

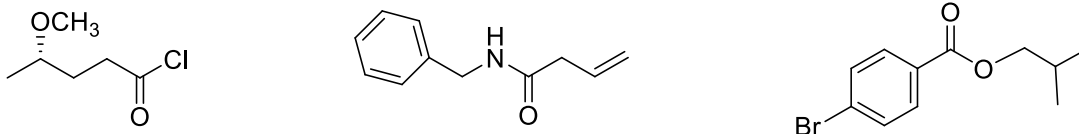
Carboxylic acid derivatives are a group of compounds which can be synthesized from a carboxylic acid. They are known for their reactivity as electrophiles which can be attacked by a variety of nucleophiles, allowing interchange among the acid derivatives as well as conversion to molecules in lower oxidation states.

Acid derivatives are more or less reactive with nucleophiles in a substitution reaction due to the nature of the leaving group. For each structure below, 1) draw the leaving group for each functional group and 2) rank the structures from most to least reactive in a substitution reaction.

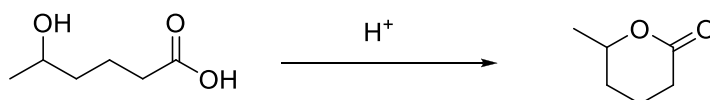
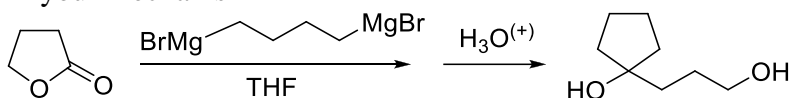


Carboxylic acids are lowest in reactivity towards nucleophilic substitution. Why? (Consider the reaction between acetic acid and sodium methoxide).

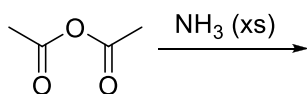
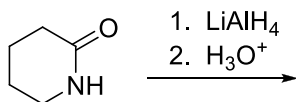
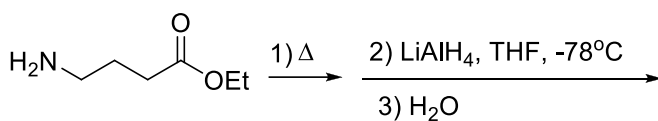
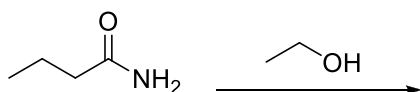
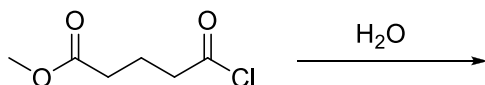
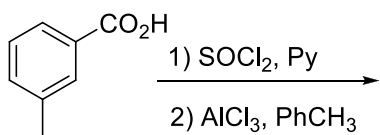
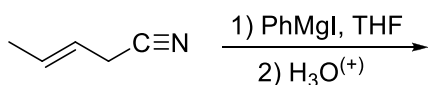
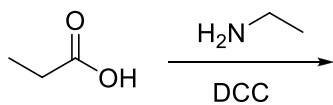
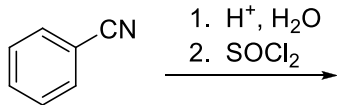
Give the IUPAC names for the molecules below:



Write out the step-by-step mechanism for each reaction below. Include all intermediates, charges and curved arrows in your mechanism



Give the major product(s) of the following reactions:



Give the reagents needed to accomplish the indicated transformations.

