

## \* Decarboxylation + Claisen Condensation Warm-Up + Application Answers

① Removal or loss of  $\text{CO}_2$

②  $\beta$ -ketoacids: Heat

③ Cyclic 6-membered transition

④ Enol: ketone

⑤ Ester: Base that matches the ester +

Acid: Base forms the enolate + Acid  
protonates the leaving group

⑥ Tetrahedral:  $\beta$ -ketoester

⑦ Dieckman

⑧ 1,6-diesters = 5 membered rings

1,7-diesters = 6 membered rings

⑨ Crossed = the 2 esters are not the same

Non-Crossed = the 2 esters are the same

Synthetically Useful = only 1  $\alpha$  H = only 1

enolate = only 1 product

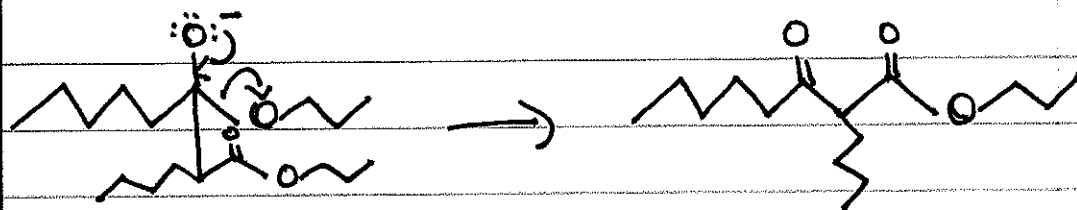
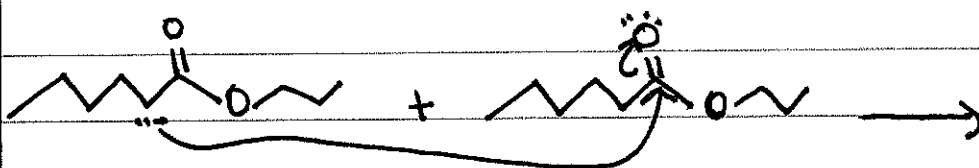
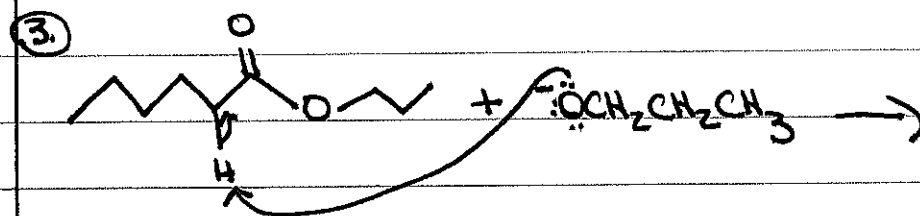
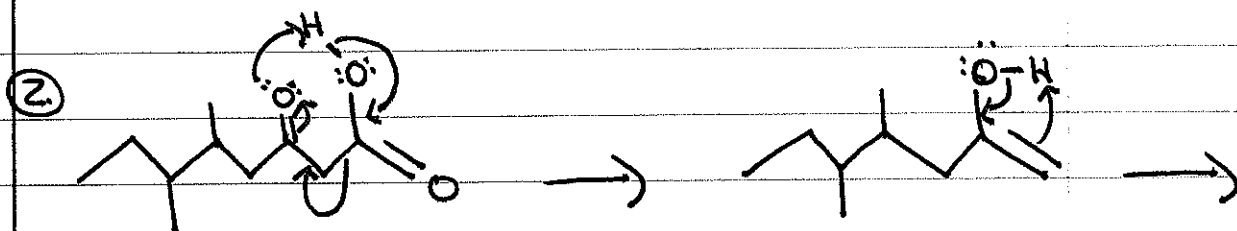
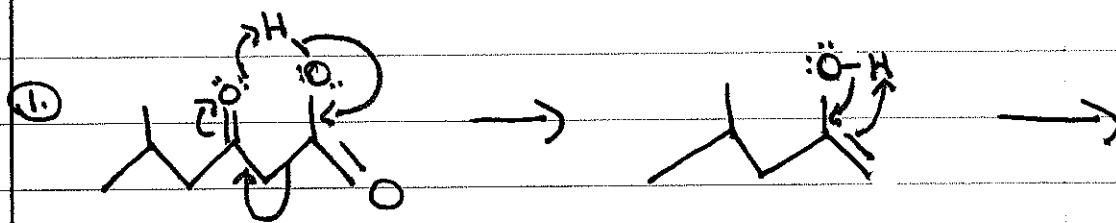
Non-Synthetically Useful = more than 1  $\alpha$  H =

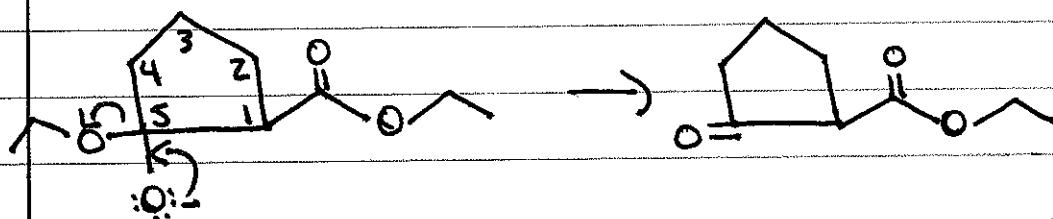
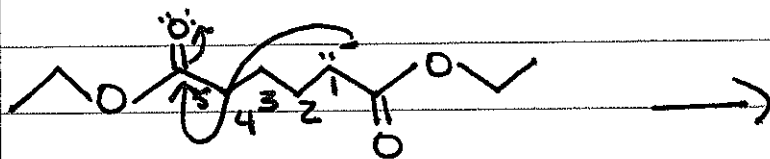
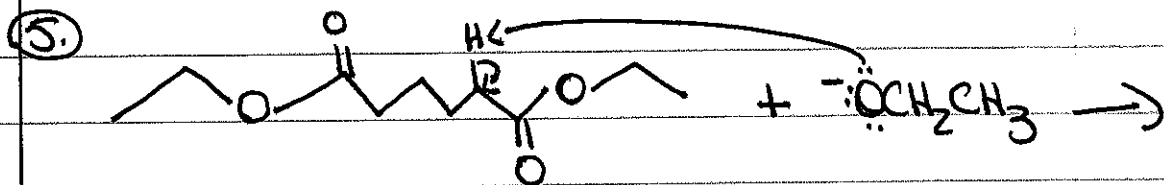
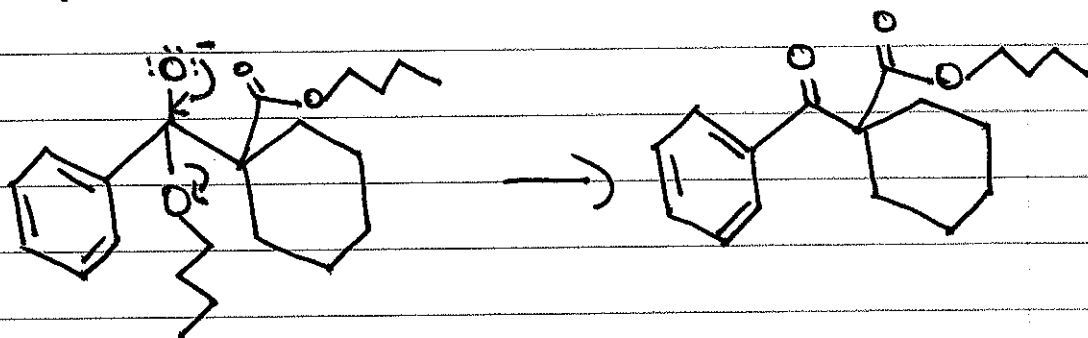
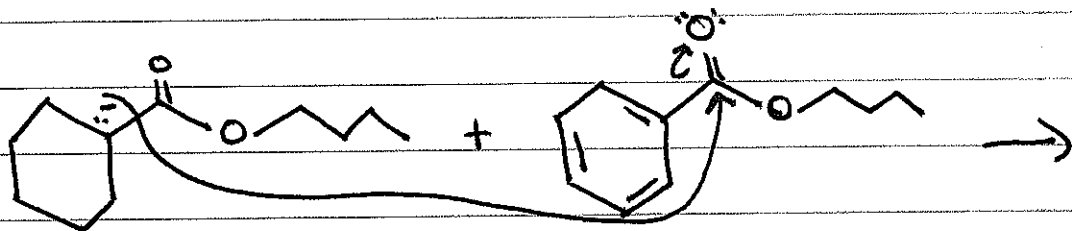
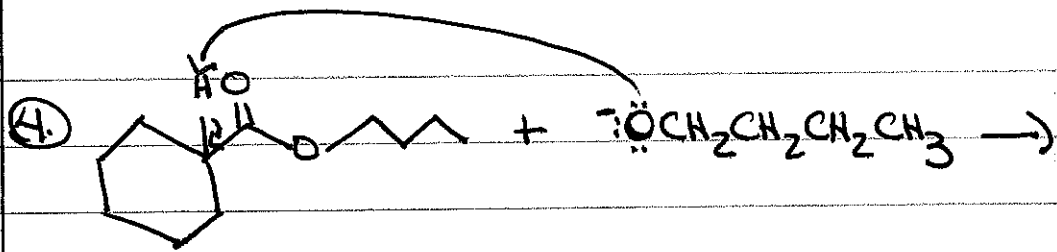
more than 1 enolate = more than 1

product

⑩

|         | Reactants   | Reagents                            | Products   |
|---------|---|-------------------------------------|--|
| Aldol   | 2 Aldehydes,<br>2 Ketones, or 1<br>aldehyde + 1<br>ketone | NaOH                                | $\beta$ -hydroxy aldehyde<br>or ketone or<br>$\alpha,\beta$ -unsaturated<br>aldehyde or ketone |
| Claisen | 2 Esters  | A Base that<br>matches the<br>ester | $\beta$ -keto ester  |





6.

