1								

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CEM 352 –Quiz 2

Spring 2025

NAME	

Score		

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① ① ①
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READ THIS!

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

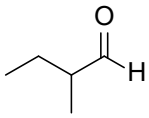
LEAVE THIS COVER SHEET ATTACHED TO THE Quiz!

1. **_____/10**
2. **_____/21**
3. **_____/12**
4. **_____/11**

TOTAL:_____/ 50

Show the reaction products or starting material in the large rectangles.
(10 pts)

1)

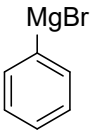


$Na_2Cr_2O_7$, H_2O, H_2SO_4

2)

Br_2, $FeBr_3$
(from CEM 351)

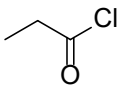
3)

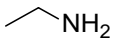


CO_2

An Anion Mg-Salt

4)

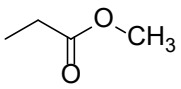


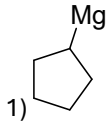


A neutral organic molecule

+ ammonium salt (do not draw)

5)

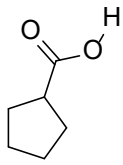


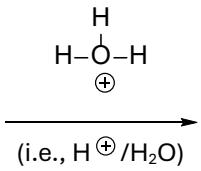


1) 2 equiv

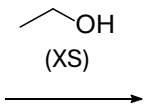
2) $H_3O^{\oplus}$ neutralizer

6) Complete the Fisher Esterification Mechanism (Include curved arrows and formal charges) (10 pts)





A cation



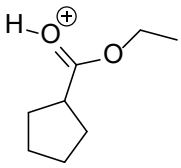
A new cation Intermediate

SHOW CURVED ARROWS FOR EACH STEP

SHOW CURVED ARROWS FOR EACH STEP

H-transfer
(Intramolecular)

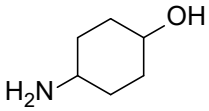
A new cation Intermediate that forms a new leaving group!

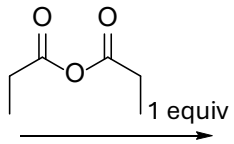


Leav^{ng} Grp

SHOW CURVED ARROWS FOR EACH STEP

7) Draw the preferred product formed in the reaction using 1 equiv of the reactant. HINT: Relative Reactivity (2 pts)





with 1 equiv of a base serving as a neutralizer

In one or two sentences, explain why the product you drew was preferred. (2 pts)

8) Complete the reaction scheme. HINT: look at what you're trying to get to and think in reverse (8 pts)

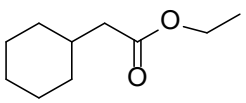
C_8H_{14}

1) BH_3
2) H_2O_2, $HO^{\ominus}$, H_2O

CrO_3, H_2O, H_2SO_4

NaOH
(a base)

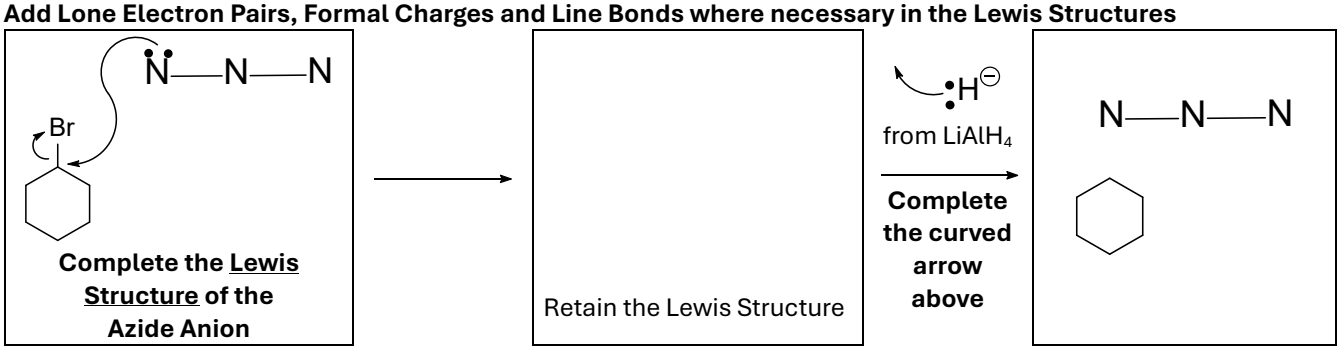
an alkyl bromide



An oxyanion

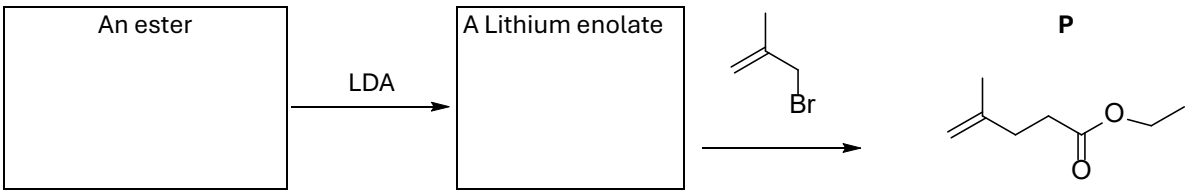
9) Complete the reaction scheme.

Add Lone Electron Pairs, Formal Charges and Line Bonds where necessary in the Lewis Structures

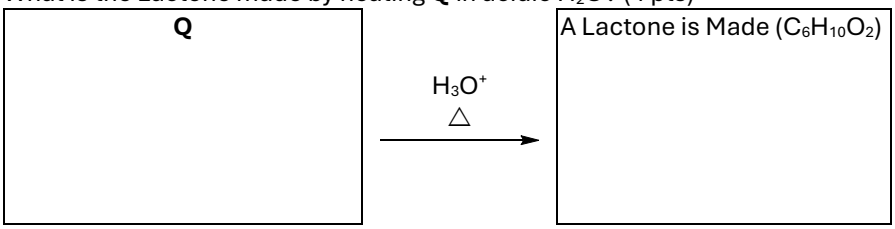


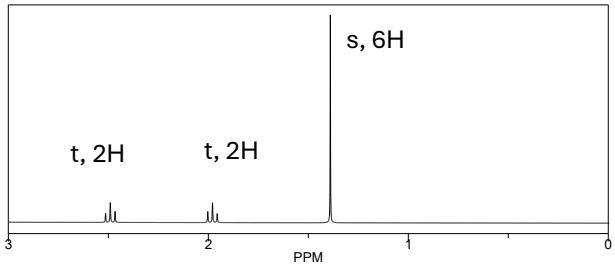
10) After a stable gas is lost, H_3O^+ is added to decompose the LiAl complex, a mild base is added to yield a neutral product. What is that product (2 pts)

11) Complete the following reaction. HINT: Look "downstream" and infer earlier structures from those provided. LDA (Lithium diisopropyl amide) function as a base (2 pts)



12) Product **P** above is treated with 1) $Hg(OAc)_2$, H_2O, then 2) $NaBH_4$. These steps convert **P** to **Q**. What is **Q**? What is the Lactone made by heating **Q** in acidic H_2O? (4 pts)

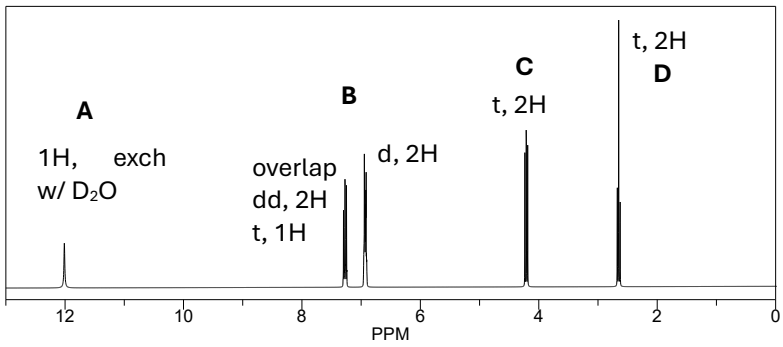




1H NMR of the Lactone

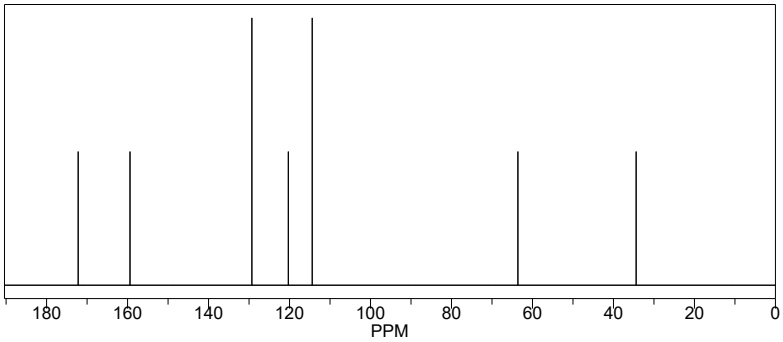
$C_9H_{10}O_3$

1H NMR

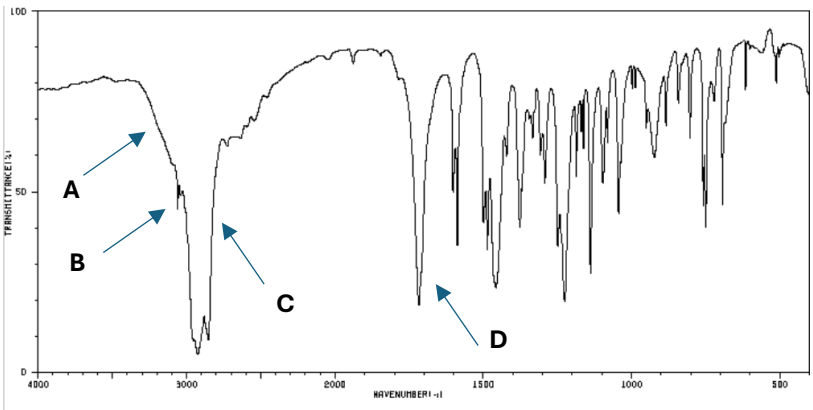


Draw the fragments/connectivities implied by the spectral data	5 pt
A	
B (detail these H's by showing which is(are) the **dd**, **t**, and **d**.	
C	
D	

13C NMR



Interpret what is implied by the 13C NMR data (1 pt)



Identify the functional groups inferred by the absorbances	4 pts
A	
B	
C	
D	

Structure (1 pt)