

CH310N
Spring 2011

Anslyn

March 22, 2011

Exam 2

Please **PRINT** the first three letters of your last name in the three boxes.

K	E	Y
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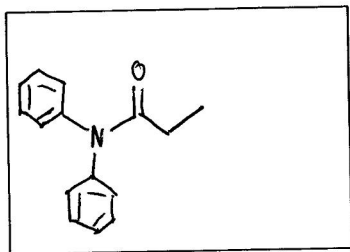
PRINT Name _____ UT-EID _____

- 1) _____ (8 pts)
- 2) _____ (6 pts)
- 3) _____ (5 pts)
- 4) _____ (5 pts)
- 5) _____ (20 pts)
- 6) _____ (9 pts)
- 7) _____ (7 pts)
- 8) _____ (6 pts)
- 9) _____ (7 pts)
- 10) _____ (8 pts)
- 11) _____ (7 pts)
- 12) _____ (12 pts)
- Bonus) _____ (2 pts)

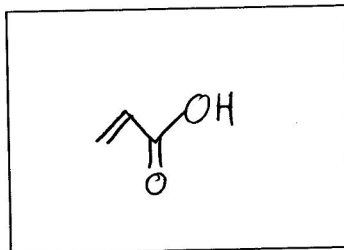
Total Score _____ (100 pts)

1.

- a) Draw the chemical structures for the following names. (From notes and homework)
(2 points each)

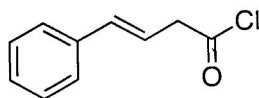


N,N-Diphenylpropanamide



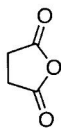
Propenoic Acid

- b) Give the IUPAC names for the following molecule. (From notes) (2 points)



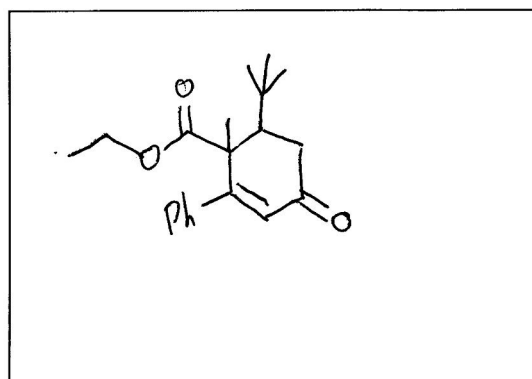
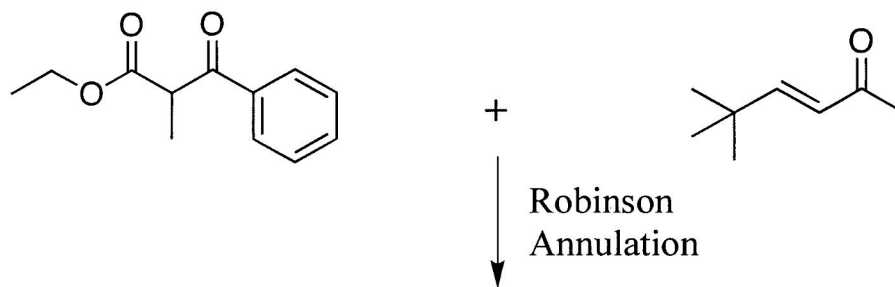
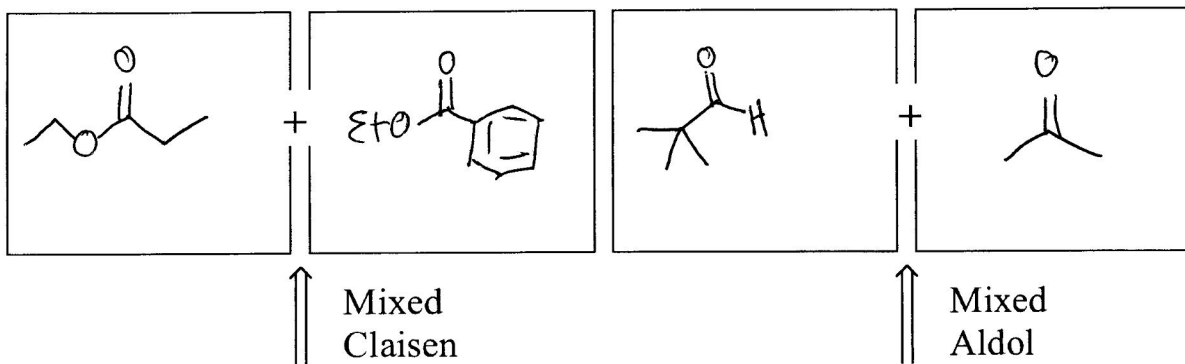
(E) - 4 - phenyl - 3 - butenoyl chloride

- c) Give the common name for the following molecule. (From notes) (2 points)

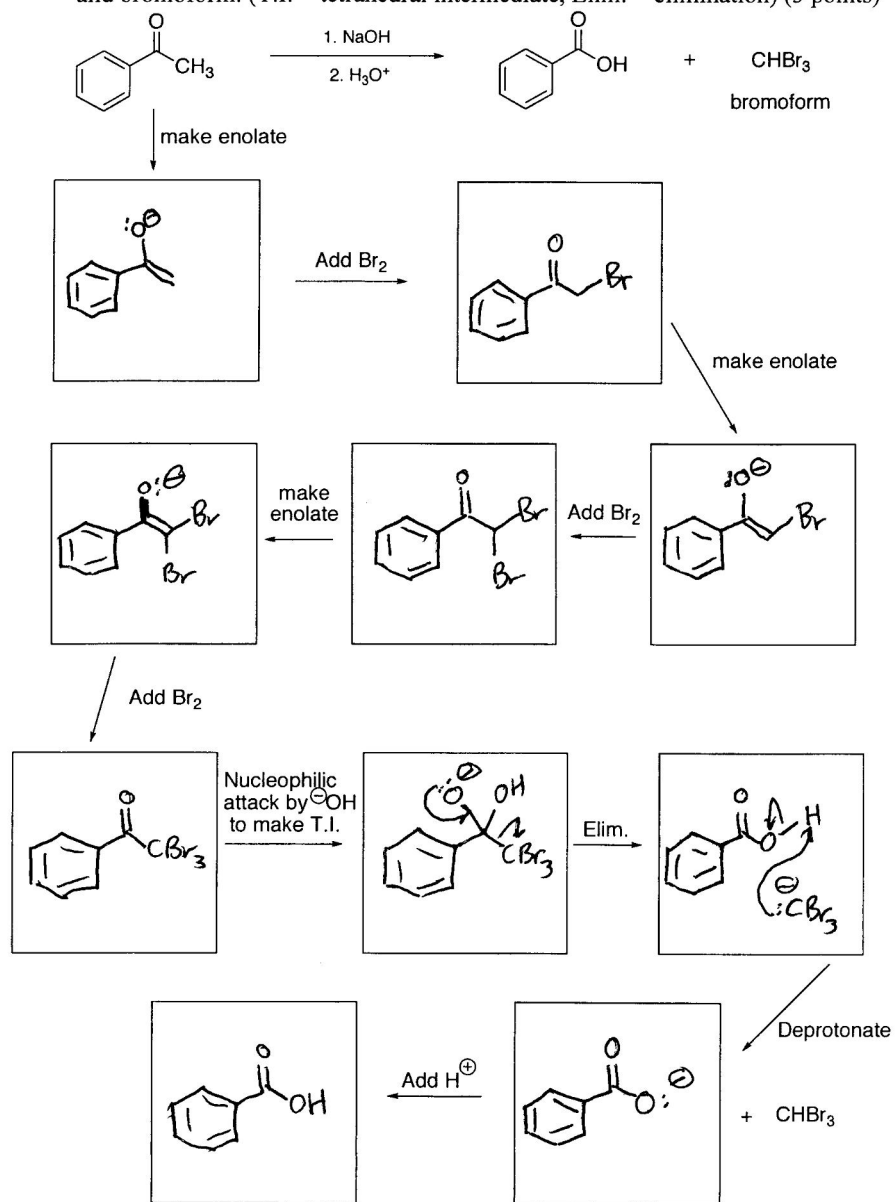


Succinic anhydride

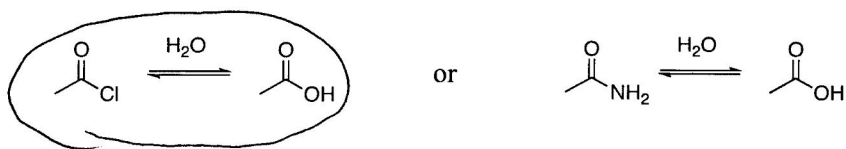
2. The structures of two molecules, a β -keto ester and a β -unsaturated ketone, are given below. Retrosynthetically thinking, please draw the starting materials needed to make each of these molecules via a Mixed Claisen reaction and a Mixed Aldol reaction, respectively. Additionally, draw the resulting product formed when these two molecules are used in a Robinson Annulation. (6 points)



3. Mechanism in a box – think! The haloform reaction converts methyl ketones to carboxylic acids and a haloform (HCX_3). Knowing what you do about making enolates and α -halogenation, propose a mechanism by drawing the intermediates in the boxes below to account for the conversion of acetophenone to benzoic acid and bromoform. (T.I. = tetrahedral intermediate, Elim. = elimination) (5 points)



4. Circle the hydrolysis reaction that you think will take place faster and provide two reasons for your choice. (From notes) (5 points)

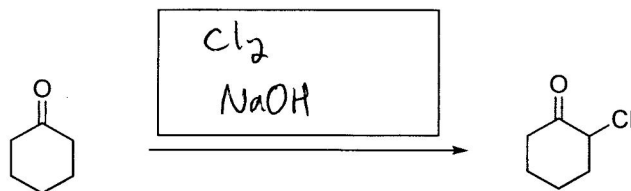


Leaving group ability: Cl^- is a much better leaving group than NH_2^- .

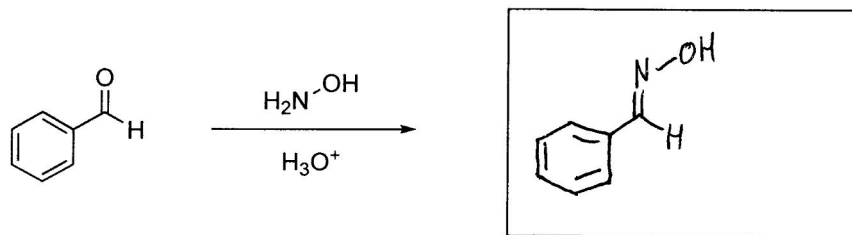
Resonance: more stable than , so it is less reactive.

5. Fill in the box with the appropriate reactant, reagent, or product. Some boxes require more than one step. (20 points)

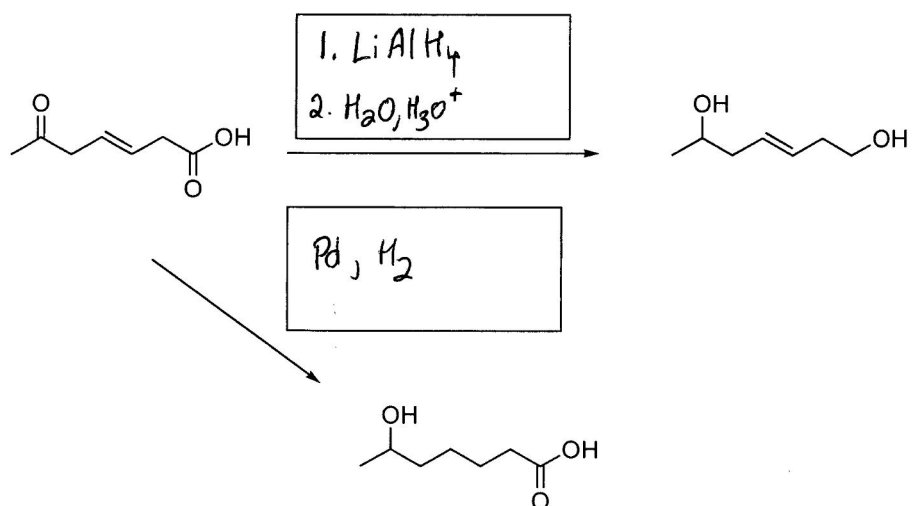
- a. From homework, problem 16.46



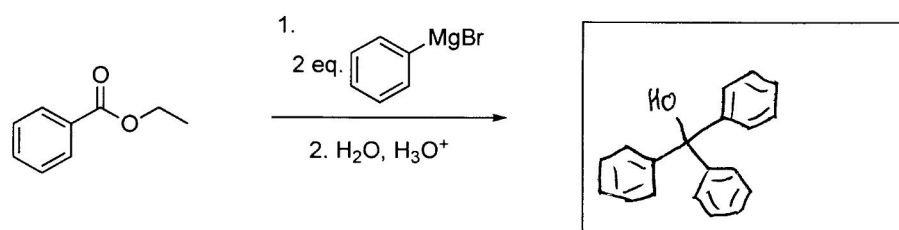
- b. From homework, problem 16.38



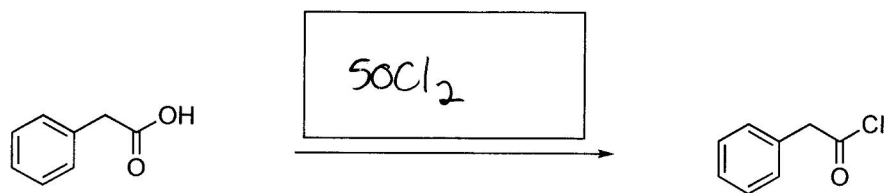
c.



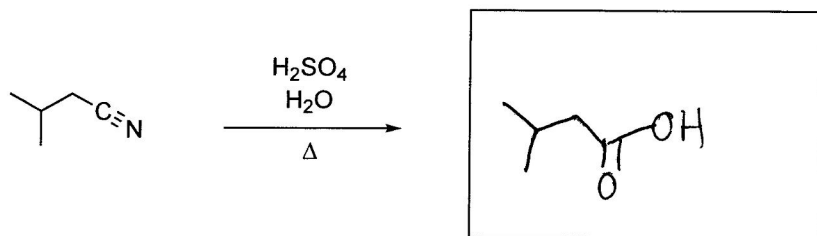
d. From homework, problem 18.20



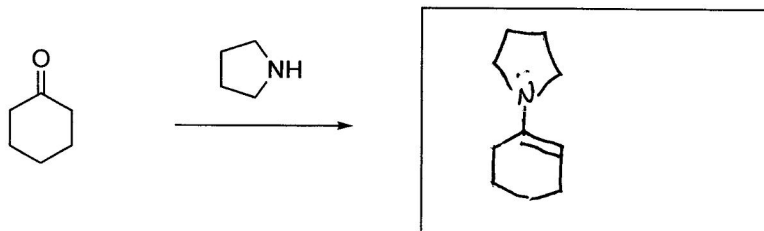
e. From homework, problem 17.32



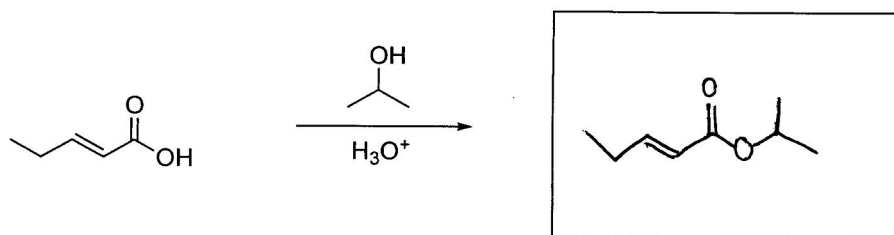
f.



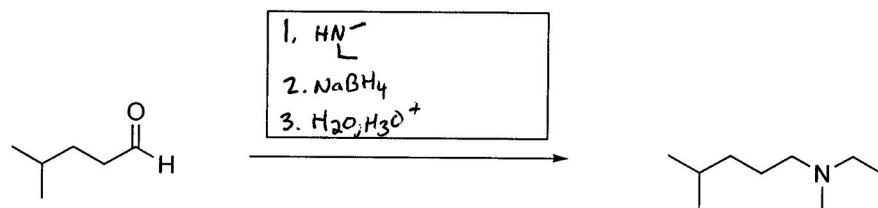
g. From lecture notes



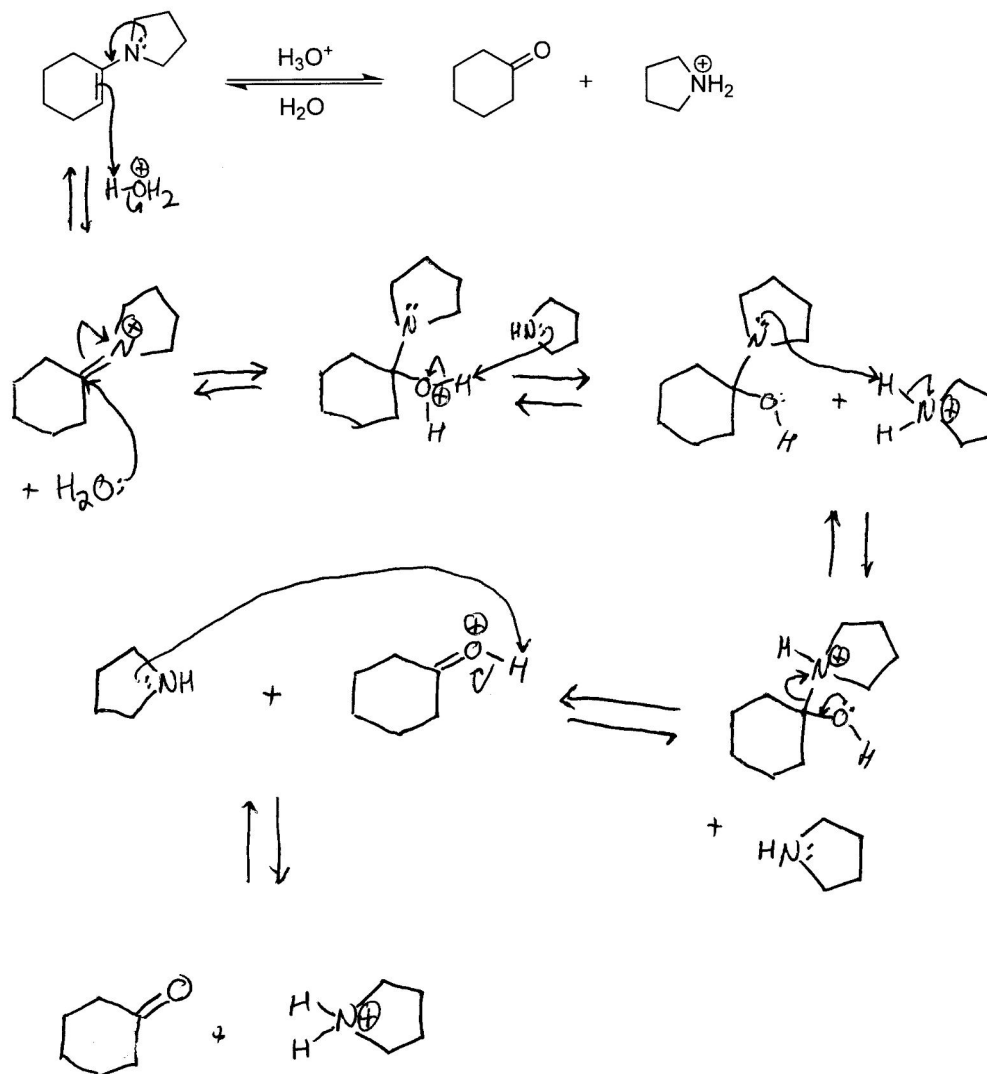
h. From homework, problem 17.37



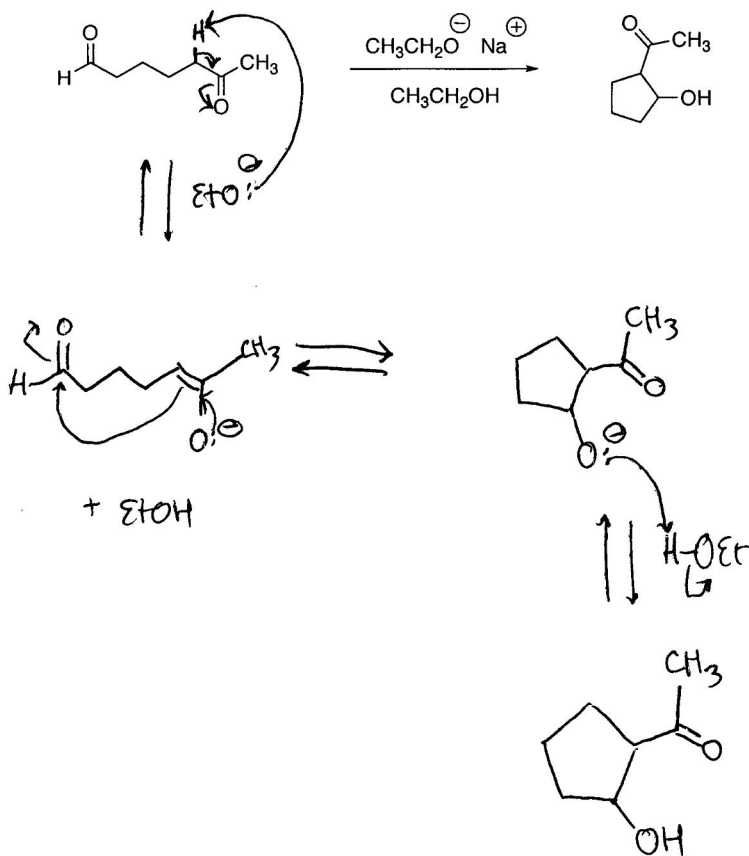
i.



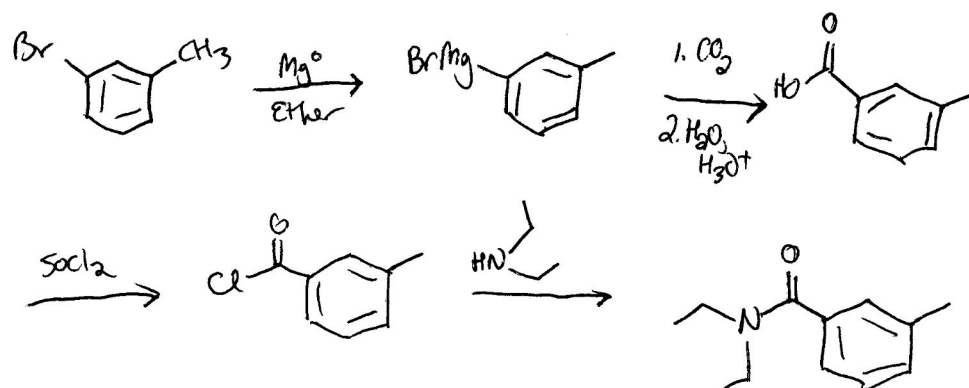
6. Draw the mechanism for the acidic hydrolysis of an enamine, making sure to show all participating lone pairs, applicable formal charges, and required arrow pushing to indicate flow of electrons. (9 points)



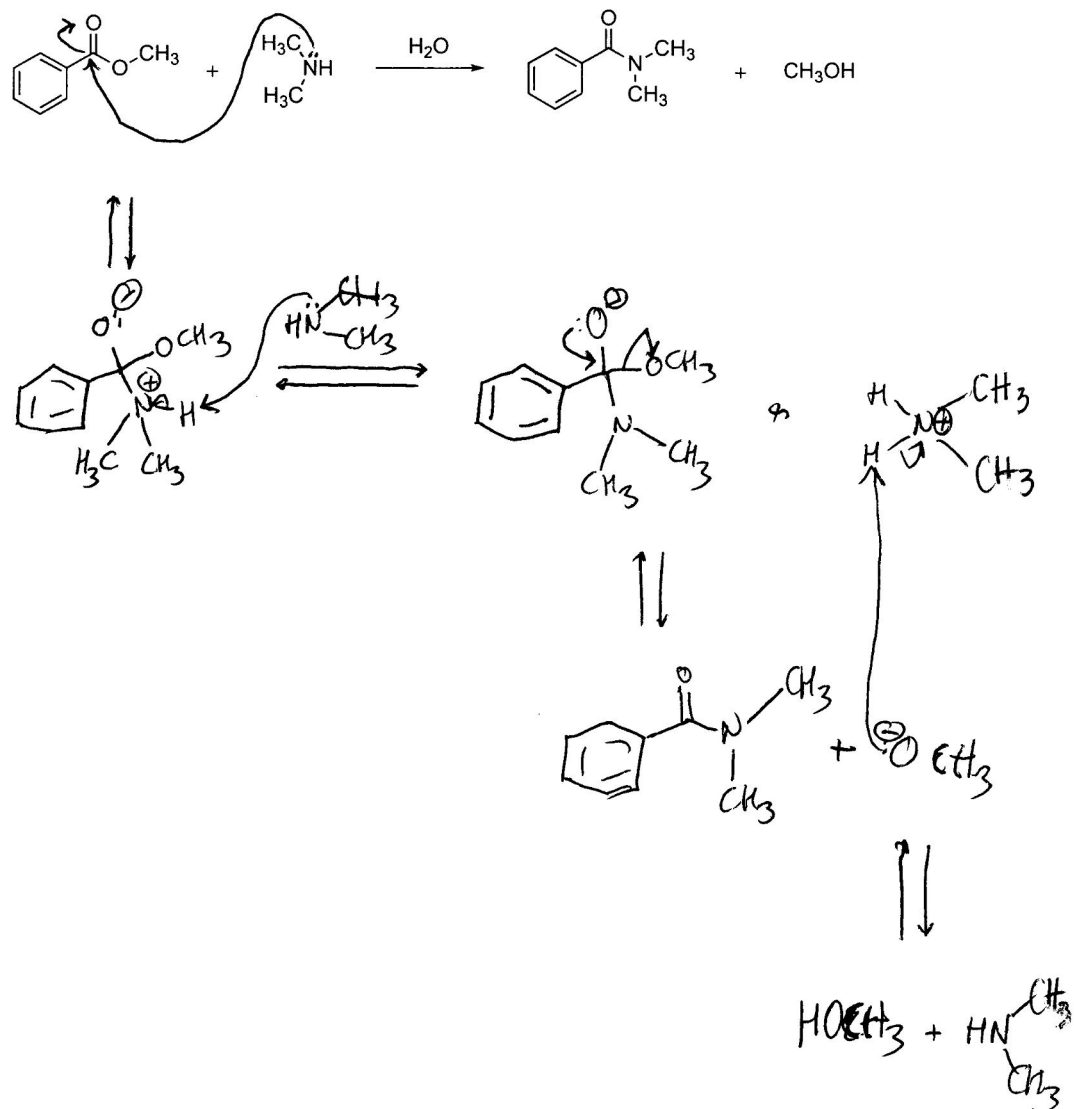
7. Draw the mechanism for following intramolecular aldol reaction, making sure to show all participating lone pairs, applicable formal charges, and required arrow pushing to indicate flow of electrons. (7 points)



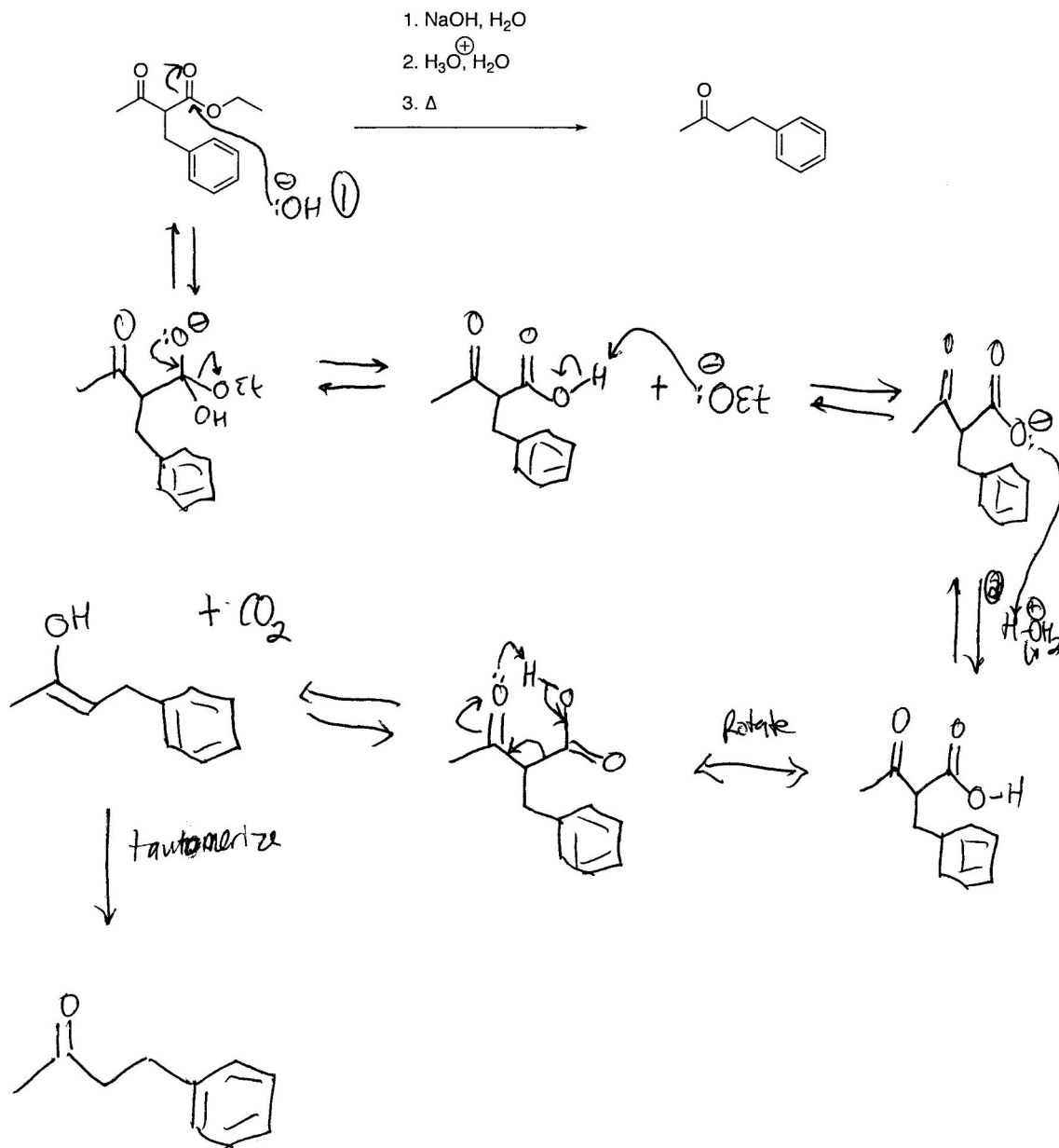
8. DEET is the active ingredient in common insect repellants. Propose a synthesis for DEET from 3-bromotoluene showing all reagents and intermediates along the way. You may use any reagents necessary; remember that you do not need to draw mechanisms here. (Partly from homework, problem 18.35) (6 points)



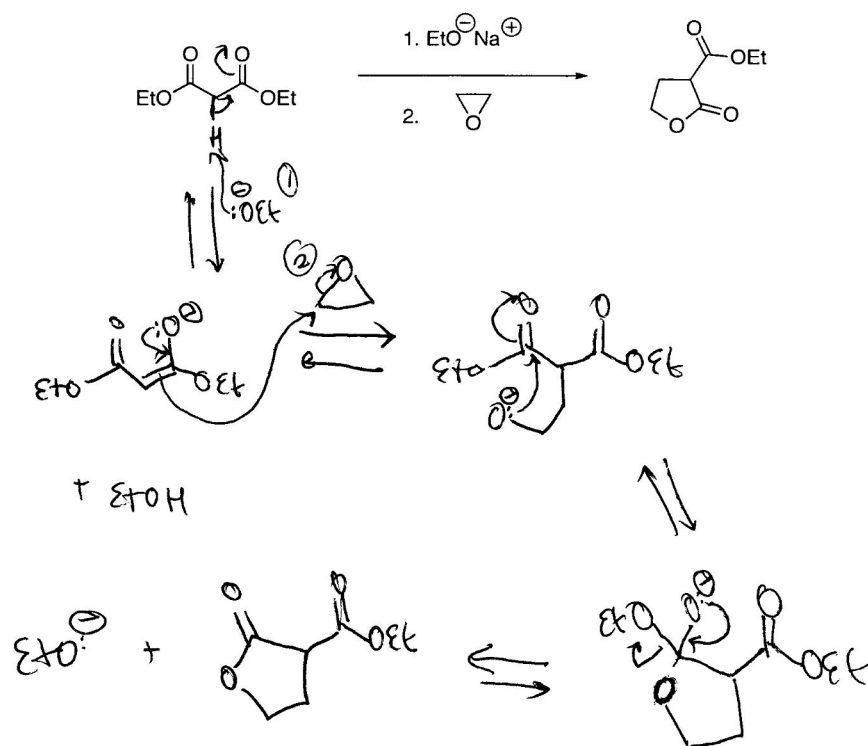
9. Draw the mechanism for the formation of an amide from an ester in neutral conditions, making sure to show all participating lone pairs, applicable formal charges, and required arrow pushing to indicate flow of electrons. (From notes) (7 points)



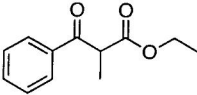
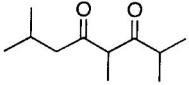
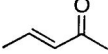
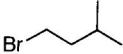

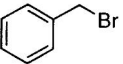
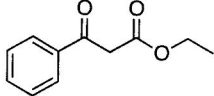
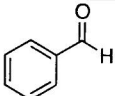
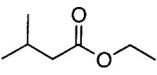
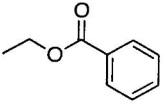

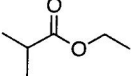
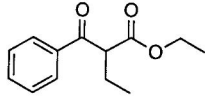
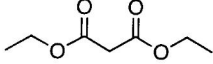
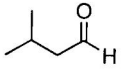
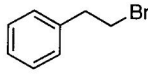
10. Draw the mechanism which accounts for the following transformation (these are the last three steps in the typical five steps used for the acetoacetic ester synthesis), making sure to show all participating lone pairs, applicable formal charges, and required arrow pushing to indicate flow of electrons. (8 points)



11. Draw the following mechanism, making sure to show all participating lone pairs, applicable formal charges, and required arrow pushing to indicate flow of electrons. (From homework, problem 19.47) (7 points)

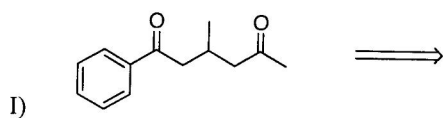


12. Using a retrosynthetic approach, give the letters (A-P) and the name of the reaction (a list of reactions names is provided) needed to make each of the products listed. Each letter can be used once, more than once, or not at all. There is an extra copy of the box of options and reaction names on the last page of the test for you to tear off and use.
(12 points)

 A	 B	 C	 D
 E	 F	 G	 H
 I	 J	 K	 L
 M	 N	 O	 P

List of Possible Reaction Names:

Aldol Reaction
Claisen Condensation
Acetoacetic Ester "Like" Synthesis
Malonic Ester Synthesis
Michael Addition Malonic Ester Synthesis
Michael Addition Acetoacetic Ester "Like" Synthesis
Robinson Annulation

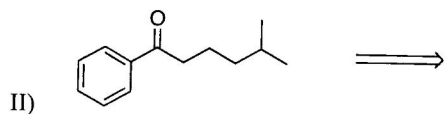


Starting Material Letters:

G & C

Reaction Name:

Michael Addition Acetoacetic Ester "Like" Synthesis

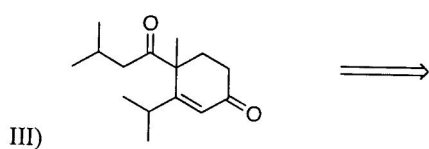


Starting Material Letters:

G & D

Reaction Name:

Acetoacetic Ester Synthesis

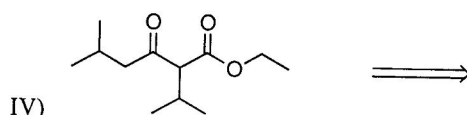


Starting Material Letters:

B & K

Reaction Name:

Robinson Annulation

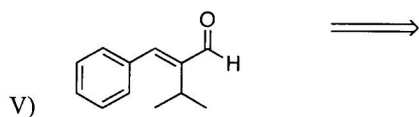


Starting Material Letters:

I (x2)

Reaction Name:

Claisen Condensation

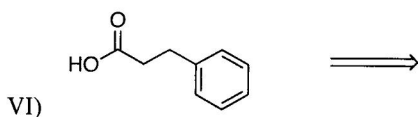


Starting Material Letters:

H & O

Reaction Name:

Aldol Condensation



Starting Material Letters:

N & F

Reaction Name:

Malonic Ester Synthesis

BONUS QUESTION: What is the name of the song that Dr. Anslyn used to play the day of an exam in college to "pump himself up" before the test? (2 points)

Funky Town