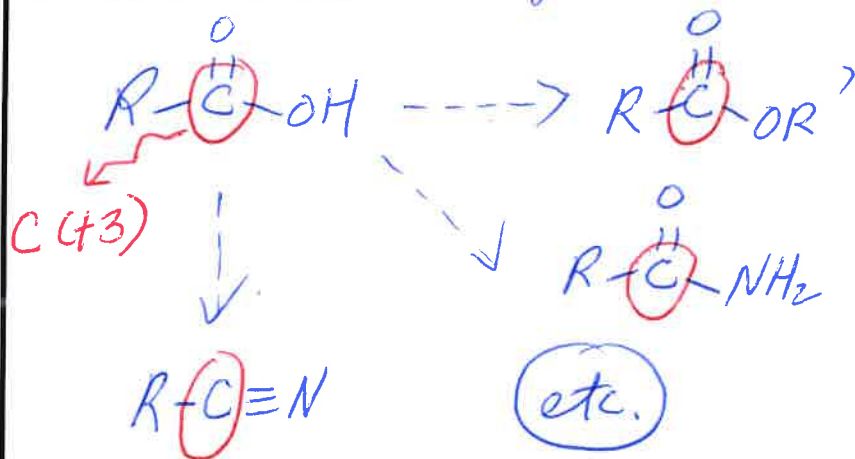


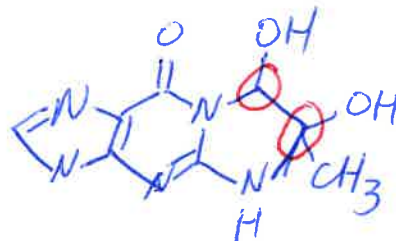
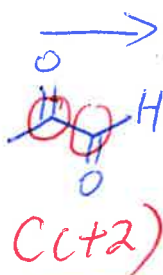
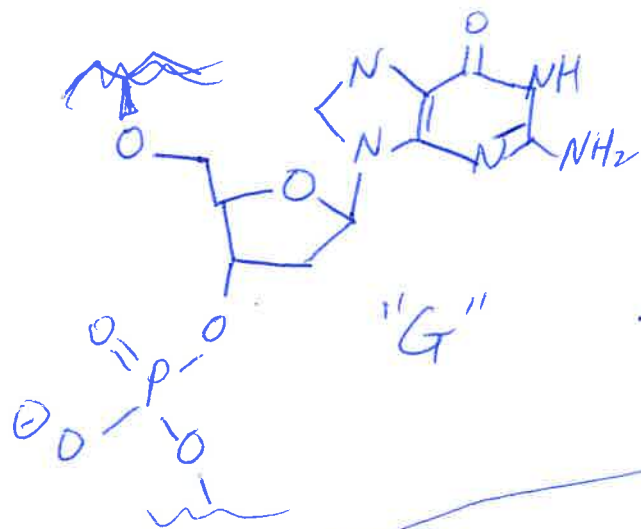
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## Recall: Carboxylic Acid Derivatives

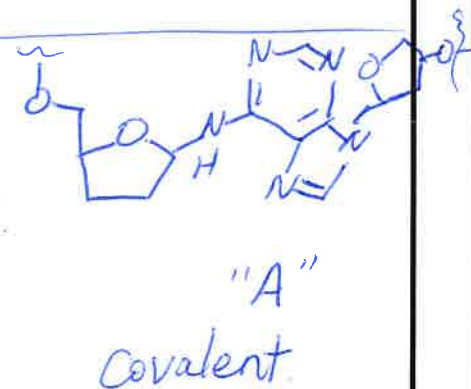
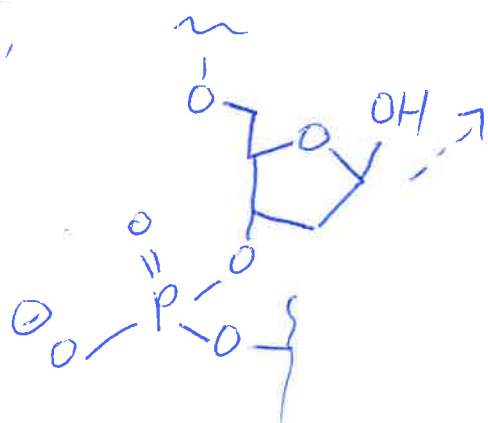


Rev. Problems:  
 7-50, 52-54,  
 55b,c,f,g, 56-60,  
 62, 63.

What I learned in California: Aldehyde/Ketones & DNA damage



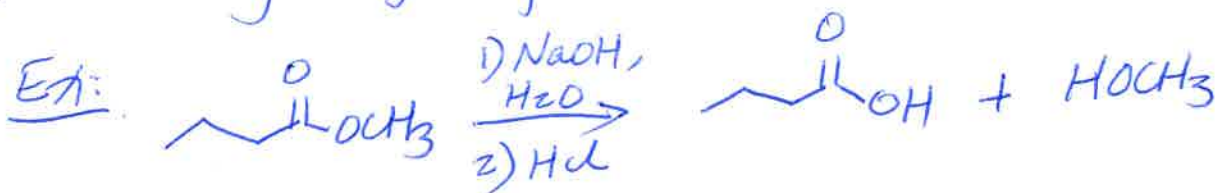
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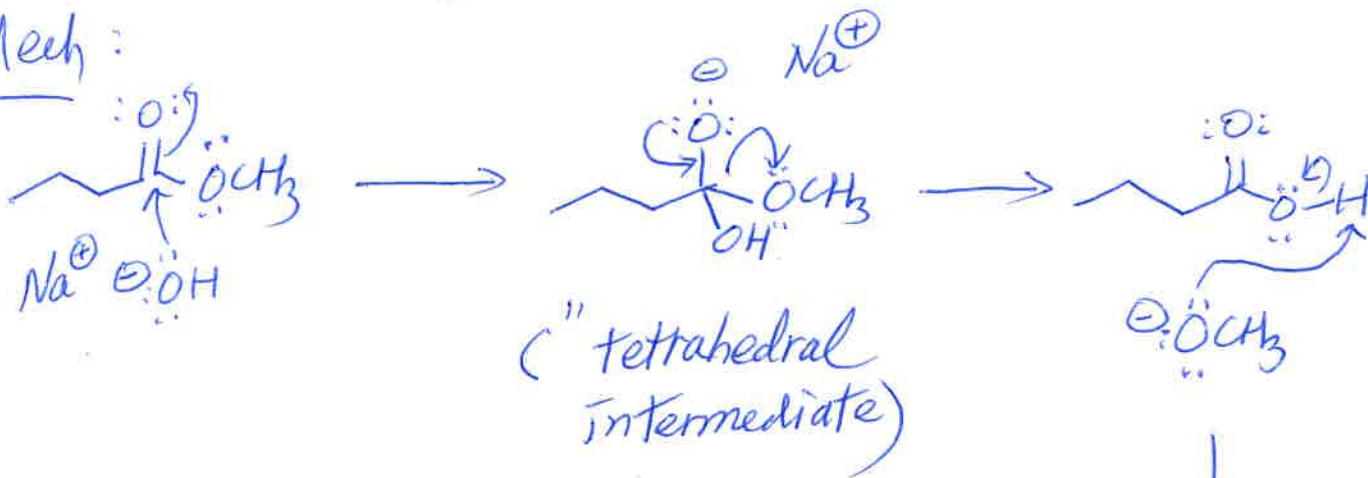
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Reactions of carboxylic acid derivatives ...  
 1) Hydrolysis - carboxylic acid derivatives can be hydrolyzed to form "parent" carboxylic acid + fragment

Alkaline hydrolysis of esters.



Mech:



Not catalytic - 1 equiv.  $OH^-$  consumed, because the "final" deprotonation to form carboxylate.

This rxn is essential irreversible. CCCC(=O)O  
 Acid-catalyzed ester hydrolysis = reverse of Fischer esterification (you fill in)



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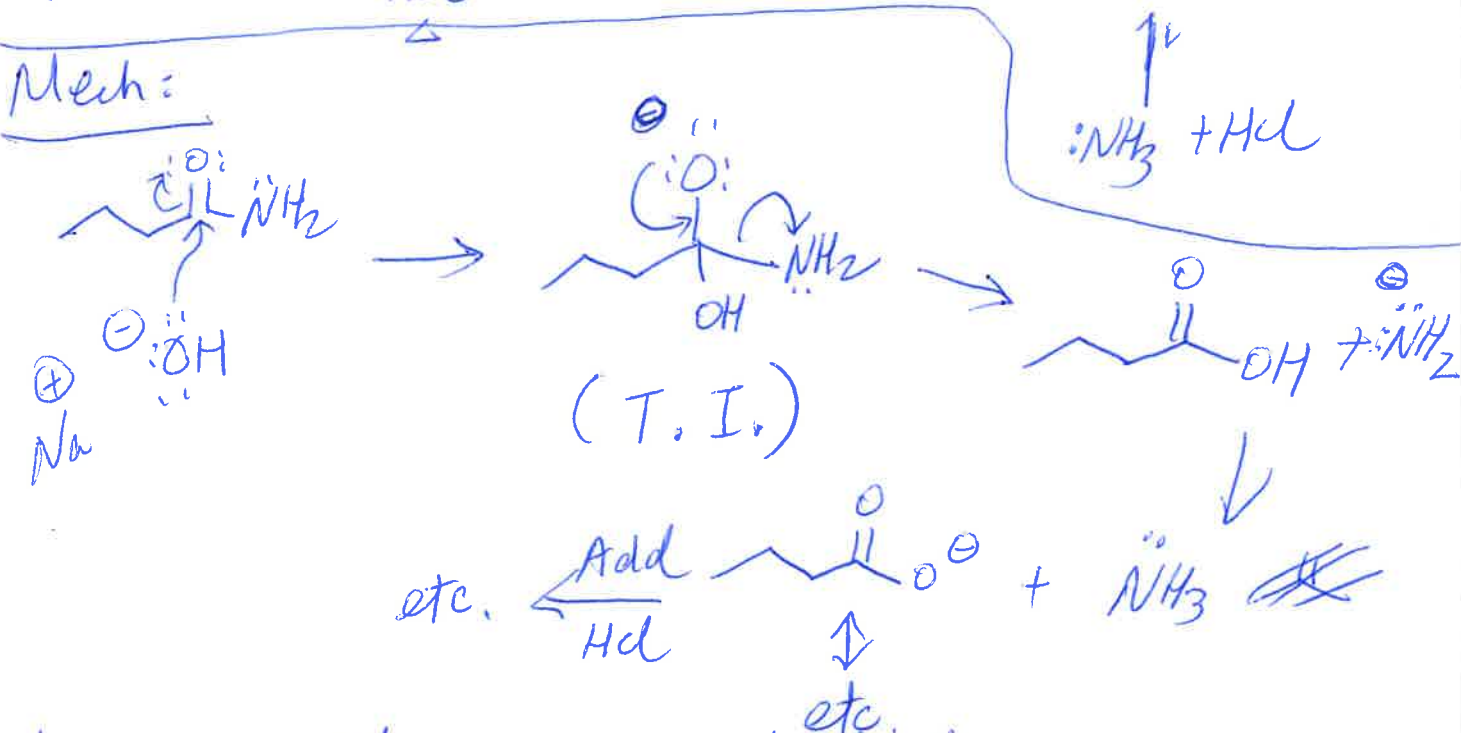
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Amide hydrolysis - both alkaline & acid ~~cat~~ processes possible. Harder than ester hydrolysis !

Ex: (Alkaline conditions)



Mech:



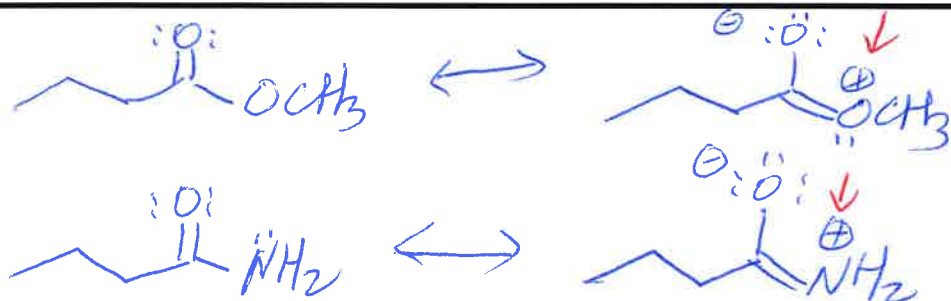
Why does amide require much harsher conditions than ester for hydrolysis?

2 conditions

1) Enhanced ~~stabi~~ resonance stabilization in amide relative to ester



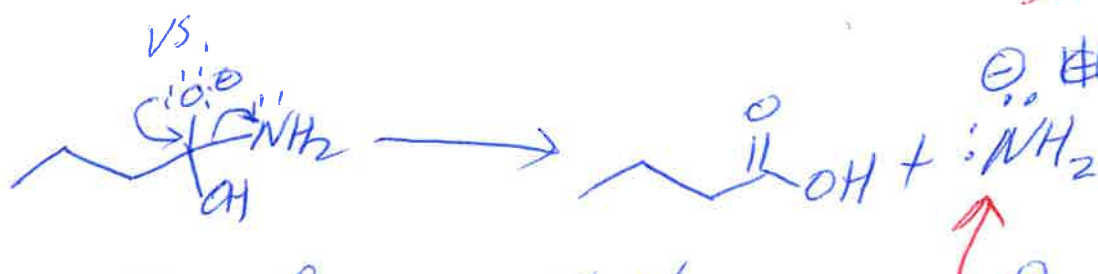
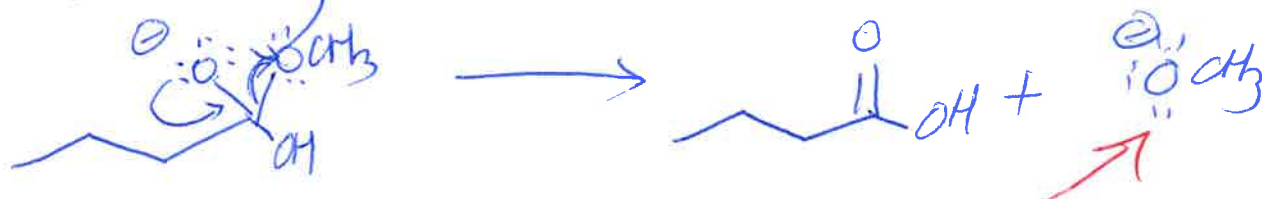
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N less electro-negative than O, N ~~more~~ more willing to bear  $\oplus$  (more willing to share  $e^-$ 's)

Observe: when  $\text{OH}^-$  "attacks" ester/amide, the resulting T.I. has no resonance.  $\therefore$  Amide has more to lose than does ester.

2) Nature of leaving group (for carbonyl regeneration)



Generation of more stable anion ( $\text{OCH}_3^-$ ) makes ester more reactive

Compare acid promoted ester vs. amide hydrolysis  $\Rightarrow$  rationalize

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lower reactivity of amide relative to ester.