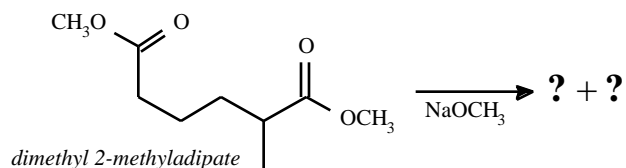


5.A. Draw the 2 possible cyclic products (β -keto esters) from the **Dieckmann condensation** (intramolecular Claisen condensation) of *dimethyl 2-methyladipate*.

(12 pts)

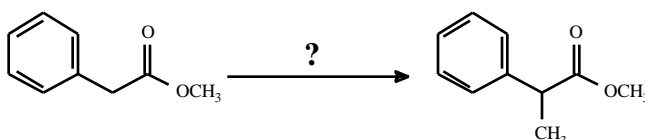
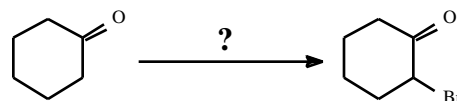
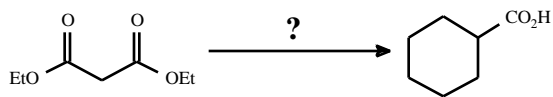
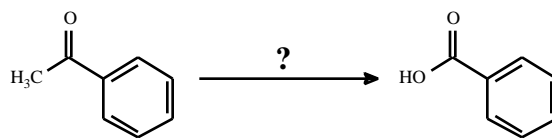
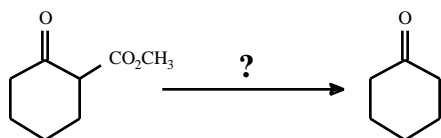


5.B. NMR data was collected for the *major product* of the **above reaction** and is shown in the box below. Based on the NMR data, **redraw the major product** in PART 5.A. **here** and **label the protons a-f**.

- | | | | |
|-----------|-----|--------------|----|
| a. | 1.2 | , doublet, | 3H |
| b. | 1.8 | , multiplet, | 2H |
| c. | 2.6 | , multiplet, | 2H |
| d. | 3.2 | , multiplet, | 1H |
| e. | 3.7 | , singlet, | 3H |
| f. | 4.8 | , triplet, | 1H |

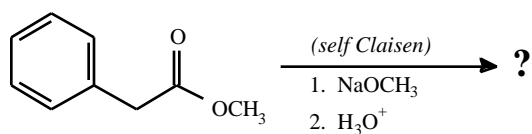
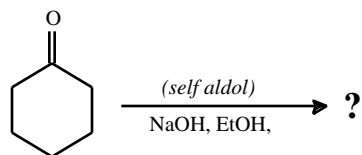
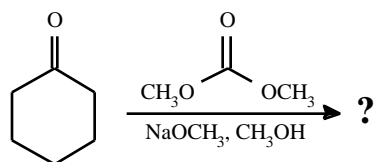
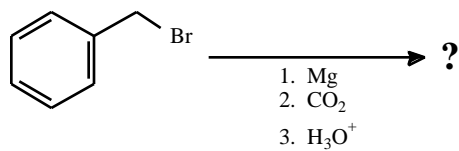
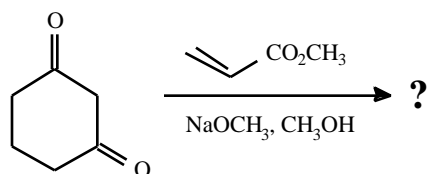
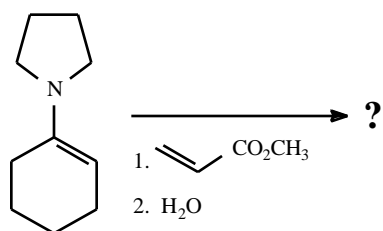
6. Provide the reagents for the following transformations.

(15 pts; 3 pts each)



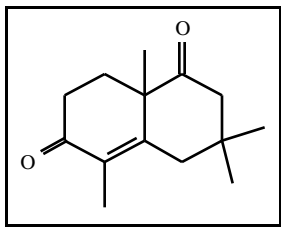
7. Draw the **MAJOR products** for the following reactions. If there is *No Reaction*, please write “**NR.**”

(24pts; 4 pts each)



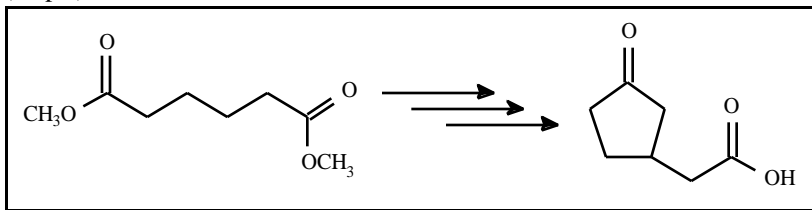
8. Show how you would prepare the following compound using a **Robinson annulation** reaction between a β -*diketone* and an α,β -*unsaturated ketone*.

(8 pts)



9. Write a *synthesis* for the following sequence. You may use *any reagent/reactant* containing 5 carbons or less. You must use the starting material in your synthesis!

(12 pts)



EXTRA CREDIT (10 pts)

Propose a **mechanism** to account for the following reaction.
Be sure to use *curved arrows* to indicate *electron movement*.

