

1. (15 points)

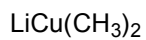
a. Most to least nucleophilic organometallic reagent



A



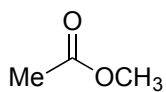
B



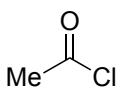
C



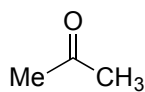
b. Rank fastest to slowest reaction with LiAlH₄



B



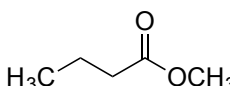
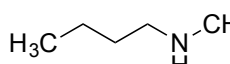
C

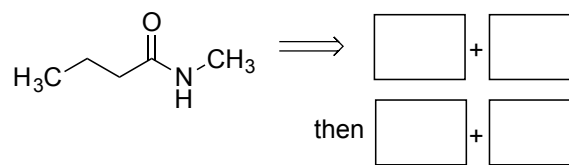


D

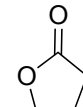
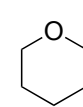
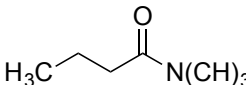
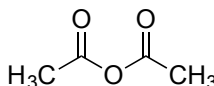
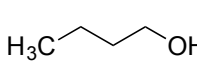
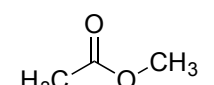
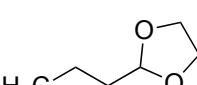
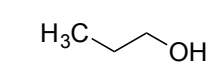


c. Fill in the correct compounds from the table to complete the retrosynthesis. You can use the same compound more than once.

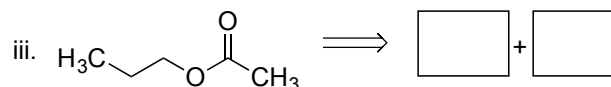
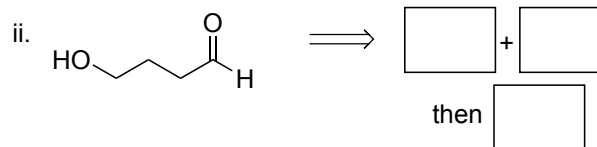
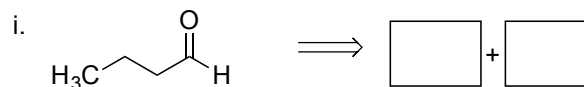
Compounds	
A NH ₃	D PCC
B 	E NaOH
C 	F DCC
	G H ₂ NCH ₃



d. Fill in the correct compounds from the table to complete the retrosyntheses. You can use the same compound more than once.

Compounds	
A LiAlH ₄	I 
B Dibal-H	K 
C NaBH ₄	M 
D 	O 
E 	P 
F H ₃ O ⁺	
G H ₂ O	
H 	

Products



2. (13 points)

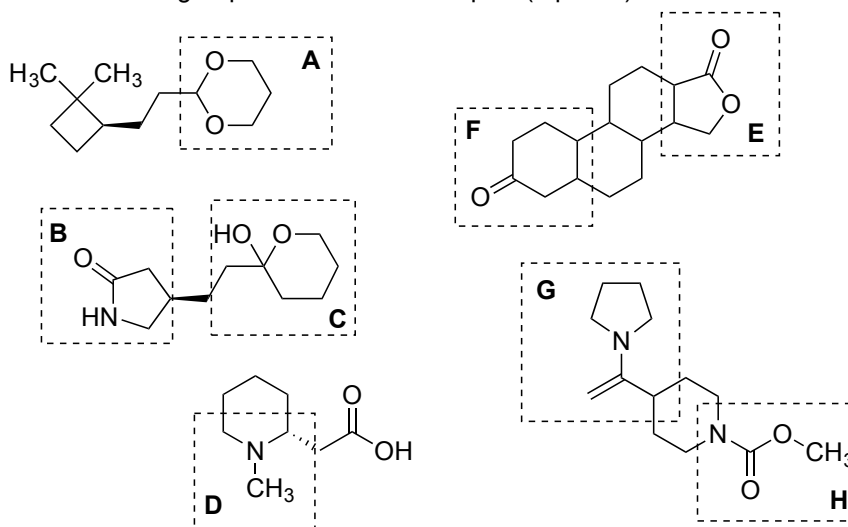
a. Match the names of the functional groups with labeled examples (3 points).

Initials: _____

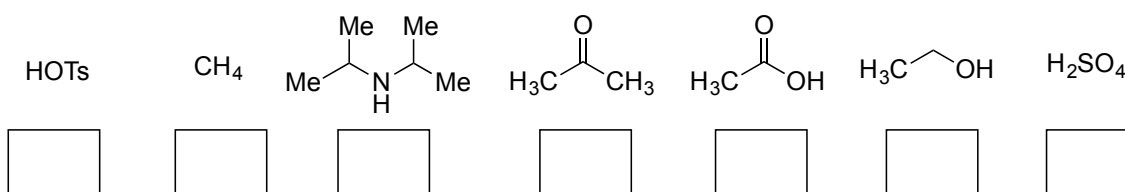
hemiacetal

enamine

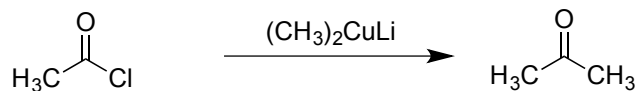
lactone



b. Provide pKa's for **any 5** of the following compounds (if you do them all, we will count your best 5).



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

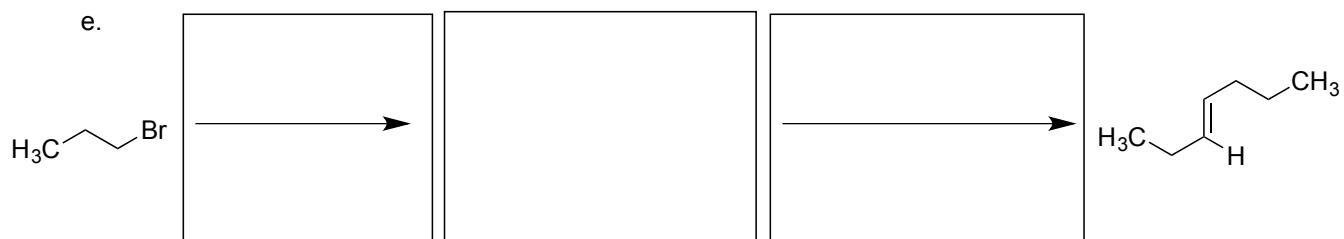
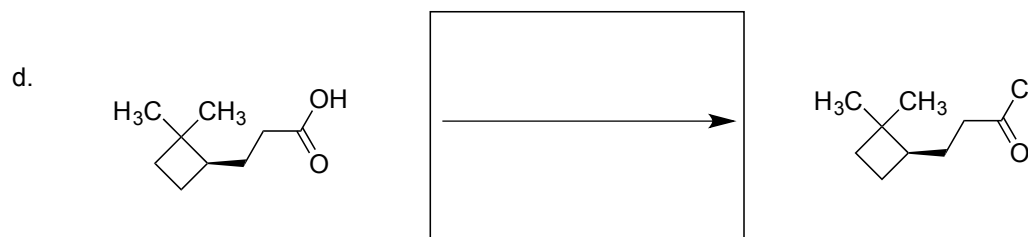
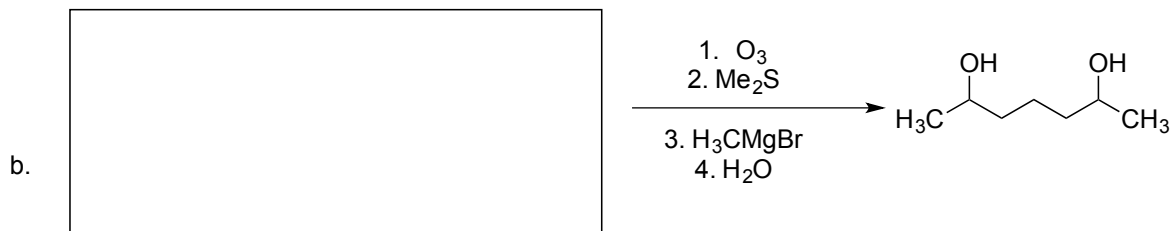
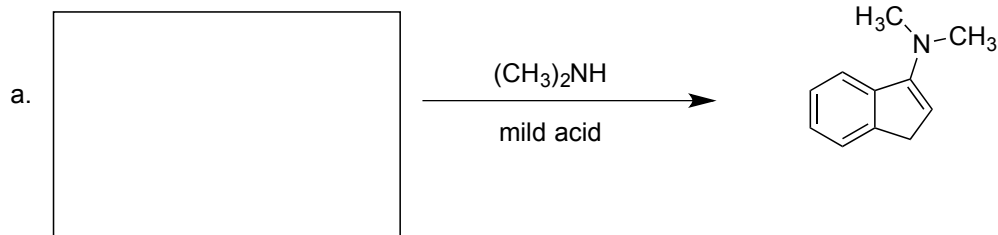


What is the name of this type of reagent?

Mechanism:

3. (21 points) Fill in the boxes with the appropriate starting material, reagent or major product. Show stereochemistry where appropriate.

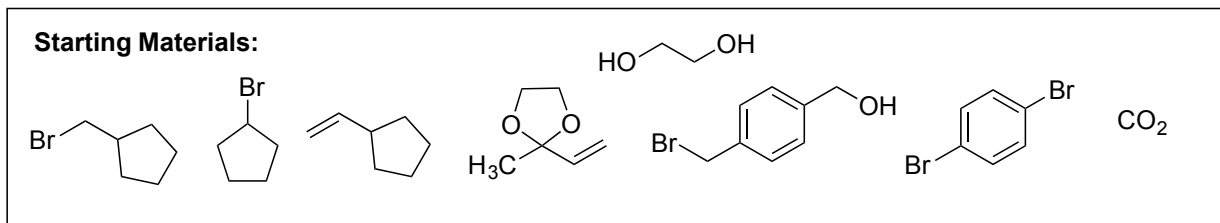
Initials: _____



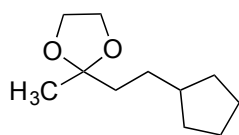
Initials: _____

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

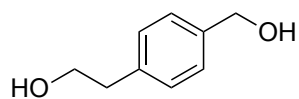
All carbons in the product must come from the starting materials provided, you can use any reagent you wish.
YOU CAN IGNORE STEREOCHEMISTRY.



Target A.



Target B.

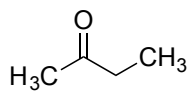
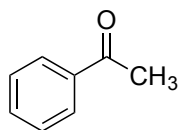


Initials: _____

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

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

Starting Materials:



Target.

