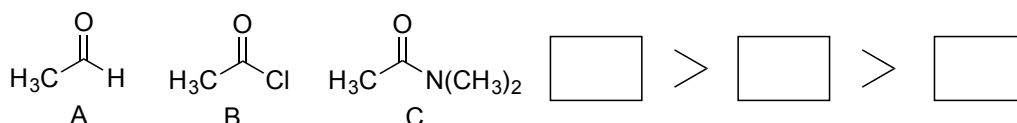


1 (20 points + 1 point bonus).

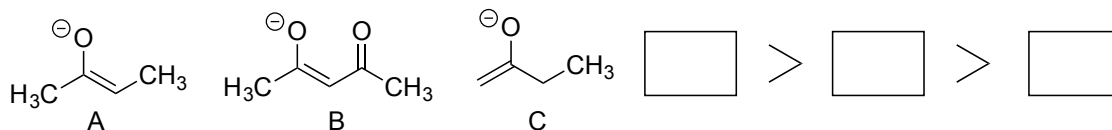
Final Exam, Chem 51C, Jarvo, Spring 18

Initials: _____

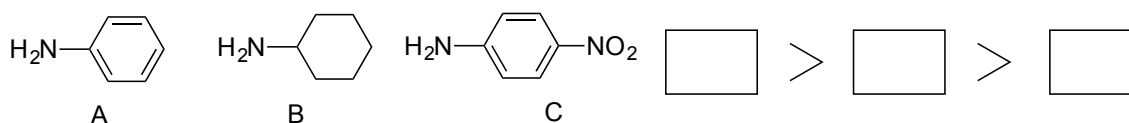
a. Rank fastest to slowest reaction with PhMgCl



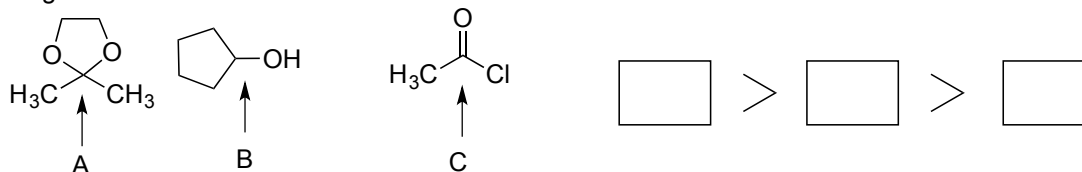
b. Rank the following enolates from **most to least** stable:



c. Most to least basic

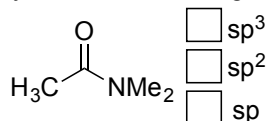


d. Highest to lowest oxidation state:

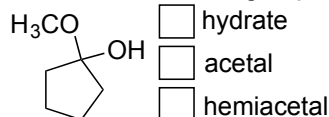


e. Check the appropriate box or boxes.

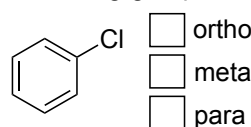
i. Hybridization of nitrogen:



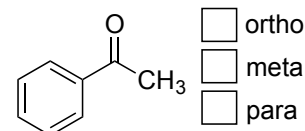
ii. Name of functional group



iii. Directing group



iii. Directing group



f. Fill in the starting materials to complete the syntheses

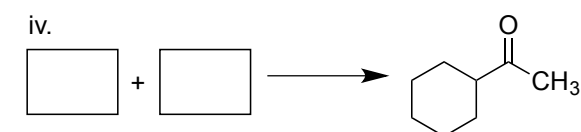
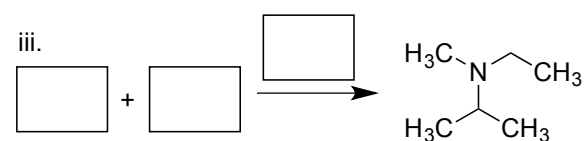
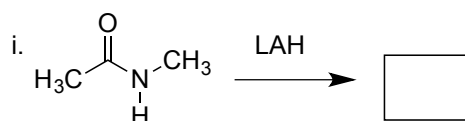
Starting materials

$\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OCH}_3$ (A)
 $\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$ (B)
 $\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$ (C)

$\text{H}_3\text{C}-\text{CH}(\text{OH})-\text{N}(\text{CH}_3)_2$ (D)
 $\text{H}_3\text{C}-\text{CH}_2-\text{OH}$ (E)
 $\text{H}_3\text{C}-\text{CH}_2-\text{N}(\text{CH}_3)_2$ (F)
 $\text{H}_2\text{N}-\text{CH}_3$ (G)

$\text{Cyclohexane}-\text{C}(=\text{O})-\text{OMe}$ (H)
 $\text{Cyclohexane}-\text{C}(=\text{O})-\text{Cl}$ (J)
 $\text{Cyclohexane}-\text{C}(=\text{O})-\text{H}$ (K)

NaCNBH_3 (L)
 NaBH_4 (M)
 H_3CMgBr (N)
 $(\text{H}_3\text{C})_2\text{CuLi}$ (O)

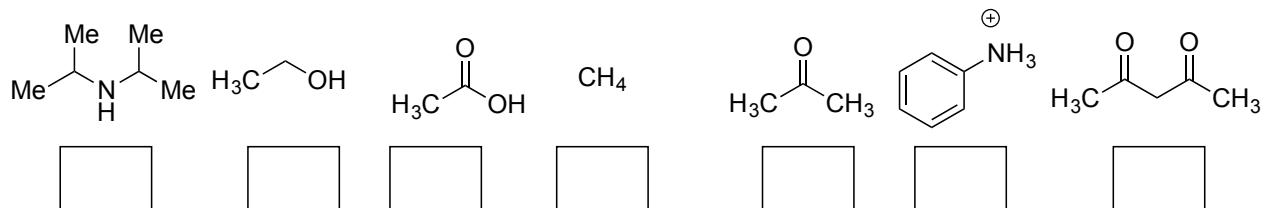


BONUS: What happens when you mix LiAlH_4 and H_2O ?

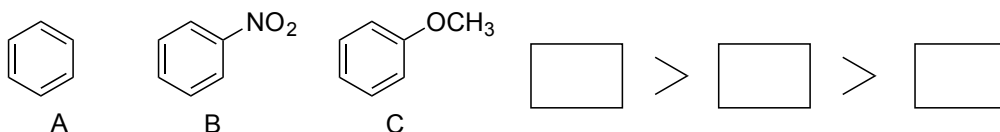
2 (18 points + 1 point bonus)

Initials: _____

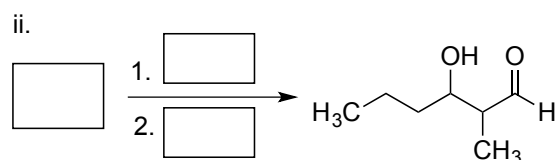
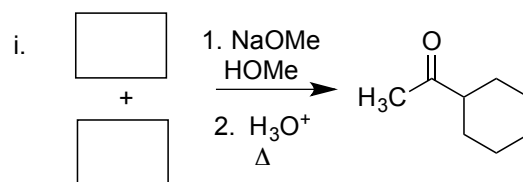
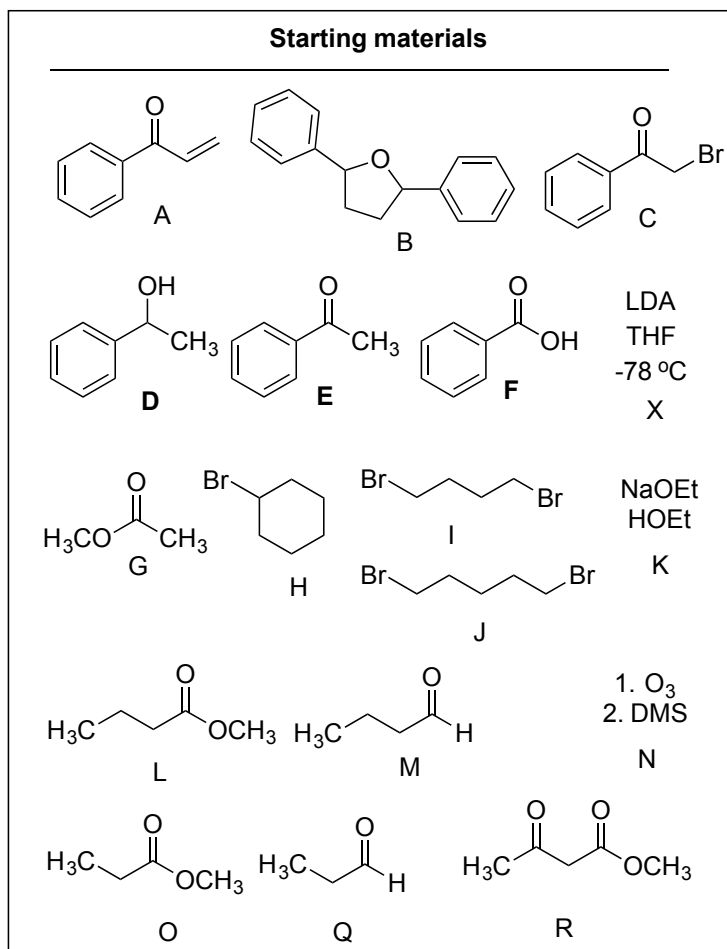
a. Provide pKa's for **any 6** of the following compounds (if you do them all, we will count your best 6).



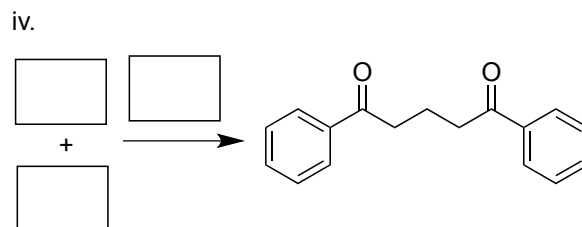
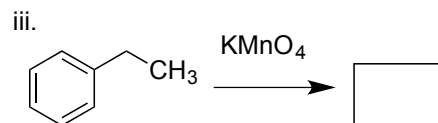
b. Rank fastest to slowest electrophilic aromatic substitution



c. Fill in the starting materials to complete the syntheses



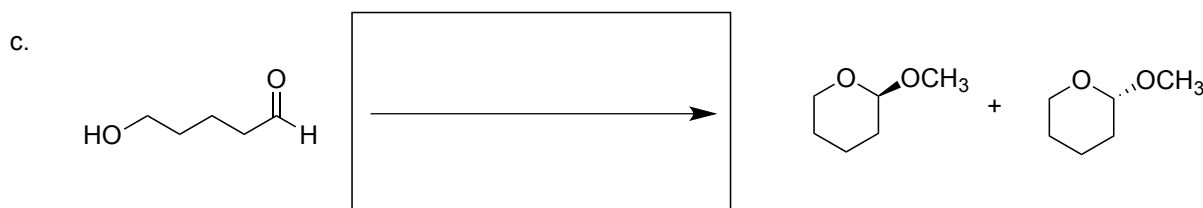
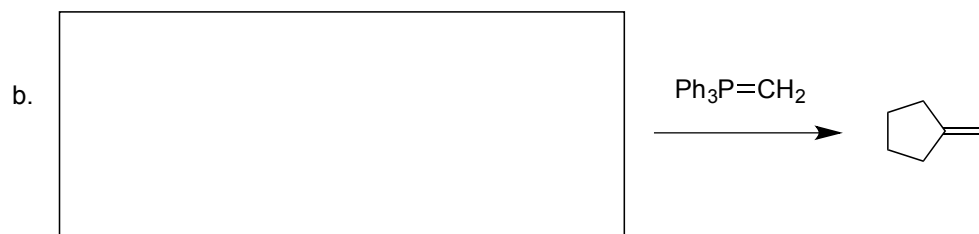
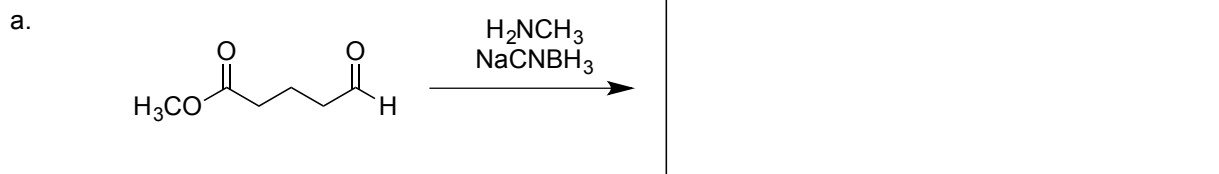
Name of reaction:



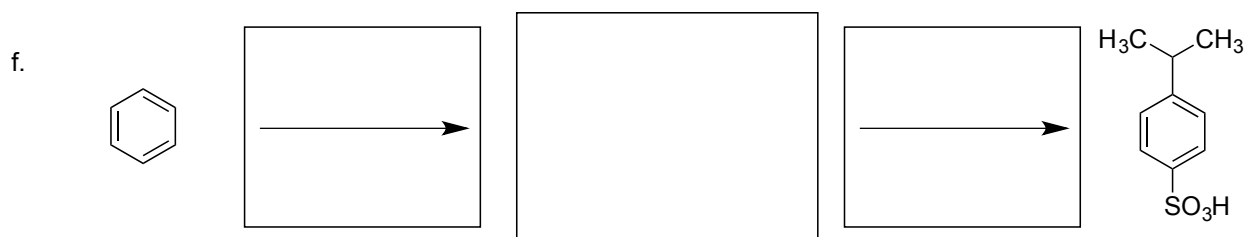
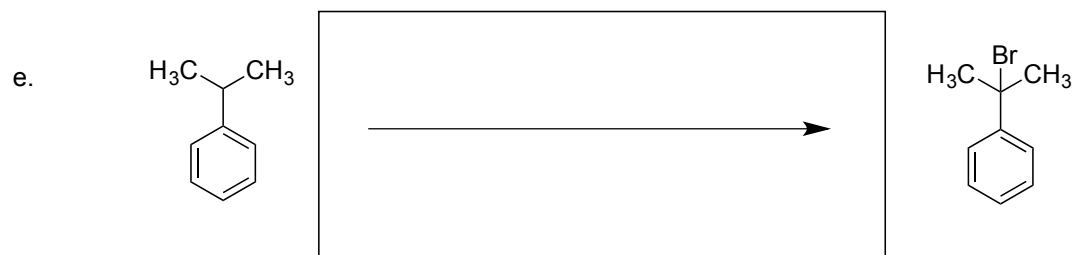
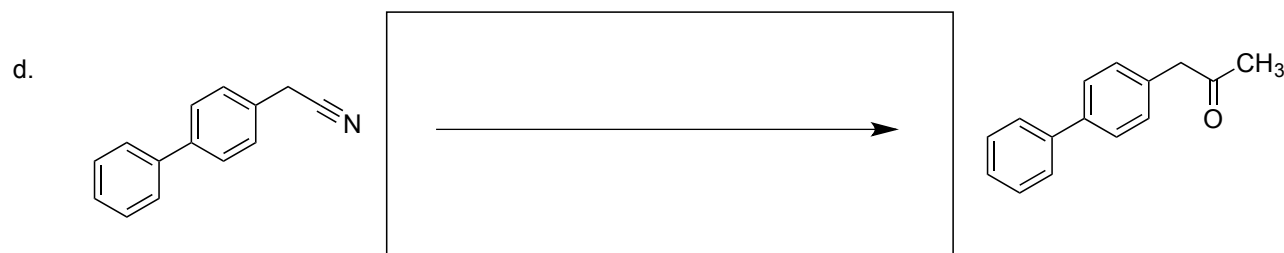
BONUS: What was your favorite song played at the beginning of lecture?

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

Initials: _____

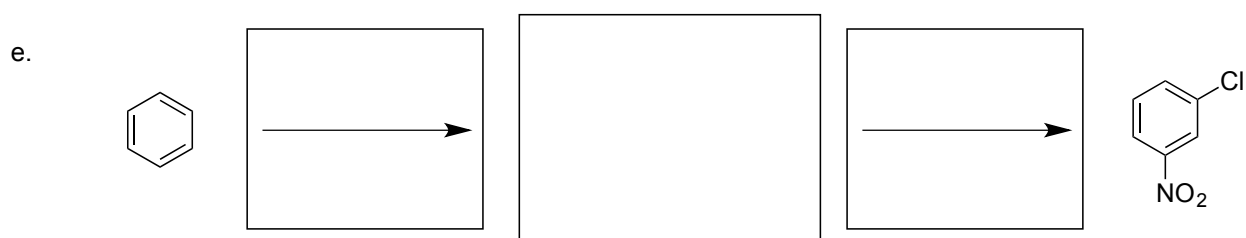
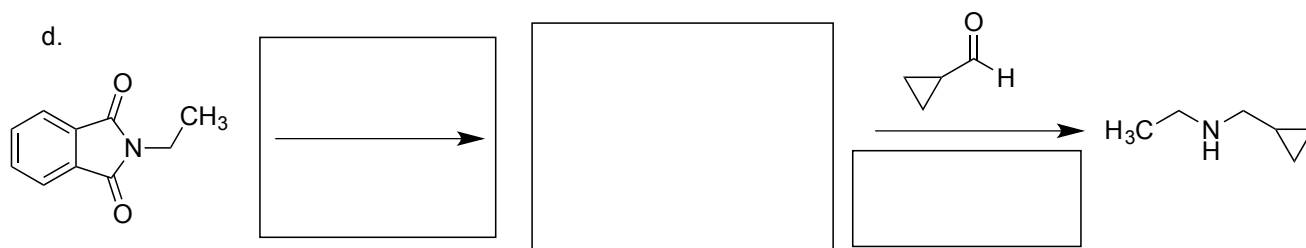
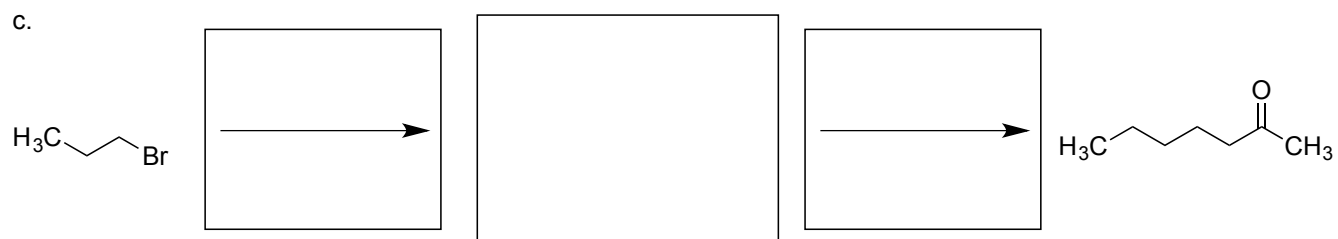
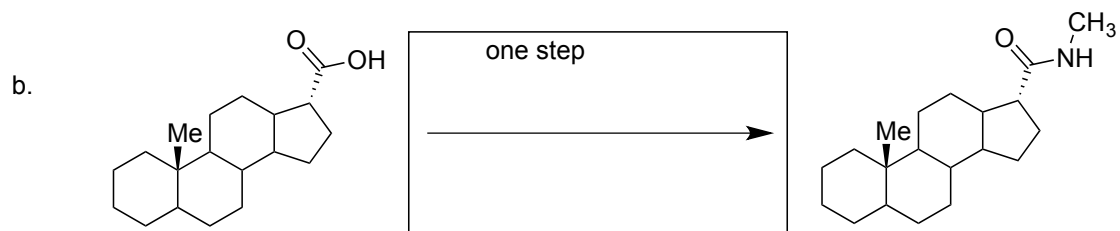
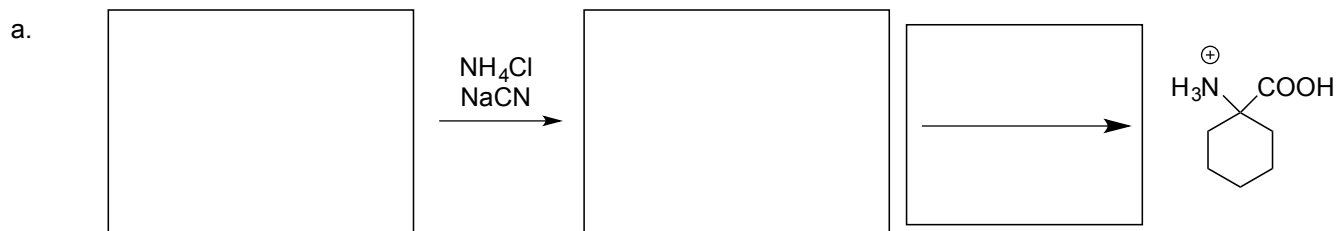


Is this reaction an oxidation, reduction, or neither?



4. Fill in the boxes with the appropriate starting material, reagent or major product (35 points).
 Show stereochemistry where appropriate

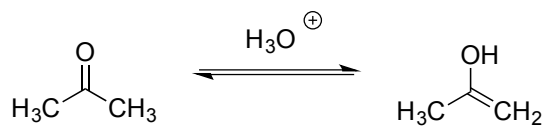
Initials: _____



5. (11 points) Provide an arrow-pushing mechanism.

Initials: _____

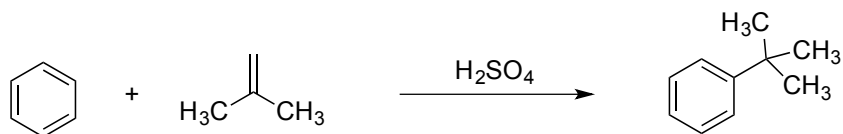
a.



What is the relationship between the starting material and product?

Mechanism:

b.



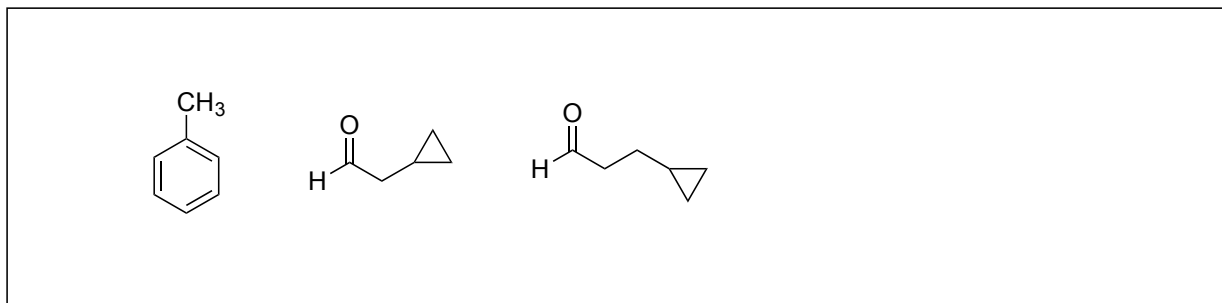
Mechanism:

Initials: _____

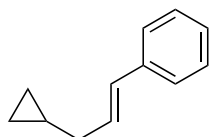
6. (6 points) Propose a synthesis of the target below.

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

YOU CAN IGNORE STEREOCHEMISTRY.



Target



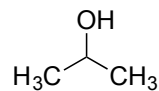
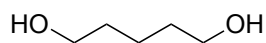
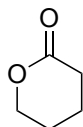
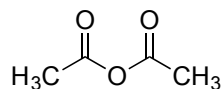
7. (4 points) Propose a synthesis of the target below.

Initials: _____

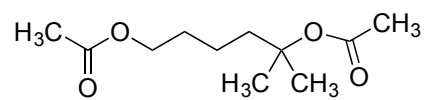
All carbons must come from the starting materials provided, you can use any reagent you wish.

YOU CAN IGNORE STEREOCHEMISTRY.

Starting Materials:



Target

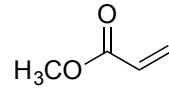
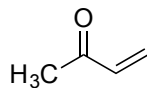
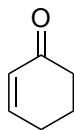
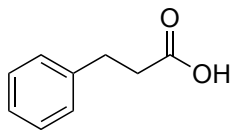
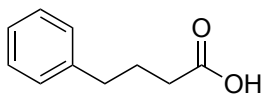


8. (6 points) Propose a synthesis of the target below.

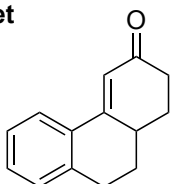
Initials: _____

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

Starting Materials:



Target

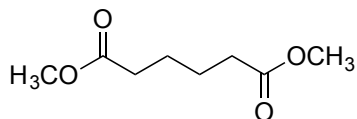
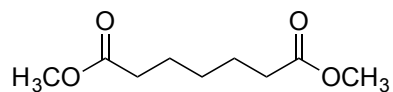
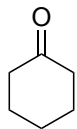
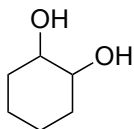


9. (6 points) Propose a synthesis of the target below.

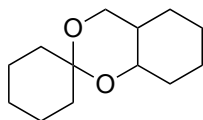
Initials: _____

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

Starting Materials:



Target

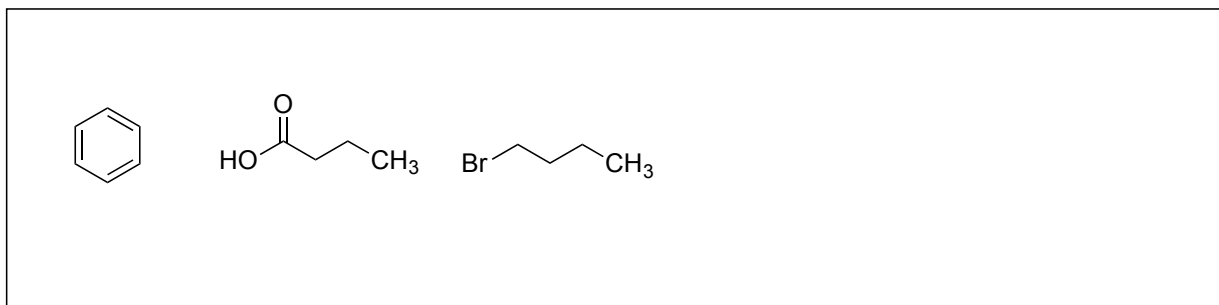


Initials: _____

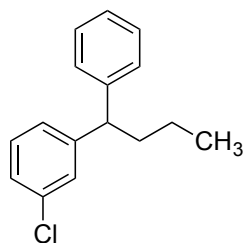
10. (8 points) Propose a synthesis of the target below.

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

YOU CAN IGNORE STEREOCHEMISTRY.



Target

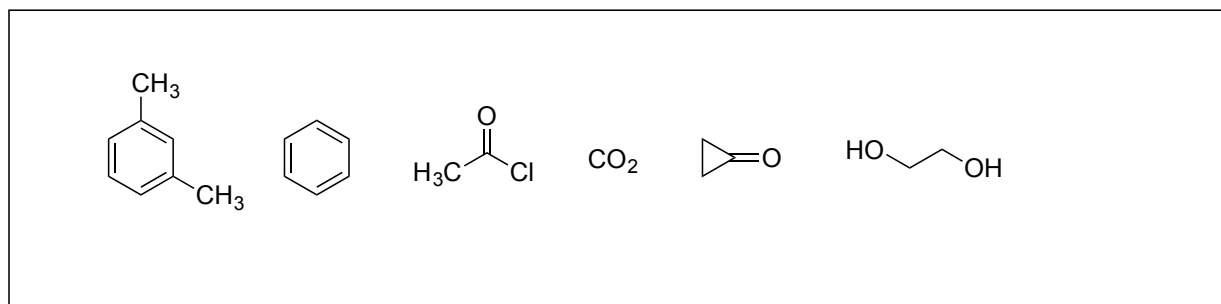


Initials: _____

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

