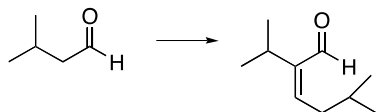


## PRACTICE PROBLEMS – UNIT 21

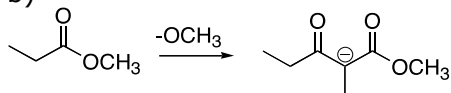
### 21A. Draw the mechanism of Aldol and Claisen condensations.

21A.1 Provide a mechanism for the following transformations. Draw intermediates and use curved arrows to show electron flow.

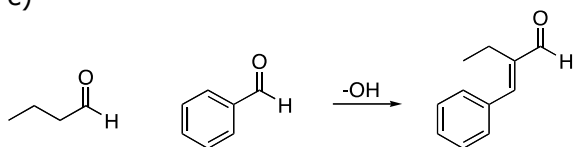
a)



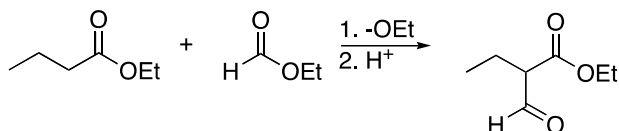
b)



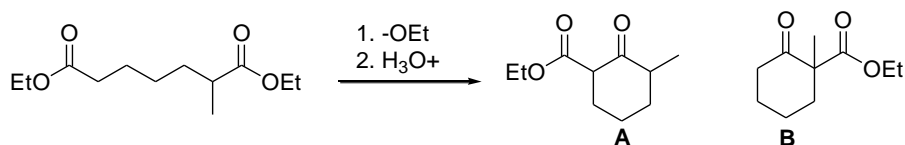
c)



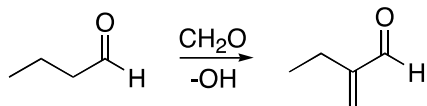
d)



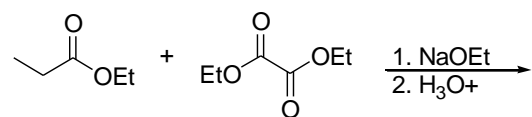
21A.2 a) Show the mechanism for the formation of **A** b) Explain why product **B** is not observed



21A.3 a) Draw the mechanism for the following reaction. b) What makes this a good mixed Aldol reaction? c) What is the driving force of the reaction?



21A.4 a) For the following mixed Claisen condensation, show the mechanism of formation. b) What makes this a good mixed Claisen reaction? c) What is the driving force of the reaction?



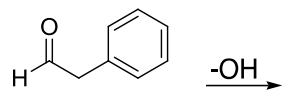
**21B. Draw the products of self, mixed, and intramolecular Aldol and Claisen condensations and determine starting materials given a product.**

21B.1 Predict the major products or missing reagents/starting materials of the following reactions.

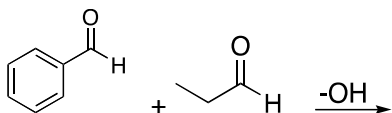
a)



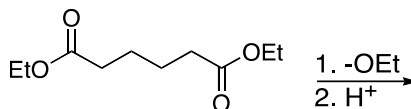
b)



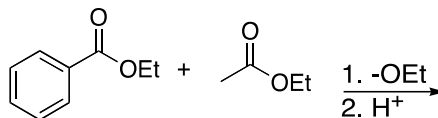
c)



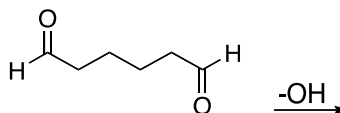
d)



e)

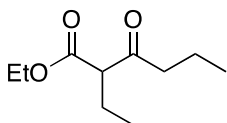


f)

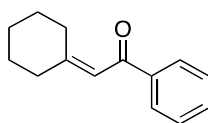


6. Draw the starting materials that could be used to form the following aldol and Claisen products.

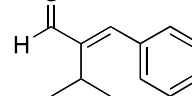
a)



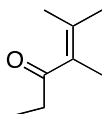
c)



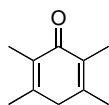
f)



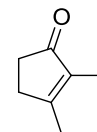
b)



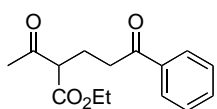
d)



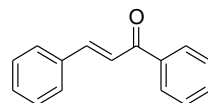
g)



c)



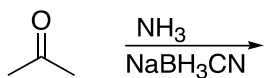
e)



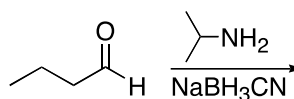
**21C. Predict the products of reductive amination, and reduction of nitriles and amides.**

21C.1 Predict the products of the following reactions.

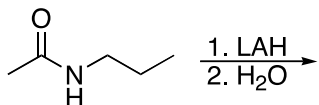
a)



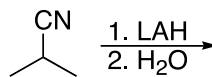
c)



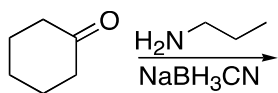
b)



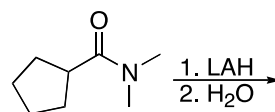
d)



e)

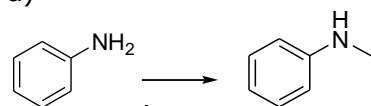


f)

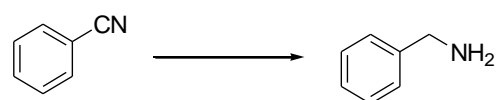


17C.2 Fill in the correct reagents for the following reactions.

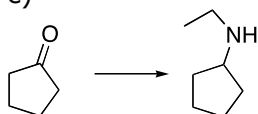
a)



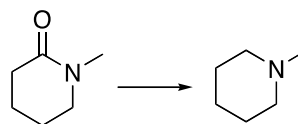
b)



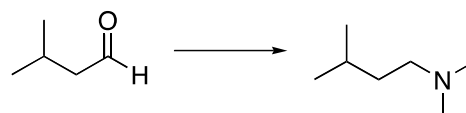
c)



d)

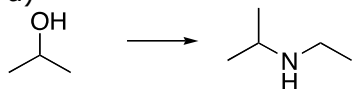


e)

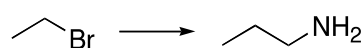
**21D. Use condensation and amine forming reactions as part of a multistep synthesis.**

21D.1 Provide a multistep synthesis for the following transformations.

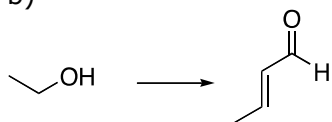
a)



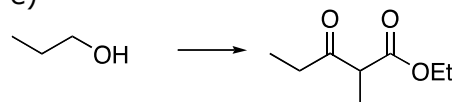
d)



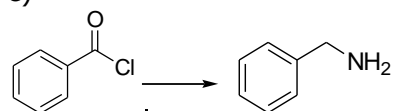
b)



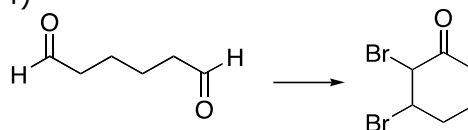
e)



c)

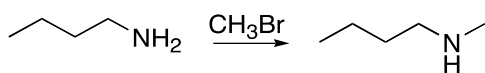


f)

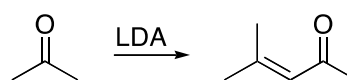


21D.2 State what is wrong with the following syntheses and propose a working synthesis.

a)



c)



b)

