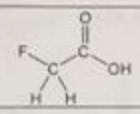
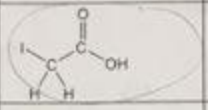
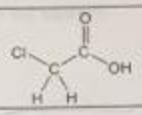
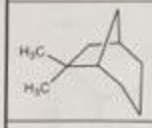
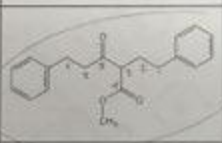
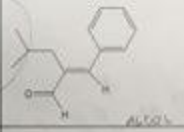
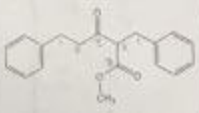
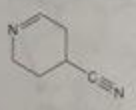
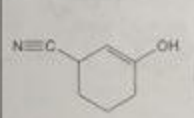
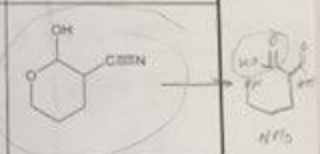
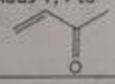
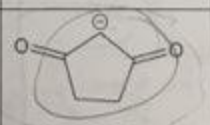
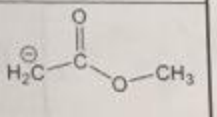
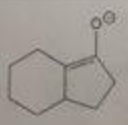
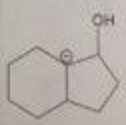
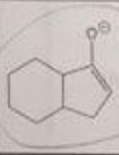
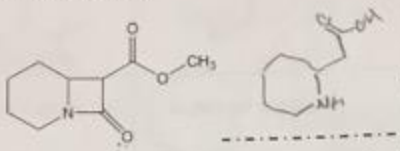
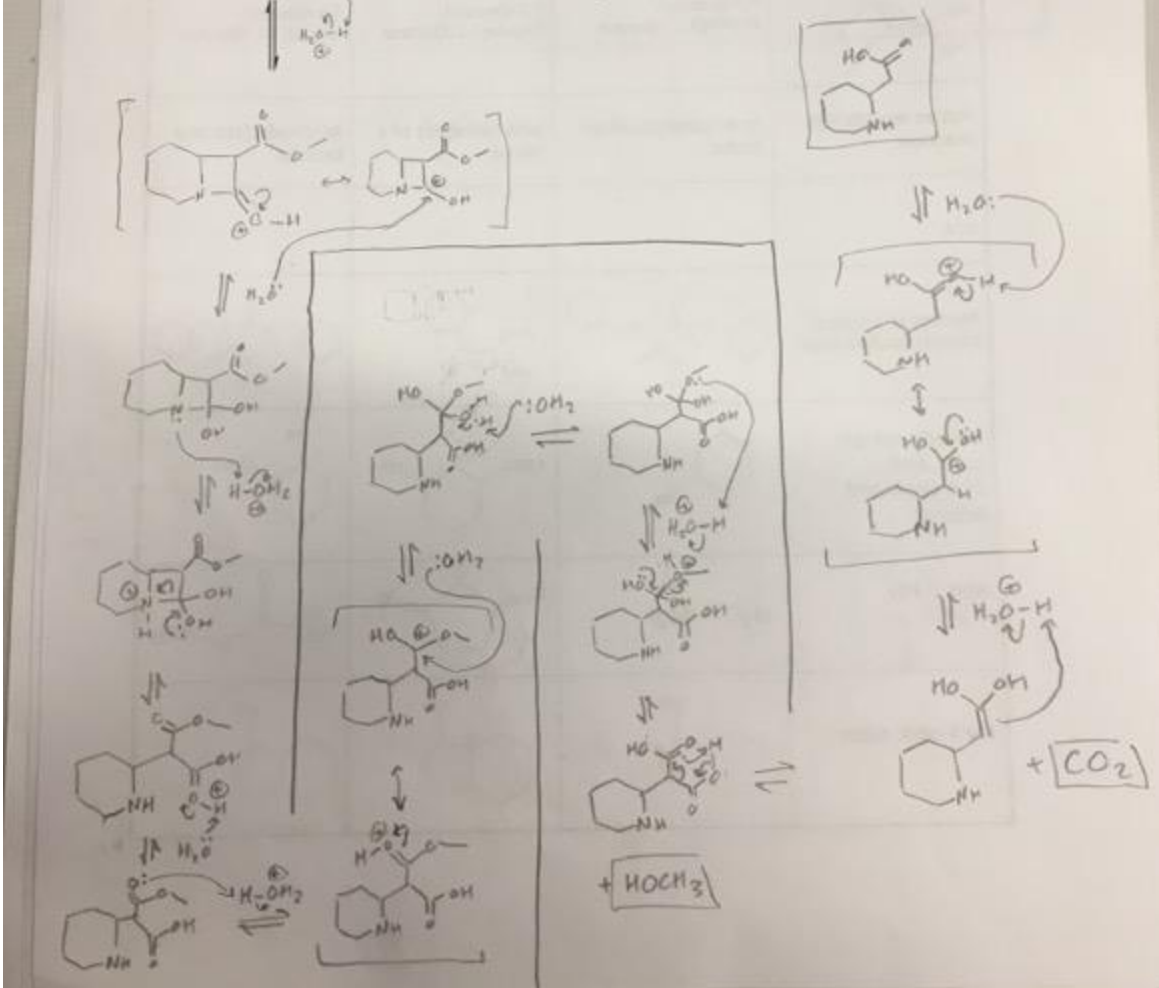
1. (10 Pts) Circle the best answer for each question below

weakest acid	HF	HI	HCl
Weakest Acid			
Requires a molar equivalent of acid	Ester hydrolysis	Lactone hydrolysis	Lactam hydrolysis
	7,7-dimethyl-bicyclo[3.2.1]octane	2,2-dimethyl-bicycle[1.2.3]octane	6,6-dimethyl-bicycle[3.2.1]octane
Not an equilibrium reaction	Acid hydrolysis of an acetal	Acid hydrolysis of a nitrile	Acid hydrolysis of a lactone
N/A			
Product of a crossed Claisen condensation			
Decarboxylates upon acid hydrolysis and heating			
Adds 1,4 to 	$H_3C—MgI$		
The kinetic anion			

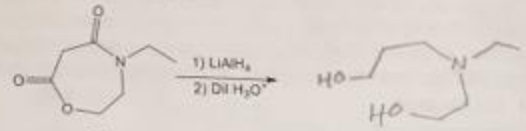
2. (20 Pts) Beta lactams are found in important antibiotics such as penicillin and cephalosporin. Please write the products you predict from exhaustive hydrolysis of the β-lactam below in hot aqueous acid; then use the curved arrow convention to show the step by step mechanism for that reaction. ***Please*** be neat!

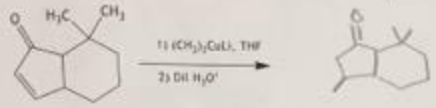


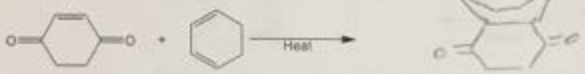
Hydrolysis Products

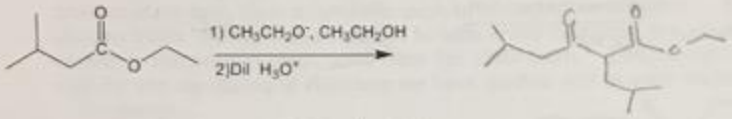


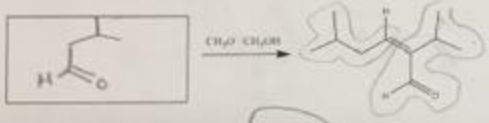
3. (10 pts) Please complete the following equations by supplying the missing products, reactants or conditions:

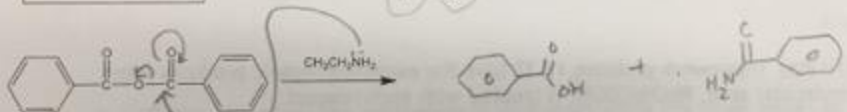


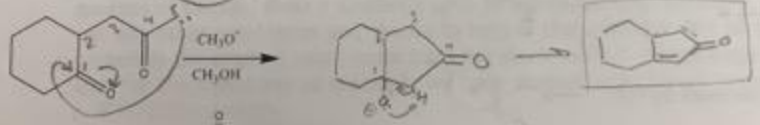




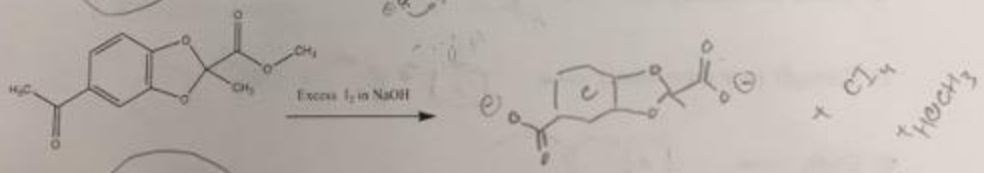


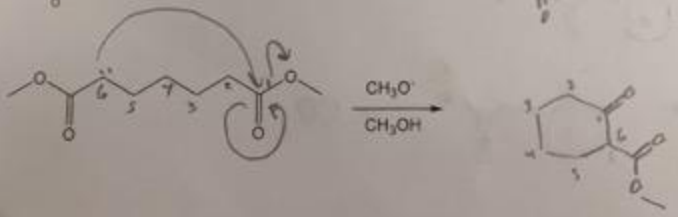




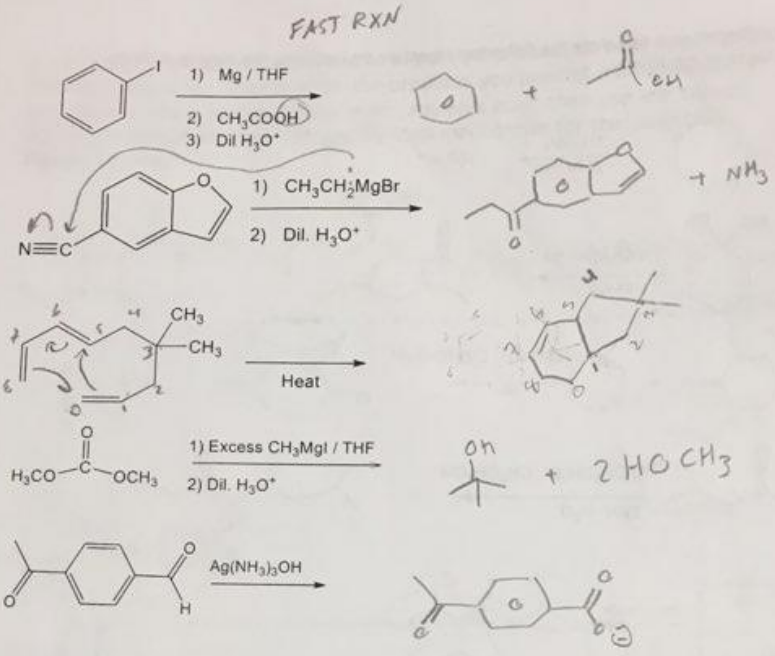


THERMODYNAMICALLY DRIVEN TO FORM CONJUGATED SYSTEM





FAST RXN



4. N/A

5. (10 Pts) Homework problem 17.32 Give the expected organic products when phenylacetic acid, $PhCH_2COOH$, is treated with each reagent:

a) $SOCl_2$ ⟶

b) $LiAlH_4$ followed by H_2O ⟶

c) CH_3MgBr (one equivalent) ⟶ + CH_4

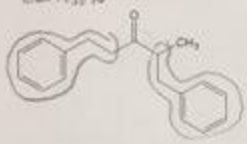
d) CH_2N_2 ⟶

e) $NaHCO_3$, H_2O ⟶ + CO_2

ALL ON OTHER SHEET -

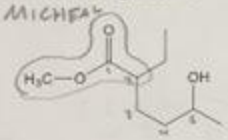
6. (10 pts) Using only the substances in your stock room (on cover page) as sources of carbon, show a synthetic path to the compounds below. You may use any other substances you choose to help in the synthesis, but all of the carbon in the product must come from the stock room. I encourage you to look for the signatures of reactions we have studied and to work backwards.

CLAISEN



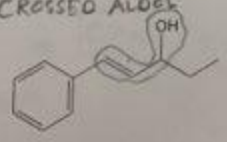
7. (10 pts) Using only the substances in your stock room (on cover page) as sources of carbon, show a synthetic path to the compounds below. You may use any other substances you choose to help in the synthesis, but all of the carbon in the product must come from the stock room. I encourage you to look for the signatures of reactions we have studied and to work backwards.

MICHEAL

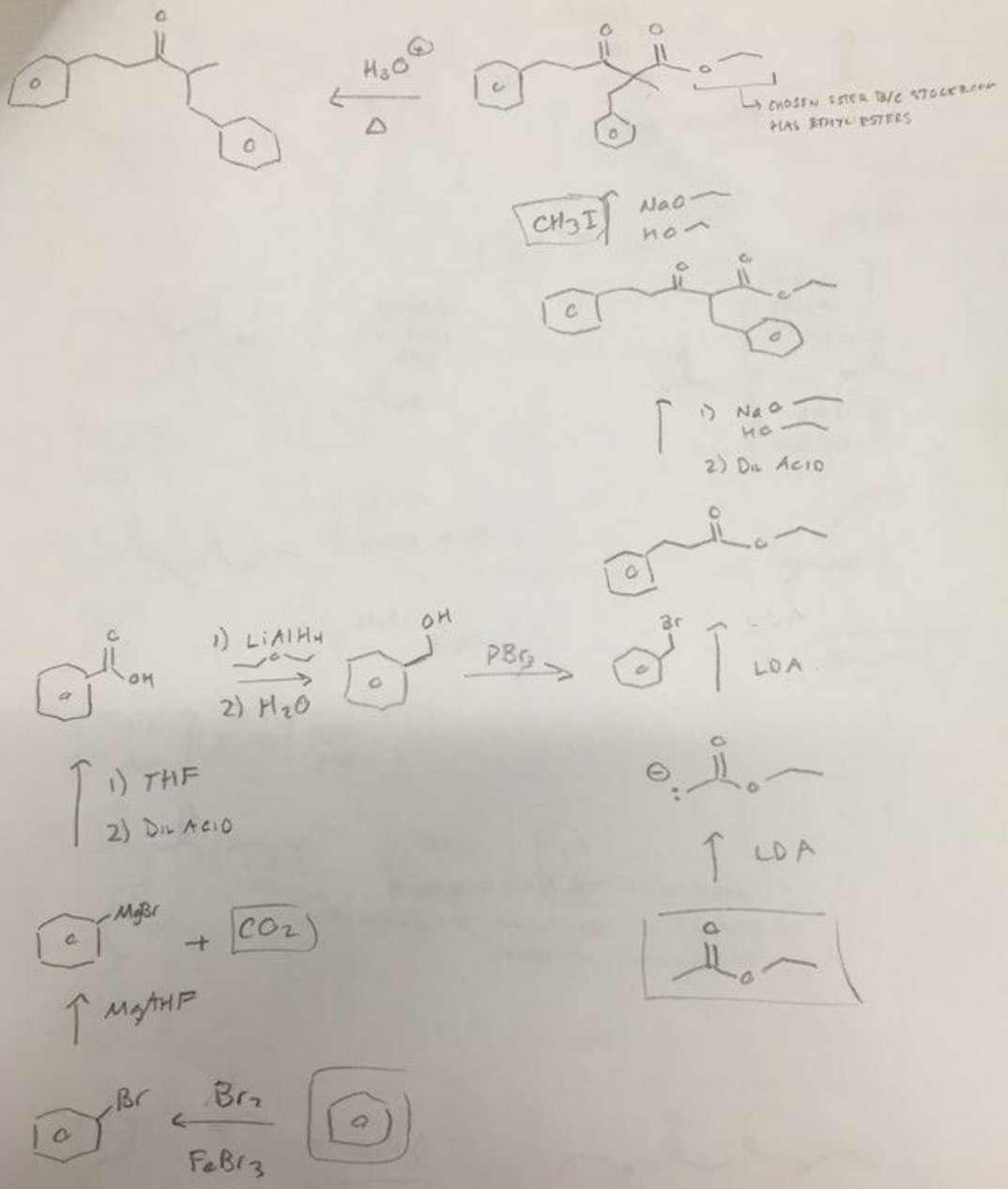


8. (10 pts) Using only the substances in your stock room (on cover page) as sources of carbon, show a synthetic path to the compounds below. You may use any other substances you choose to help in the synthesis, but all of the carbon in the product must come from the stock room. I encourage you to look for the signatures of reactions we have studied and to work backwards.

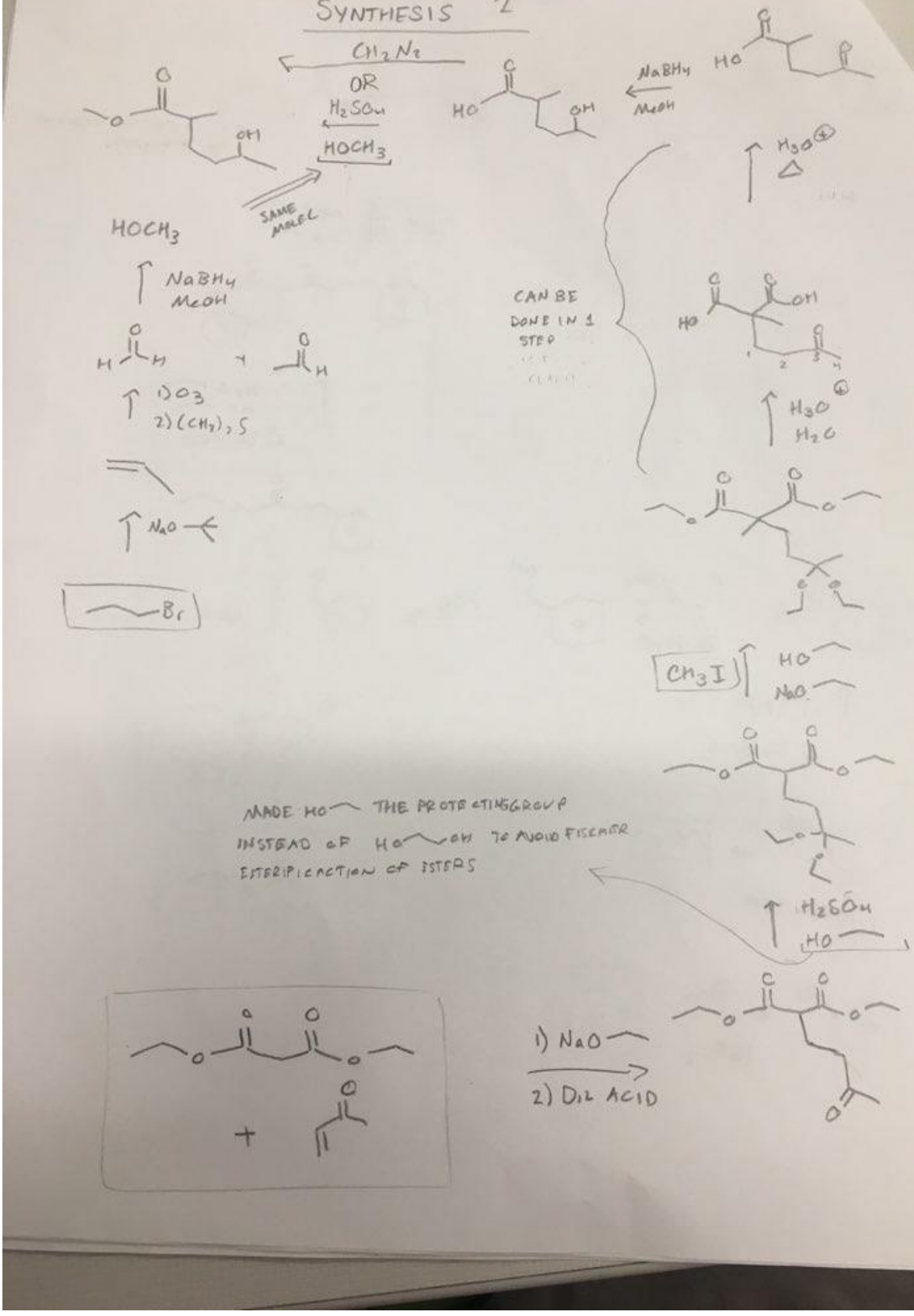
CROSSED ALDOL



SYNTHESIS 1


H_3O^+
Δ
CHOSEN ESTER B/C STOCKROOM HAS ETHYL ESTERS
CH_3I
NaO
HO
1) NaO
HO
2) Dil Acid
OH
1) $LiAlH_4$
2) H_2O
PBr_3
Br
LDA
1) THF
2) Dil Acid
MgBr
+
CO_2
Mg/THF
Br
Br_2
$FeBr_3$

SYNTHESIS 2



MADE HO~ THE PROTECTINGGROUP INSTEAD OF HO~OH TO AVOID FISCHER ESTERIFICACTION OF ESTERS

DAY 1
MASS
FILTER PA
PROD

SYNTHESIS 3