

1								
---	--	--	--	--	--	--	--	--

CEM 352 - Quiz 1	
Spring 2025	
NAME	KEY

Score		

1	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)
	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)
	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)
	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)

(0)	(0)	(0)
(1)	(1)	(1)
(2)	(2)	(2)
(3)	(3)	(3)
(4)	(4)	(4)
(5)	(5)	(5)
(6)	(6)	(6)
(7)	(7)	(7)
(8)	(8)	(8)
(9)	(9)	(9)

**READ THIS!**

*Bubble in your PID in the space above. Write your answer for each question in the space provided.*

**LEAVE THIS COVER SHEET ATTACHED TO THE Quiz!**

1. \_\_\_\_\_ / 15

2. \_\_\_\_\_ / 16

3. \_\_\_\_\_ / 12

4. \_\_\_\_\_ / 11

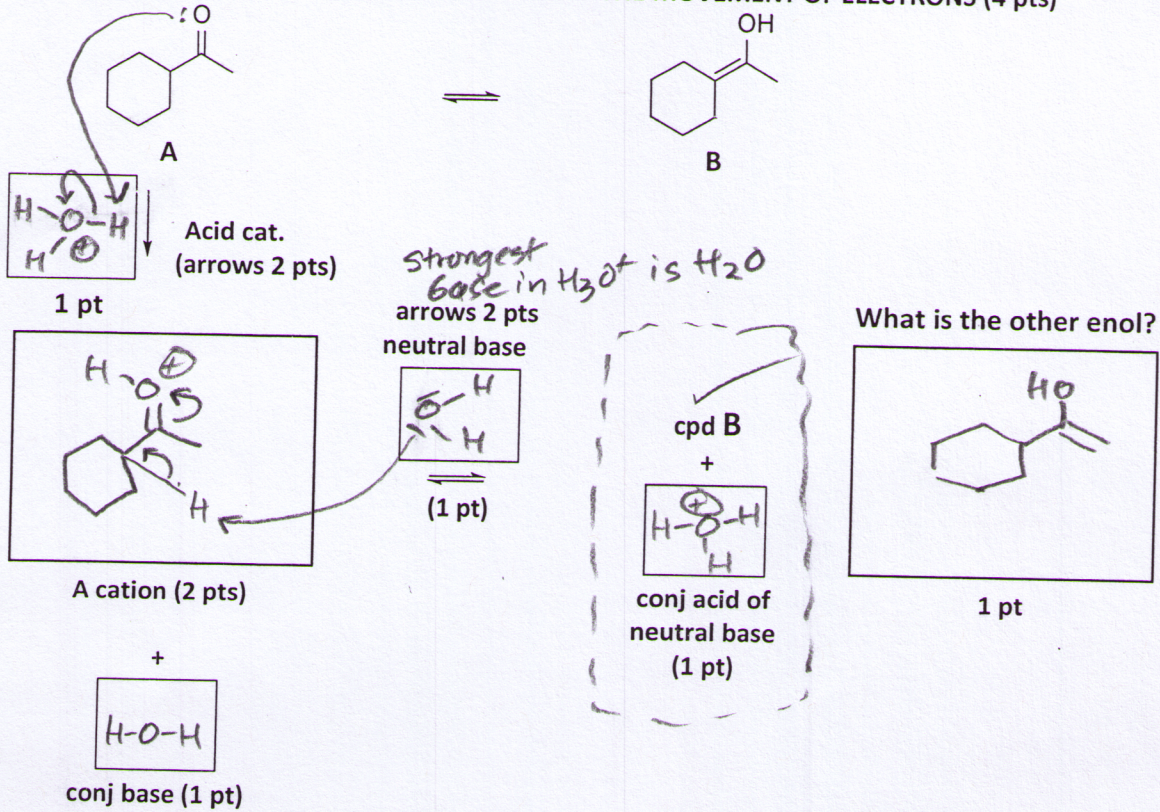
54

TOTAL: \_\_\_\_\_ / 50

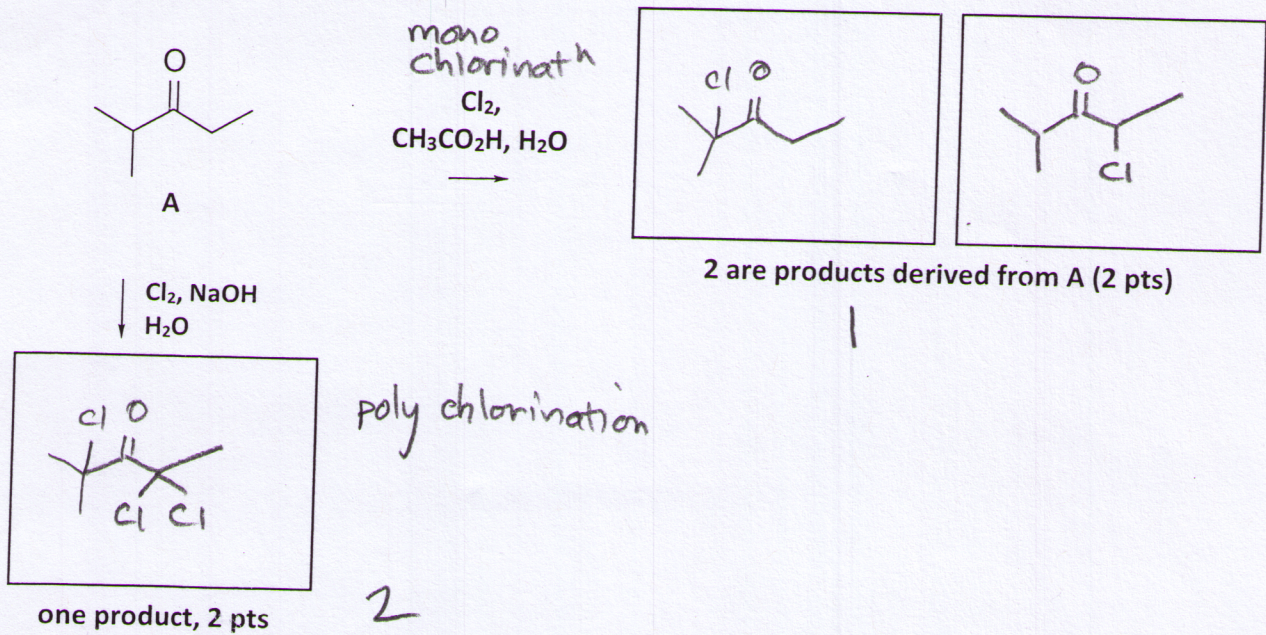
4 pts Extra Credit Built In

1) Complete the acid catalyzed ( $\text{H}_3\text{O}^+$ ) mechanism for the enol/keto tautomerization. Place the appropriate small molecules in the smaller boxes drawn as Lewis (line) structures e.g. ( $:\text{X}-\text{Y}^+-\text{Z}:$ ) that show bonds, lone electron pairs, and formal charges on the correct atoms. (11 pts)

CURVED ARROWS MUST BE INCLUDED THAT SHOW THE MOVEMENT OF ELECTRONS (4 pts)

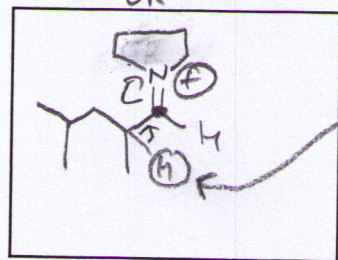
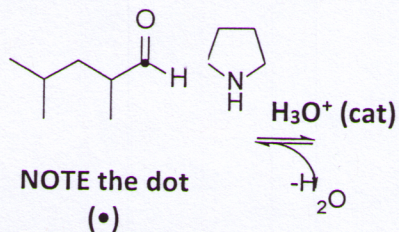


Show the products of the following reactions

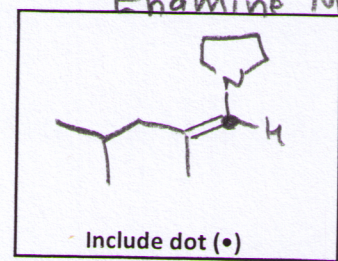
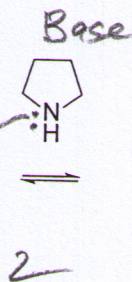


THIS WAS OKAY!

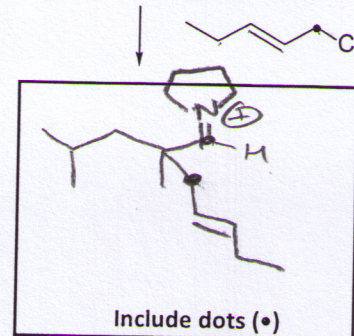
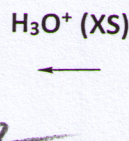
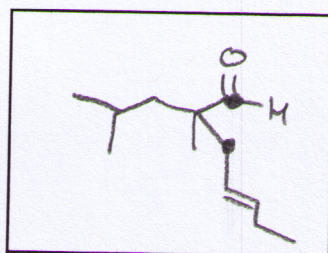
2) Complete the synthesis scheme.



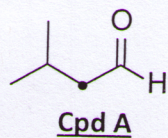
ARROWS NOT REQUIRED!  
Enamine MUST BE HERE



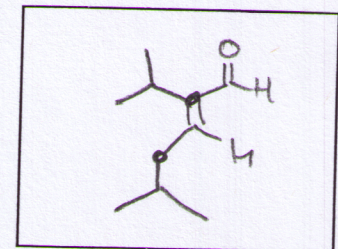
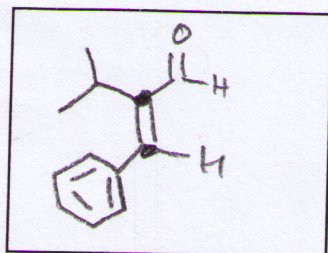
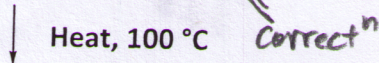
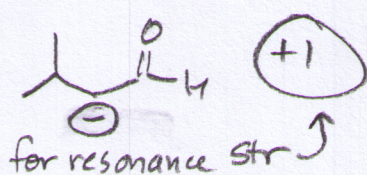
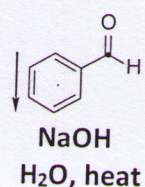
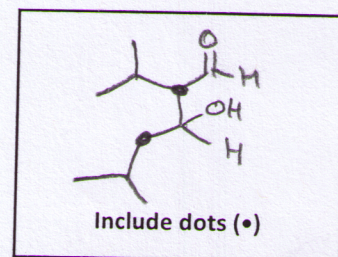
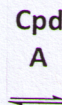
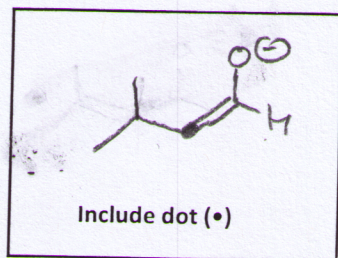
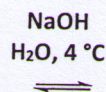
This cpd is isolated, then reacted with the reagent below



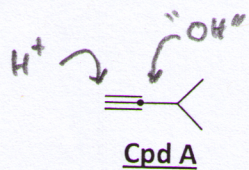
3) Complete the synthesis scheme.



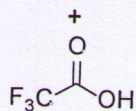
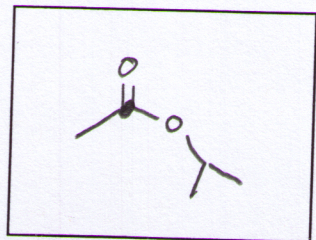
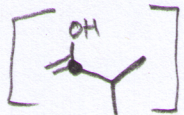
NOTE the dotted carbon



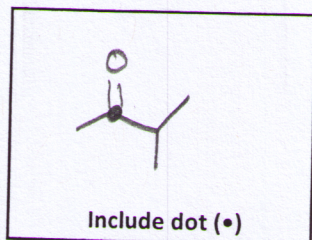
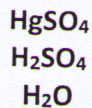
4) Complete the synthesis scheme. (Baeyer-Villiger)



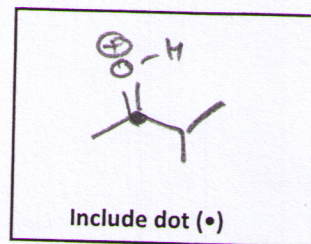
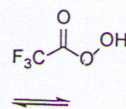
NOTE the dotted carbon



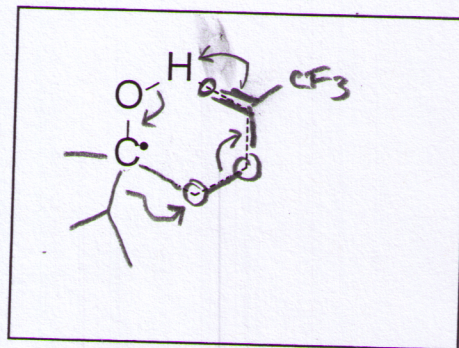
HINT: look at this product to figure out how to complete prior box



Most abundant at equil

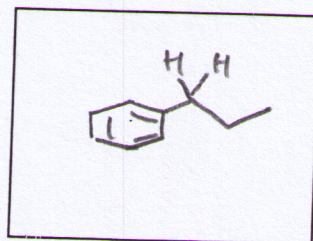
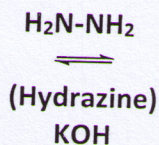
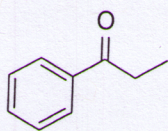


(A cation) – an activated intermediate

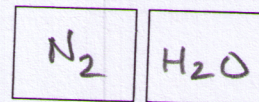


Partial scaffold for the 6-atom intermediate is provided: dotted C shown. Fill in the remaining bonds/atoms along with curved mechanism arrows to show access to the final products

5) Show the products.

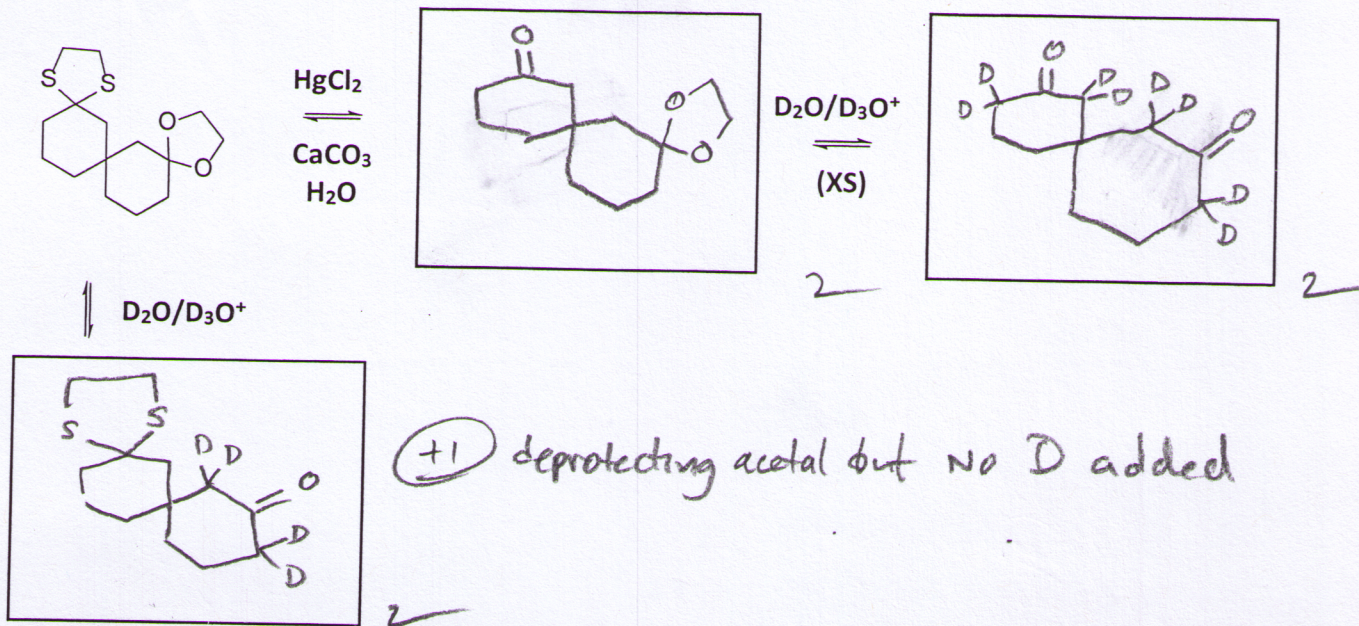


What are the 2 neutral byproducts of this reaction?



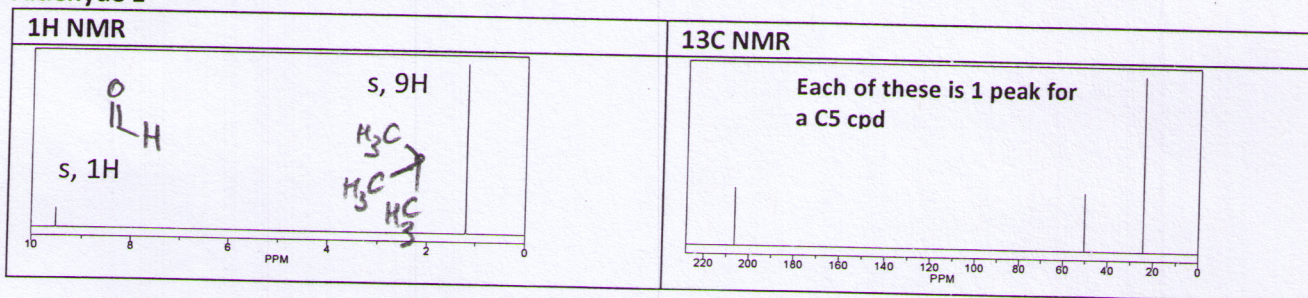
1    1

6) Complete the synthesis scheme.

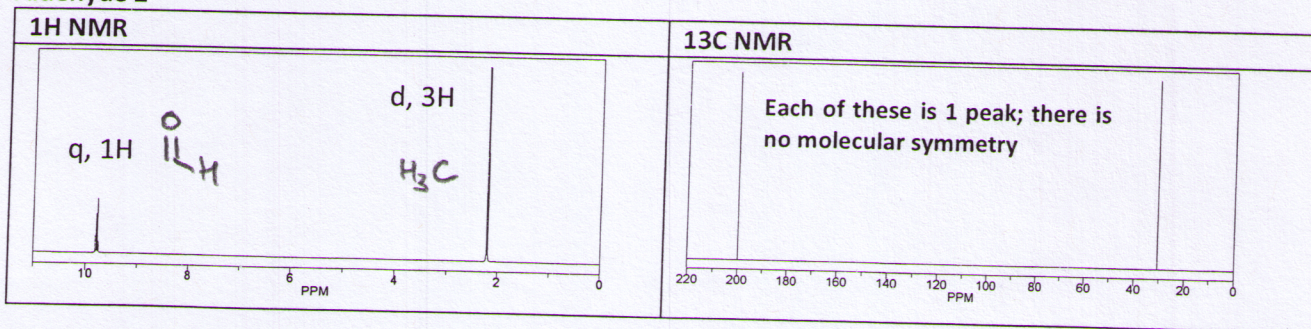


7) Two different aldehydes are mixed in NaOH/H<sub>2</sub>O and heated at 100 C for 12 h. The NMR spectra for Aldehyde 1 and Aldehyde 2 are shown.

Aldehyde 1

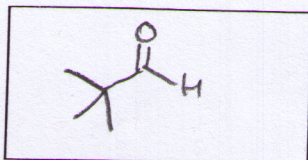


Aldehyde 2

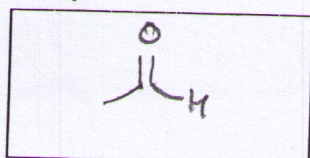


The final aldol condensation product isolated after heating has a molecular formula of C<sub>7</sub>H<sub>12</sub>O. Derived the structures

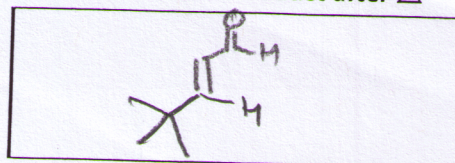
Aldehyde 1



Aldehyde 2



Aldol Condensation Product after  $\Delta$



2

4A

2

1