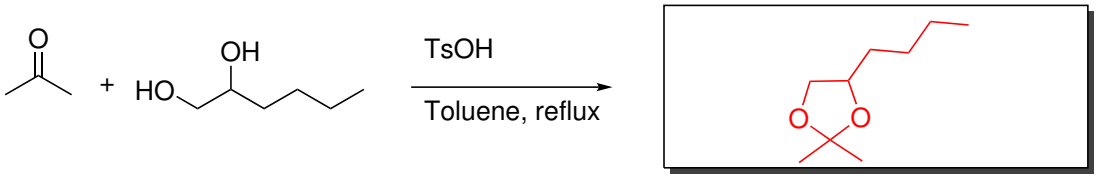
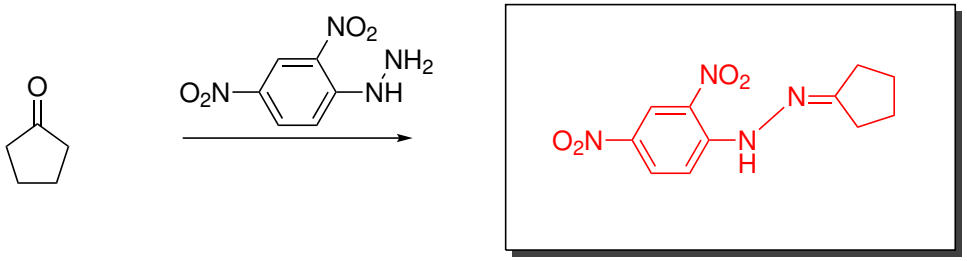
Name_____

1. (5 points each; 25 total) Place the structure of the major organic product of each reaction in the box provided. Specify the correct stereochemistry in any case where that is an issue.

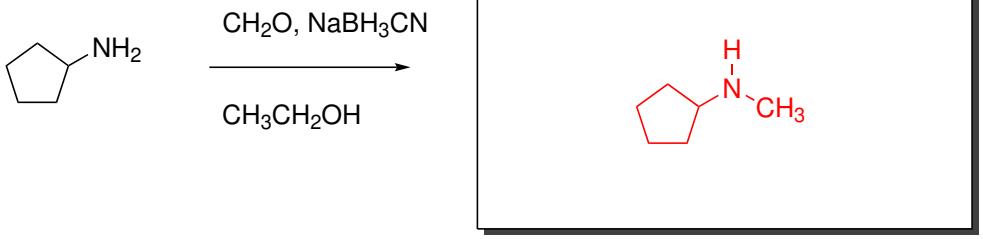
A.



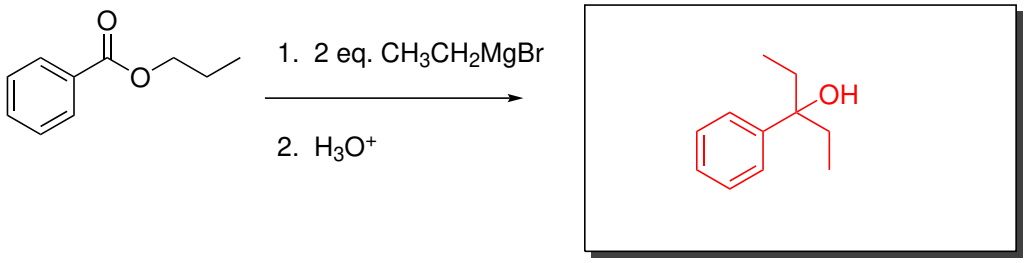
B.



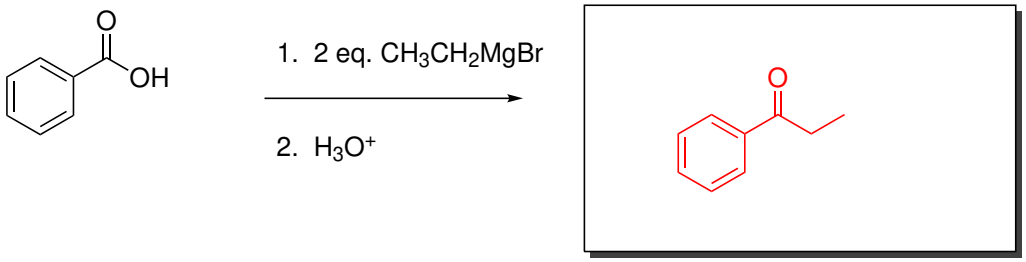
C.



D.

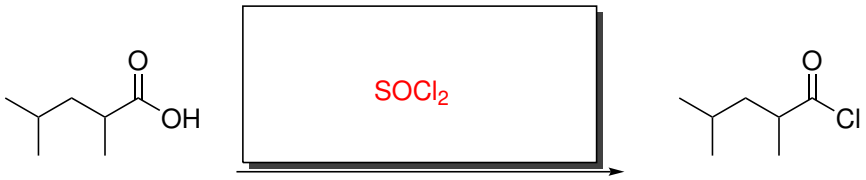


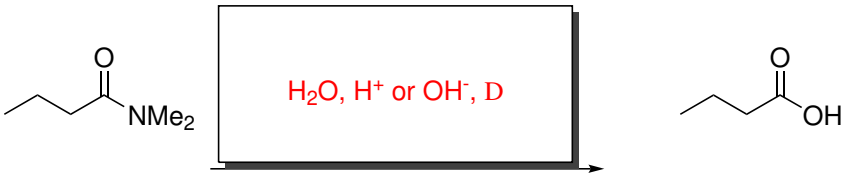
E.

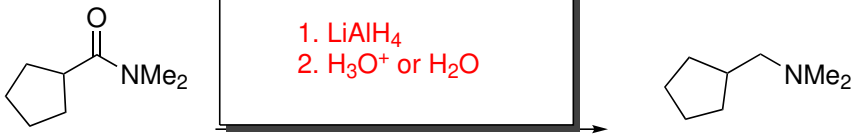


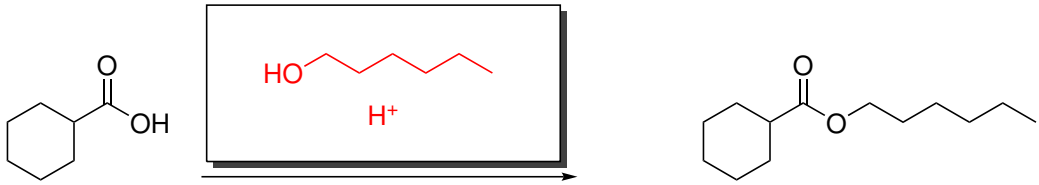
Name_____

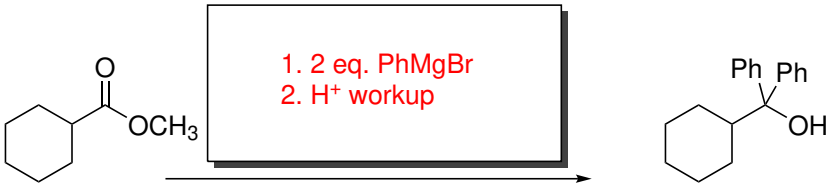
2. (5 points each; 30 total) Specify reagents or conditions that will accomplish each of the following transformations.

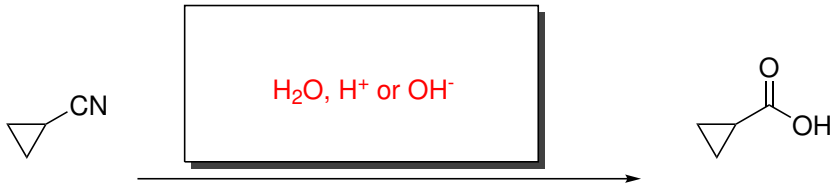
A. 

B. 

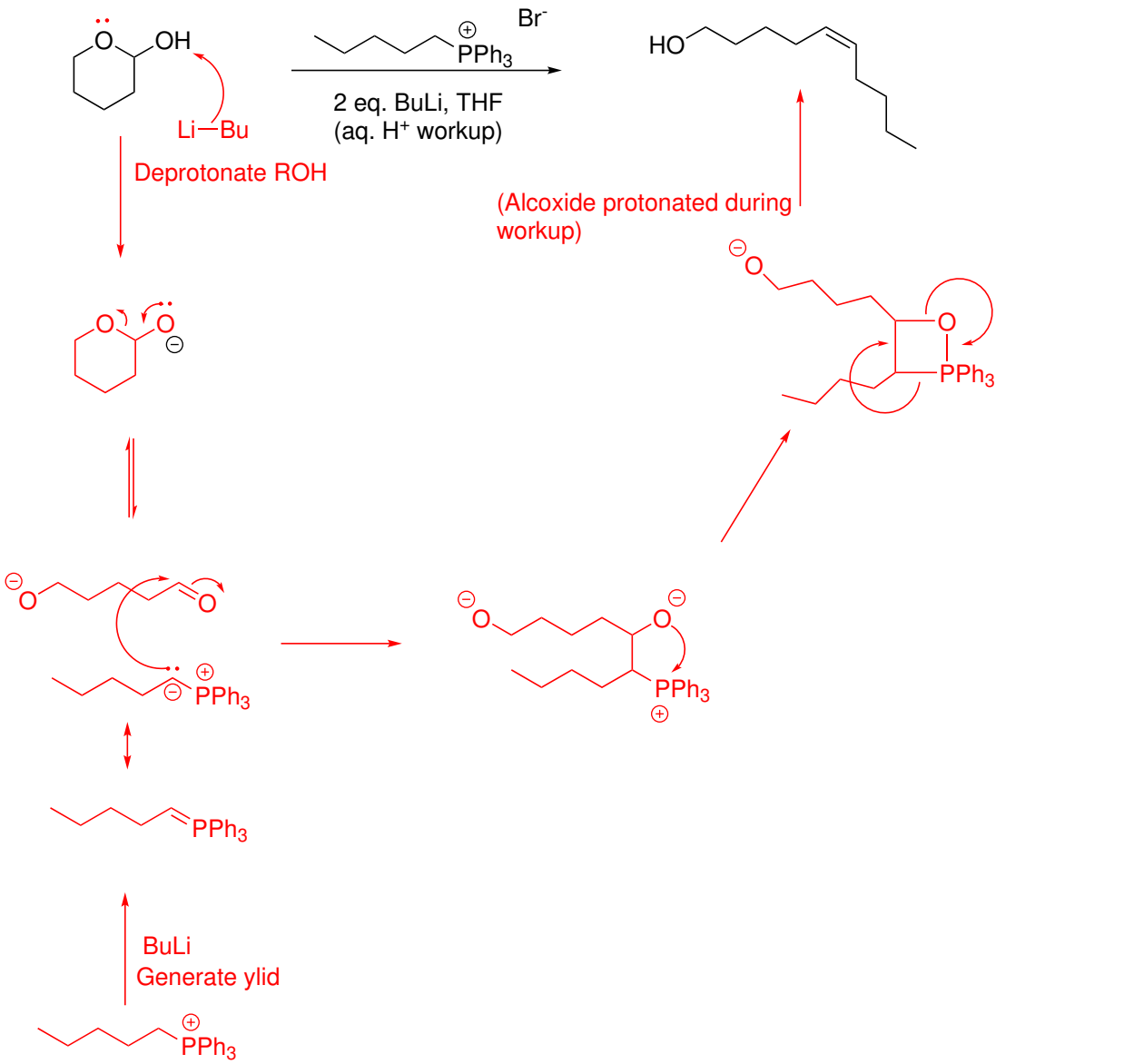
C. 

D. 

E. 

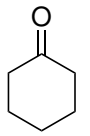
F. 

Name_____


OH
Li—Bu
Br-
PPh3
2 eq. BuLi, THF
(aq. H+ workup)
HO
Deprotonate ROH
(Alcoxide protonated during workup)
O
PPh3
BuLi
Generate ylid

Name_____

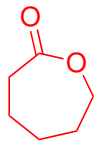
4. (24 point total: 3 points per structure, 1 point per spectral prediction) Complete the multistep synthesis shown below by drawing compounds **A, B, C**, and **D**. For each compound, list a characteristic peak in each of the IR, ^{1}H and ^{13}C NMR spectra that would confirm that you had made the compounds you draw.



mCPBA, base

IR: 1710 cm^{-1}
^{1}H NMR: 2.335 t, 4H
1.862 m, 4H
1.728 quintet, 2H
^{13}C NMR: 212
42
27
25

A



IR: 1745 cm^{-1}

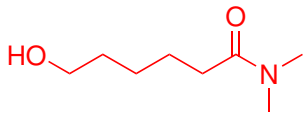
^{1}H NMR: 4.2 (2H) ppm

^{13}C NMR: 176 ppm

$HNMe_2$,

acid

B



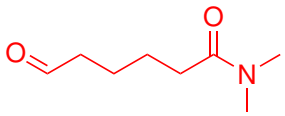
IR: 3300 & 1670 cm^{-1}

^{1}H NMR: 3.5 (2H) & 2.8 (6H) ppm

^{13}C NMR: 170 & 80 ppm

DMSO
ClCOCOCl
Et_3N
(Swern oxidation)

C



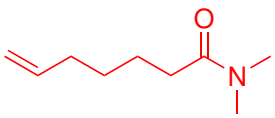
IR: 1720 & 1670 cm^{-1}

^{1}H NMR: 9.2 (1H) & 2.8 (6H) ppm

^{13}C NMR: 170 & 200 ppm

$Ph_3P{=}CH_2$

D



IR: 3050, 1650, & 1670 cm^{-1}

^{1}H NMR: 5-6 (3H) & 2.8 (6H) ppm

^{13}C NMR: 170 & 130 (x2) ppm