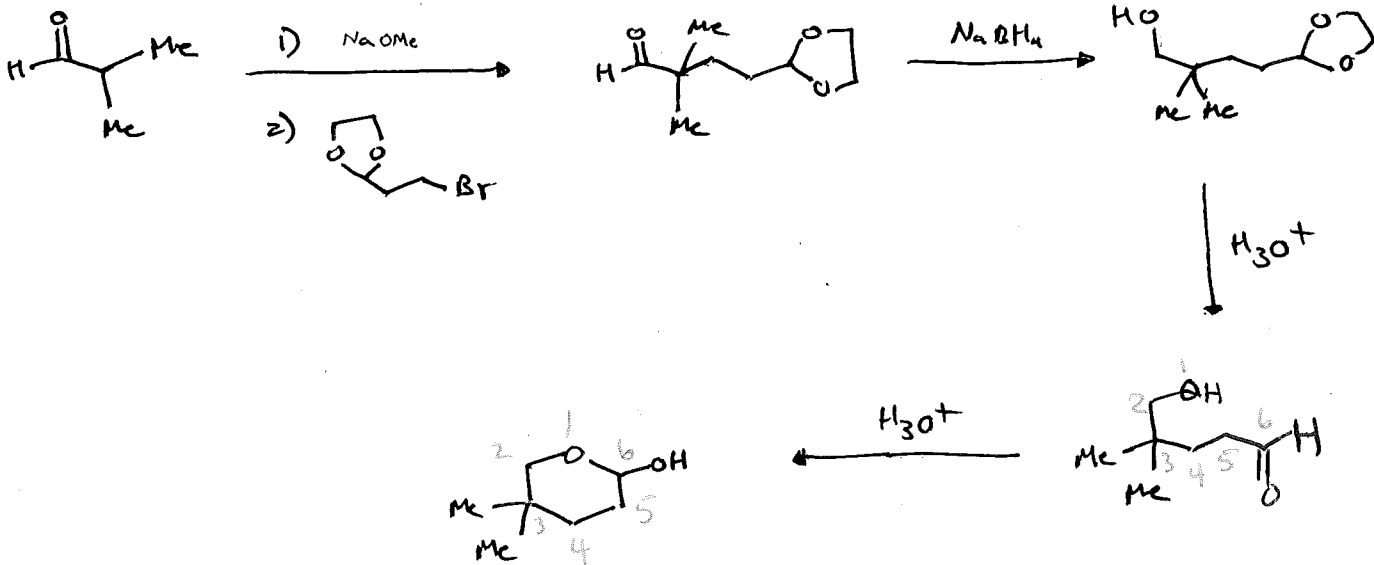
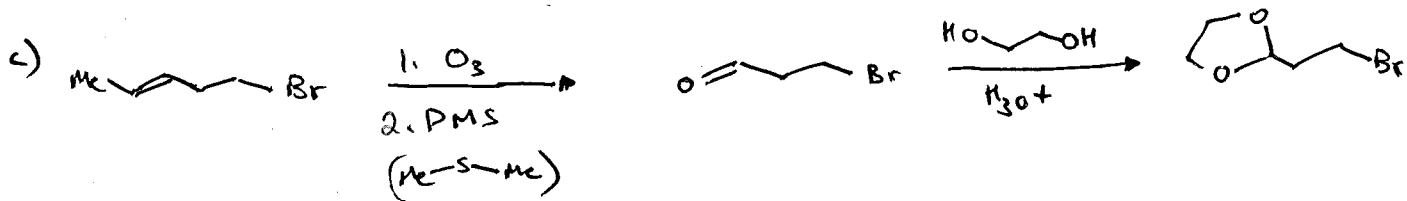


11

(b)



11



11

d)

