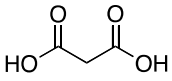
17A. Name carboxylic acids and carboxylates including common names acetic acid and benzoic acid.

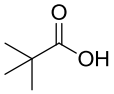
17A.1 Name the following compounds.

a)

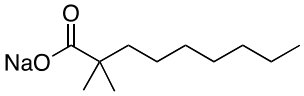


b)

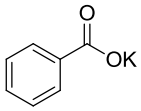
c)



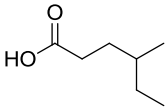
d)



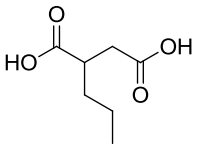
e)



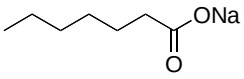
f)



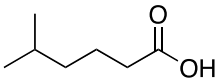
g)



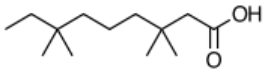
h)



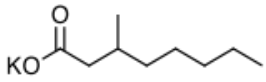
i)



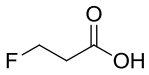
j)



k)



l)



17A.2 Draw the structure of the following molecules.

a) *o*-pentyl benzoic acid

b) 4,5-dimethylnonanoic acid

c) 3-sec-butyl octanedioic acid

d) 2,2,2-tribromoacetic acid

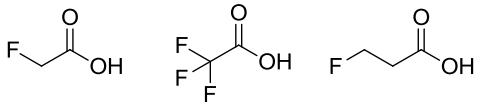
e) sodium 3,3-dibromoheptanoate

f) 2-methylpropanedioic acid

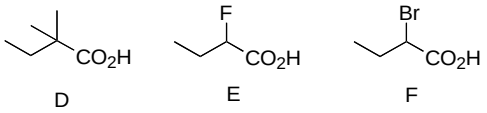
17B. Predict products of acid-base reactions of carboxylic acids and predict relative acidity based on structure. Draw three forms of amino acids.

17B.1 Rank the following sets of molecules based on acidity, #1 being the most acidic.

a)

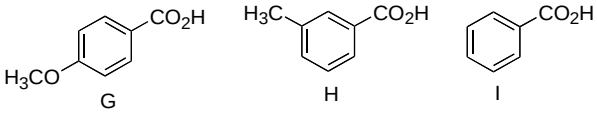


b)



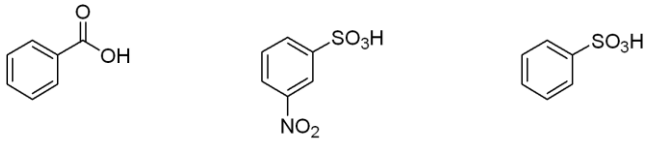
D E F

c)



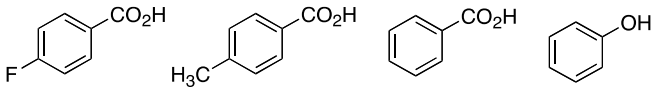
G H I

d)

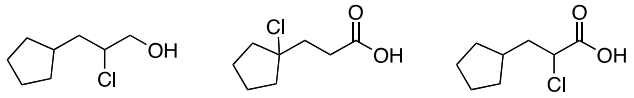


A. B. C.

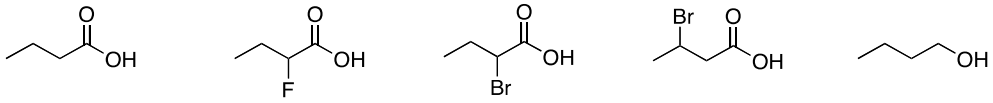
e)



f)



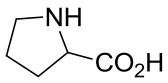
g)



17B.2 Why is propanoic acid a stronger acid than 1-propanol? Draw structures to support your explanation.

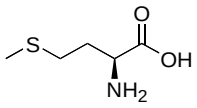
17B.3 Draw the structure of the following amino acids in the low pH, neutral pH and high pH conditions.

a)

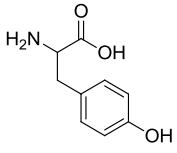


proline

b) methionine



c) tyrosine

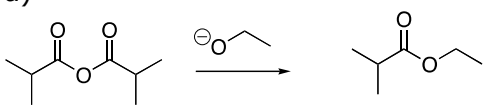


17B.4 Why are amino acids, unlike most organic compounds, insoluble in organic solvents such as diethyl ether?

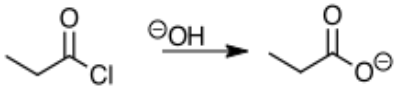
17C. Draw the mechanism of nucleophilic acyl substitution, hydrolysis and fisher esterification.

17C.1 Provide a mechanism for the following transformations. Draw all intermediates and use curved arrows to show electron flow. Note side products are not drawn

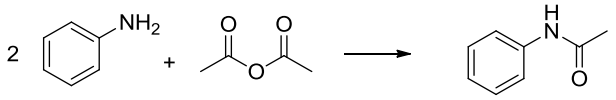
a)



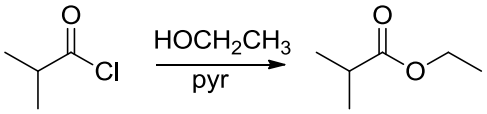
b)



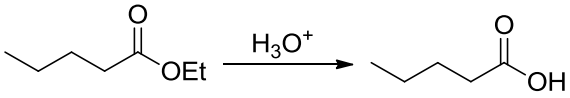
c)



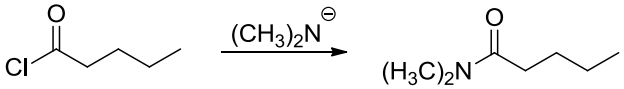
d)



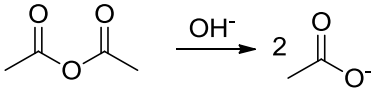
e)



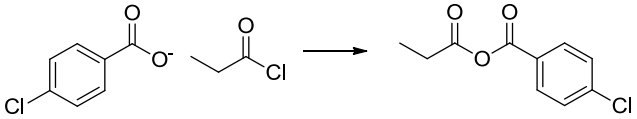
f)



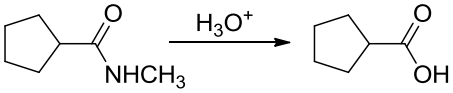
g)



h)

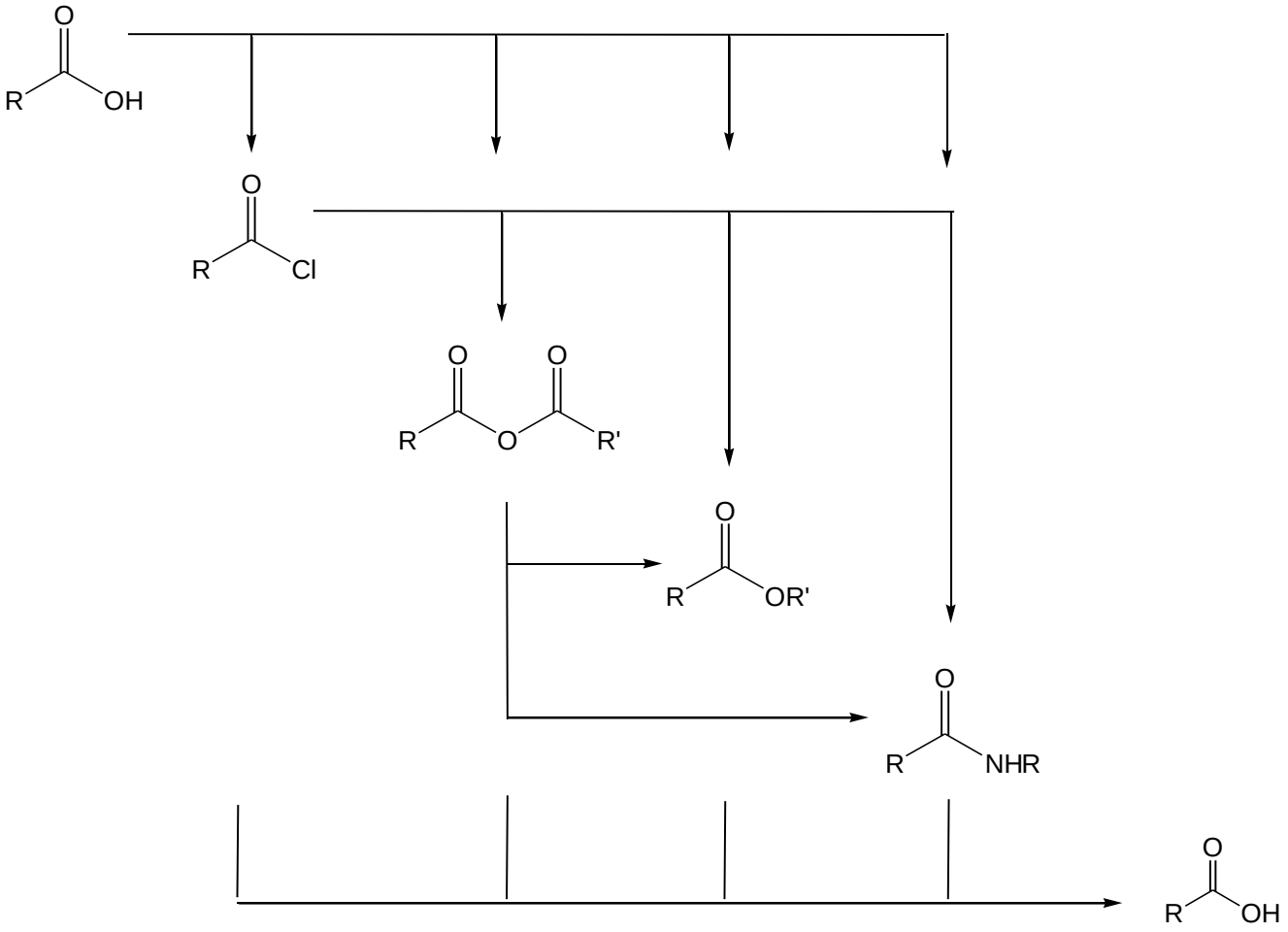


i)



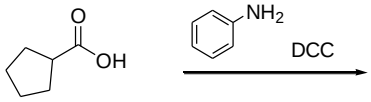
17D. Predict the products of acyl substitution, hydrolysis, and conversion of acids to acid derivatives.

17D.1 Fill in the reagents for the following transformations.

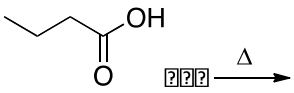


17D.2 Predict the major product of the following reactions. If no reaction write "NR".

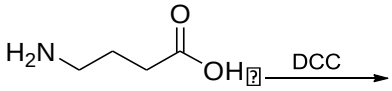
a)



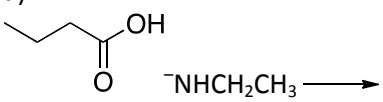
b)



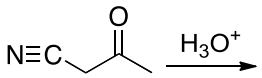
c)



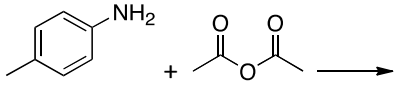
d)



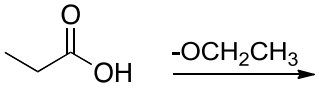
e)



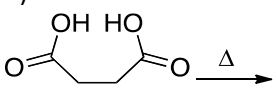
f)



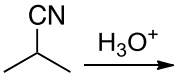
g)



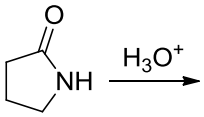
h)



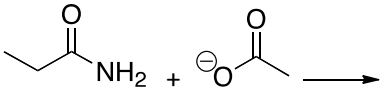
i)



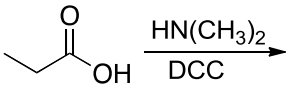
j)



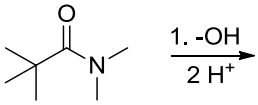
k)



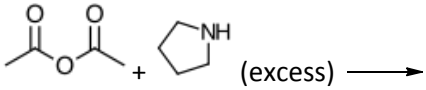
l)



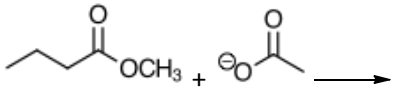
m)



n)



o)



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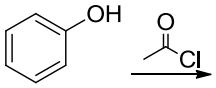
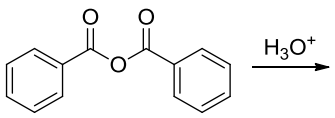
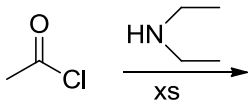


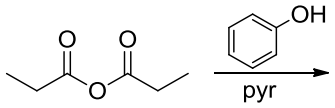
q)



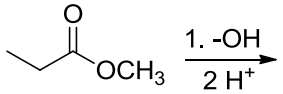
r)



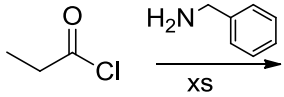
s)



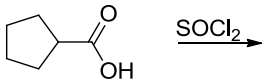
t)



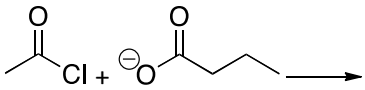
u)



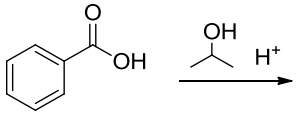
v)



w)

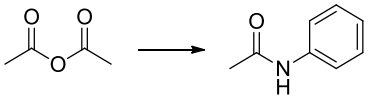


x)

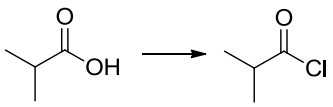


17D.3 Fill in the missing reagents.

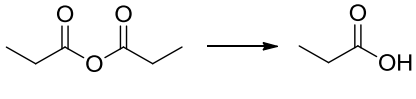
a)



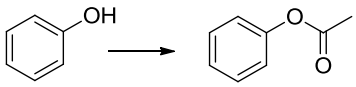
b)



c)



d)



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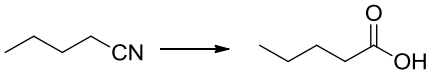

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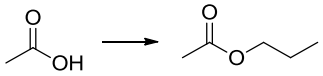
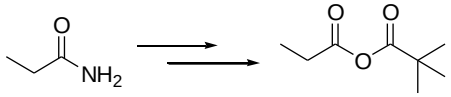


17E. Devise multistep synthesis using acyl reactions.

17E.1 Provide a multistep synthesis for the following transformations.

a)



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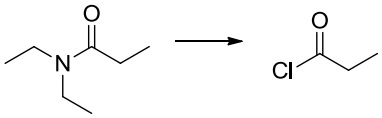

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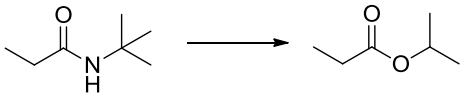

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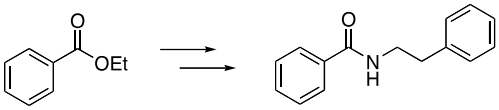

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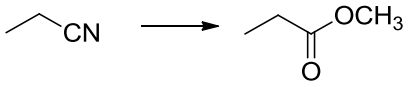

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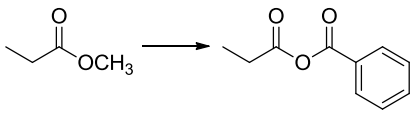

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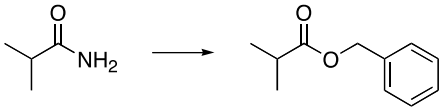
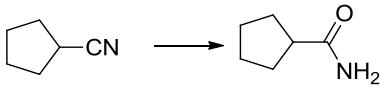
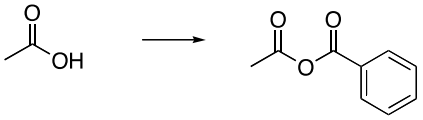


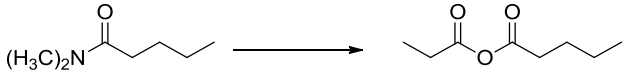
h)



i)

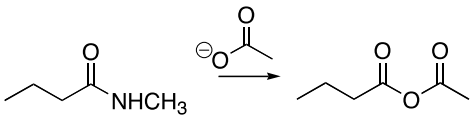


j)

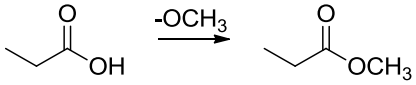


17E.2 Explain why the following syntheses are flawed and propose a working synthesis.

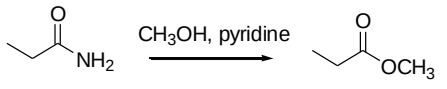
a)



b)



c)



d)