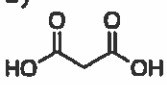
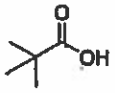
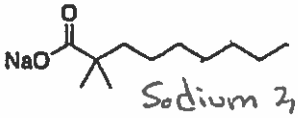
17A. Name carboxylic acids and carboxylates including common names acetic acid and benzoic acid.

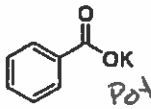
17A.1 Name the following compounds.

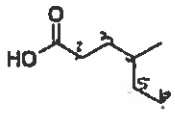
a)  propanedioic acid

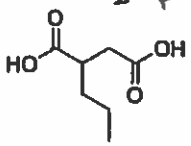
b)  acetic acid

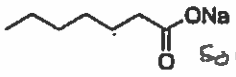
c)  2,2-dimethyl propanoic acid

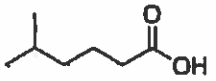
d)  Sodium 2,2-dimethyl nonanoate

e)  Potassium benzoate

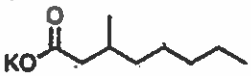
f)  4-methyl hexanoic acid

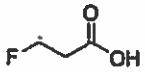
g)  2-propyl butanedioic acid

h)  Sodium heptanoate

i)  5-methyl hexanoic acid

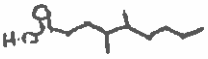
j)  3,3,7,7-tetramethyl nonanoic acid

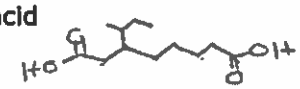
k)  Potassium 3-methyl ~~octanoic acid~~ Octanoate

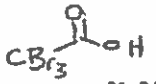
l)  3-fluoropropanoic acid

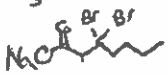
17A.2 Draw the structure of the following molecules.

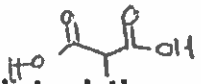
a) *o*-pentyl benzoic acid 

b) 4,5-dimethylnonanoic acid 

c) 3-sec-butyl octanedioic acid 

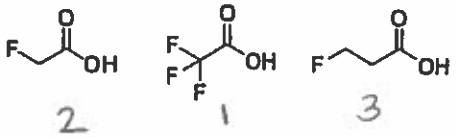
d) 2,2,2-tribromoacetic acid 

e) sodium 3,3-dibromoheptanoate 

f) 2-methylpropanedioic acid 

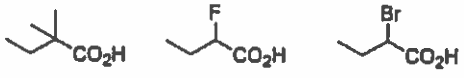
17B. Predict products of acid-base reactions of carboxylic acids and predict relative acidity based on structure. Draw three forms of amino acids.

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

a) 

2 1 3

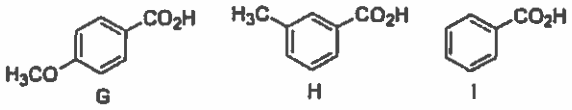
b)



D E F

3 1 2

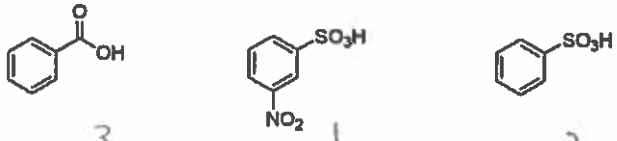
c)



G H I

3 2 1

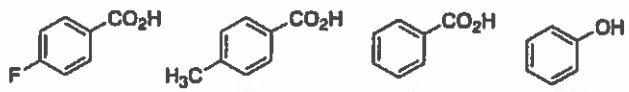
d)



A. B. C.

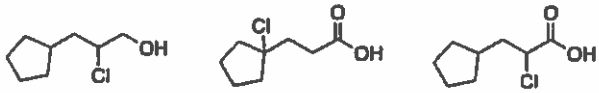
3 1 2

e)



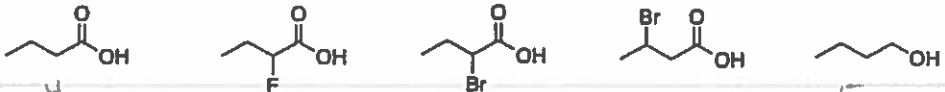
1 3 2 4

f)



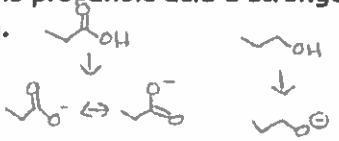
3 2 1

g)



4 1 2 3 5

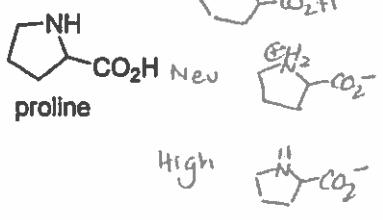
17B.2 Why is propanoic acid a stronger acid than 1-propanol? Draw structures to support your explanation.



Resonance stabilization of the conjugate base makes propanoic acid a stronger acid

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

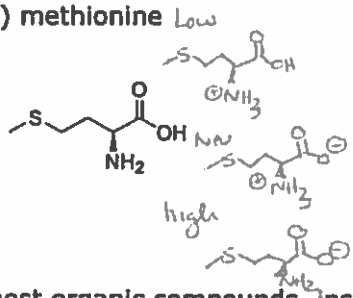
a)



proline

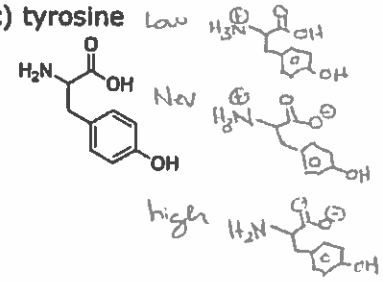
Low Neu High

b) methionine



Low Neu high

c) tyrosine



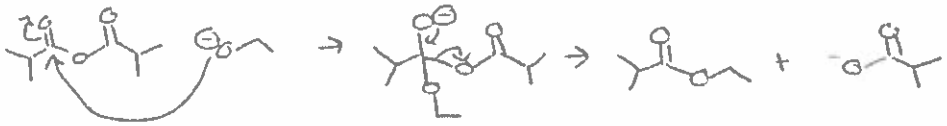
Low Neu high

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

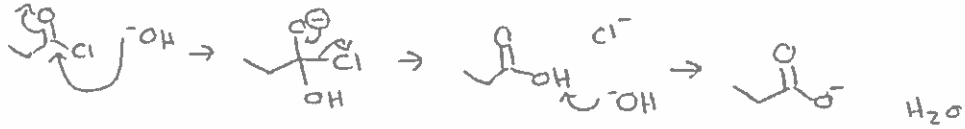
They exist as zwitterions - ionic compounds are not soluble in organic solvents

17C.1

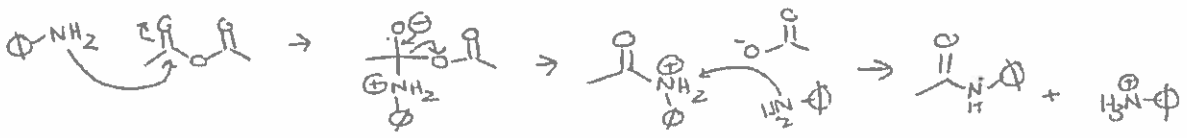
a)



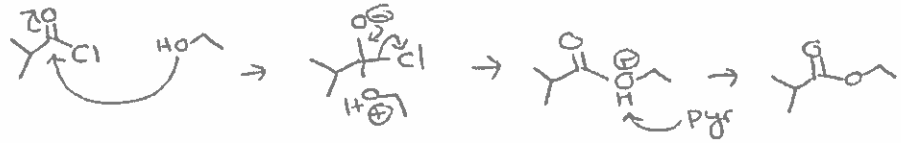
b)



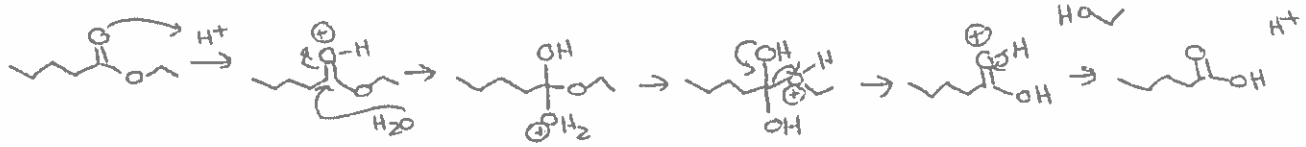
c)



d)

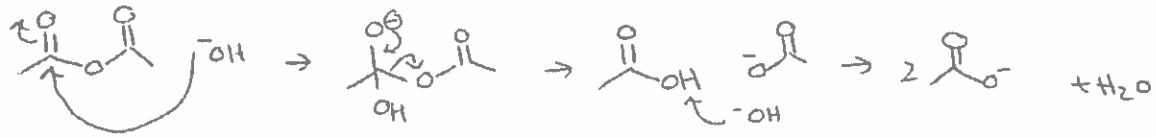


e)

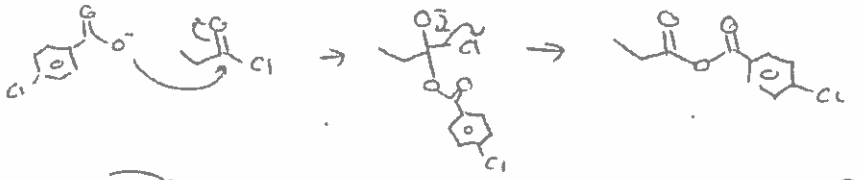


f)

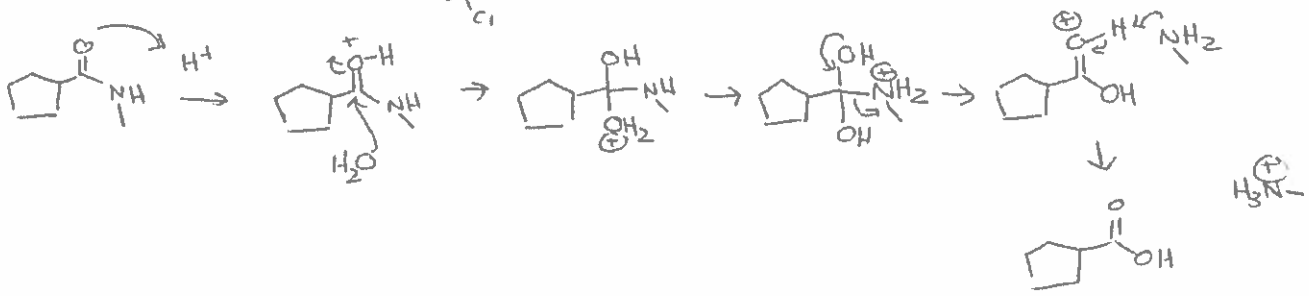
g)



h)

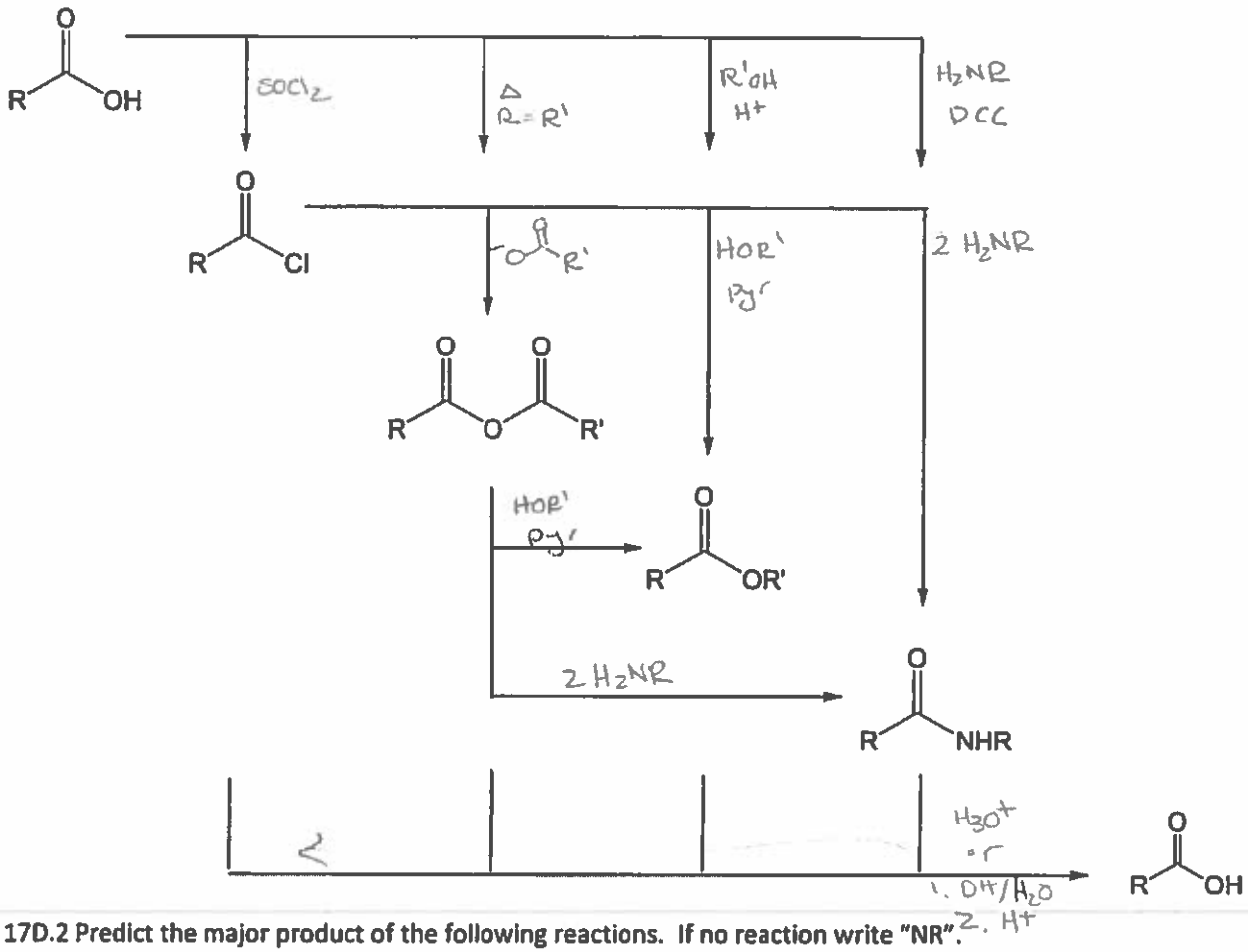


i)



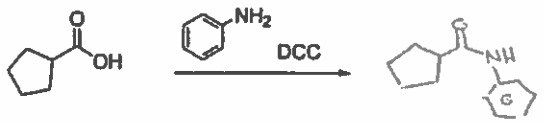
17D. Predict the products of acyl substitution, hydrolysis, and conversion of acids to acid derivatives.

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



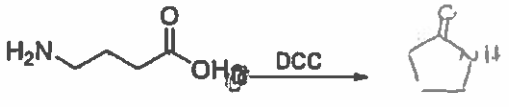
17D.2 Predict the major product of the following reactions. If no reaction write "NR".

a)

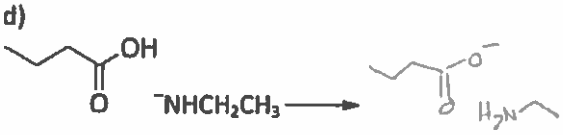


b)

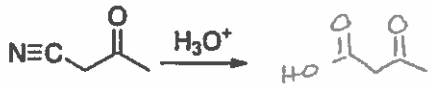
c)



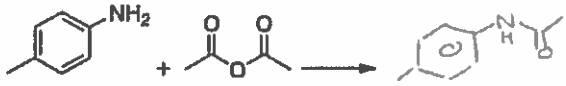
d)



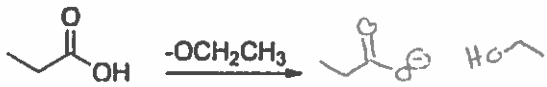
e)



f)

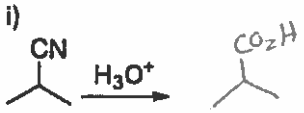


g)

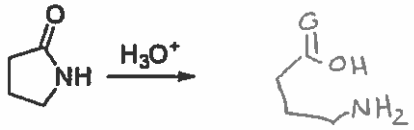


h)

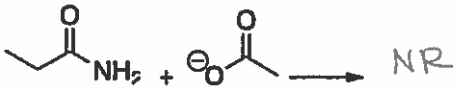
i)



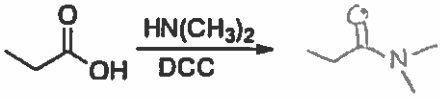
j)



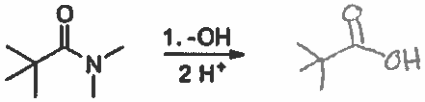
k)



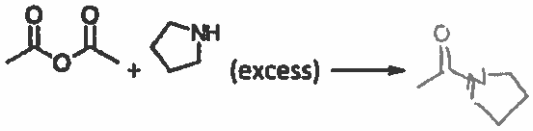
l)



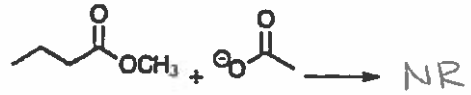
m)



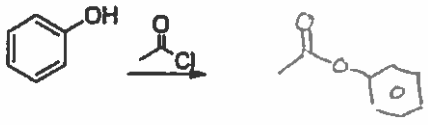
n)



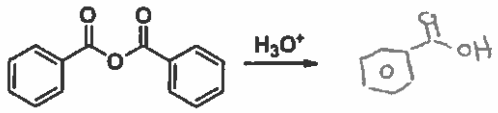
o)



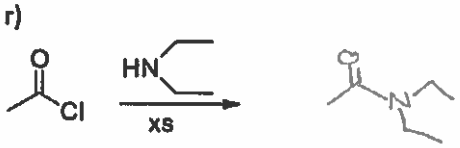
p)



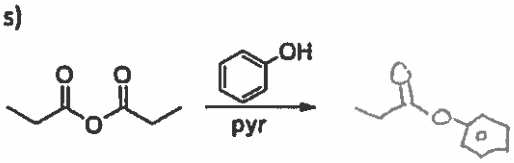
q)



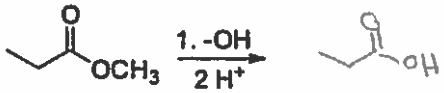
r)



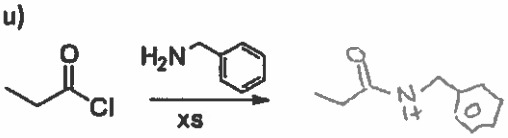
s)



t)

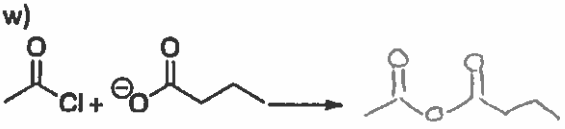


u)

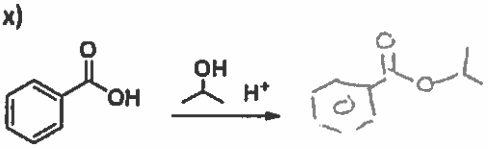


v)

w)

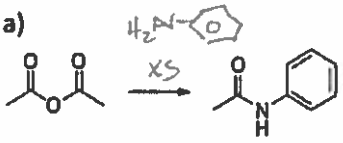


x)

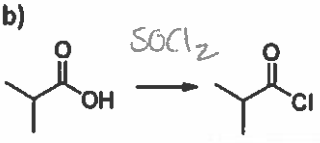


17D.3 Fill in the missing reagents.

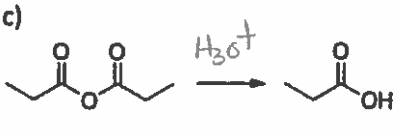
a)



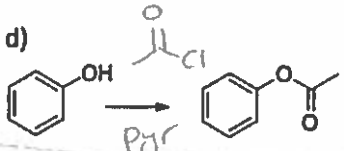
b)



c)



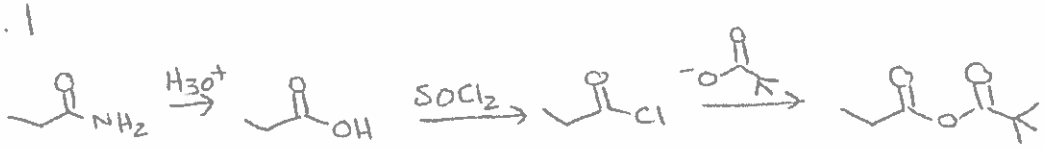
d)

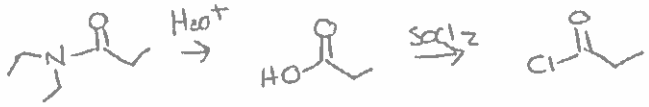


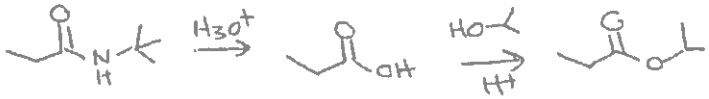
e) H_3O^+

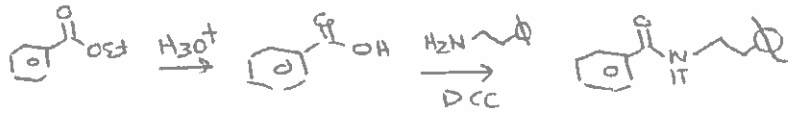
f) H^+, HO

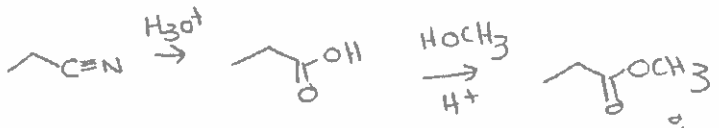
17E.1

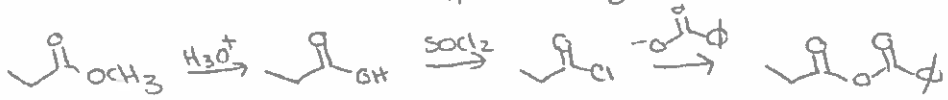
a) 

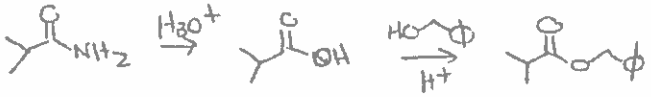
b) 

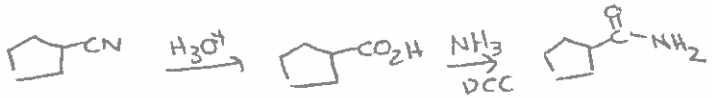
c) 

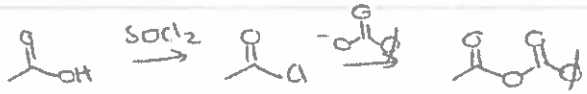
d) 

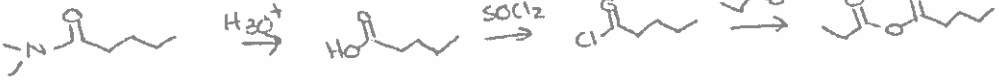
e) 

f) 

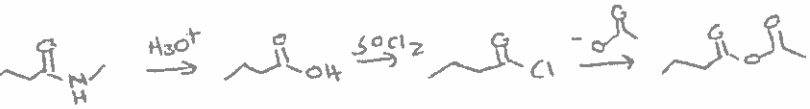
g) 

h) 

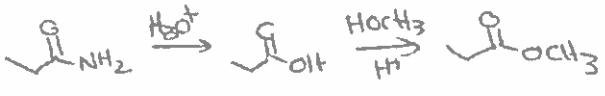
i) 

j) 

17E.2

a) uphill in energy - 

b) results in acid/base rxn, use $HOCH_3/H^+$

c) uphill in energy 

d) Results in a mixture of products