HOMEWORK #6

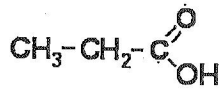
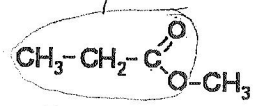
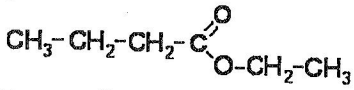
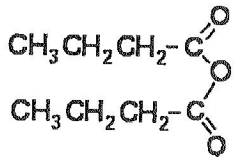
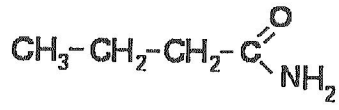
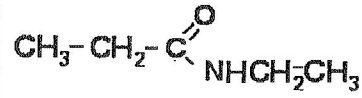
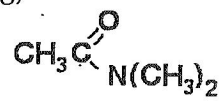
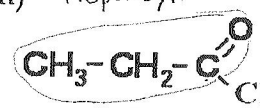
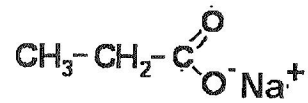
CHEM 121, section 1, **Printed Name:** Key

Chapter. 15. Carboxylic Acids, Esters, and Other Acid Derivatives

Homework# 6 Due **Group Name:** _____

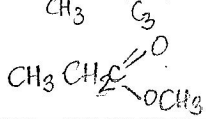
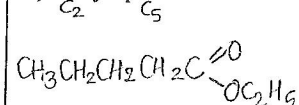
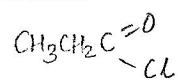
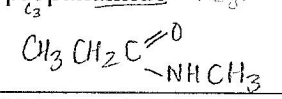
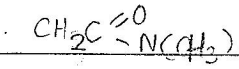
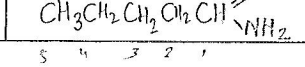
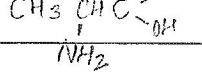
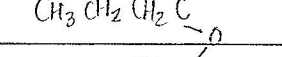
1) (2 pts) Identify the carboxylic acids, their derivatives (esters, anhydrides, amides, chlorides and salts) from the following and give their common and/or IUPAC names.

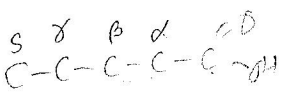
Propanoate

a)  Type: Carboxylic acid Name: Propionic/propanoic acid	b)  Type: Ester Name: methyl propanoate	c)  Type: Ester Name: Ethyl butanoate
d)  Type: Acid anhydride Name: Butanoic anhydride	e)  Type: Amide Name: Butanamide	f)  Type: Amide Name: N-ethyl propanamide
g)  Type: Amides Name: N,N-dimethyl methanamide	h) Propanoyl  Type: Acid chloride Name: Propanoyl chloride	i)  Type: carboxylic acid salt Name: Sodium Propionate

2) (2 pts) Draw the condensed formula of following carboxylic acid and their derivatives.

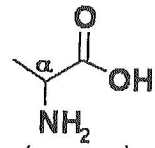
$R-C(=O)-Cl$

a) methyl propanoate 	b) ethyl pentanoate 	c) propanoyl chloride 	d) N-methyl propanamide 
e) N,N-dimethyl ethanamide 	f) 2-methyl pentanamide 	g) 2(α)-aminopropanoic 	h) butanoic ethanoic anhydride 



3) (2 pts) Identify type and give name of each of the following carboxylic acids.

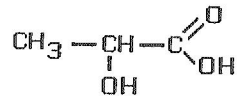
a)



Type: Amino acid

Name: α-amino propionic acid

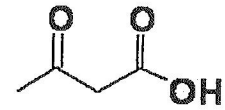
b)



Type: Hydroxide

Name: 2-hydroxy propionoic acid

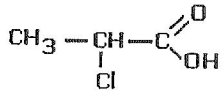
c)



Type: Keto acid

Name: β-keto butanoic acid

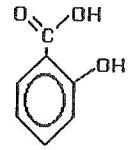
d)



Type: carboxilic acid halogen

Name: 2-chloro propanoic acid

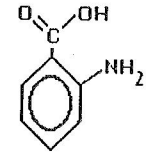
e)



Type: Hydroxy aromatic acid

Name: 2-hydroxy benznic acid

f)

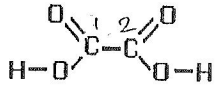


Type: aromatic amino acid

Name: 2-amino benzoic acid

4) (3 pts) Give common/IUPAC names of following dicarboxylic acids. Use "**O**h **m**y, **s**uch **g**reat **a**pple **p**ie!" (**o**xalic, **m**alonic, **s**uccinic, **g**lutaric, **a**dipic, **p**imelic).

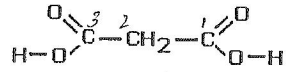
a)



Common: oxalic

IUPAC: ethandioc acid

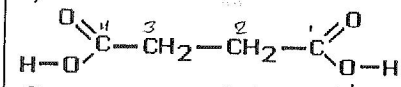
b)



Common: malonic

IUPAC: propandioc

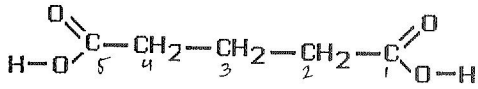
c)



Common: succinic acid

IUPAC: butandioc

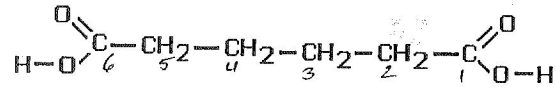
d)



Common: glutaric acid

IUPAC: pentadioc acid

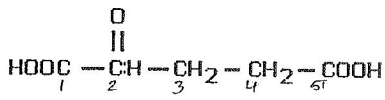
e)



Common: Adipi acid

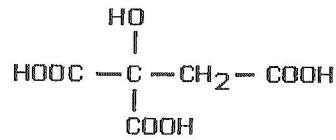
IUPAC: hexandioc acid

e)



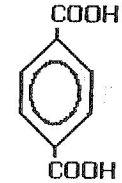
Name: α-keto glutaric acid

f)



Name: citric acid

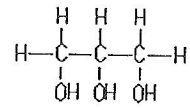
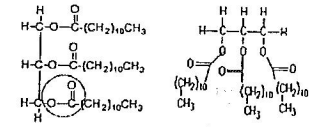
g)



Common: terephthalic

IUPAC: benze 1,4 dioic acid

5) (2 pts) Give type/name of following fatty acids, and their derivatives.

a) $CH_3(CH_2)_{10}CO_2H$ Type: saturated fatty acid Name: lauric acid IUPAC: dodecanoic	b) $CH_3(CH_2)_{14}CO_2H$ Type: saturate fatty acid Name: palmitic acid IUPAC: hexadecanoic acid	c) $CH_3(CH_2)_{16}CO_2H$ Type: saturate fatty acid stearic acid Name:
j) $CH_3(CH_2)_7CH{=}CH(CH_2)_7COOH$ Type: unsaturated fatty acid Name: oleic acid.	k)  Type: triol Name: glycerol	l)  Type: triglyceride Name: laurie triglyceride

6) (3 pts) Name and complete following reactions.

1. $CH_3CH_2CH_2CH_2OH \xrightarrow[\text{(Jones' reagent)}]{H_2CrO_4,\ H_3O^+ \text{ \& acetone}} CH_3CH_2CH_2C(=O)OH$

2. $CH_3-CH_2-C(=O)-OH \xrightarrow[2.\ H_3O^+]{1.\ LiAlH_4} CH_3CH_2CH_2-OH$
propanoic acid

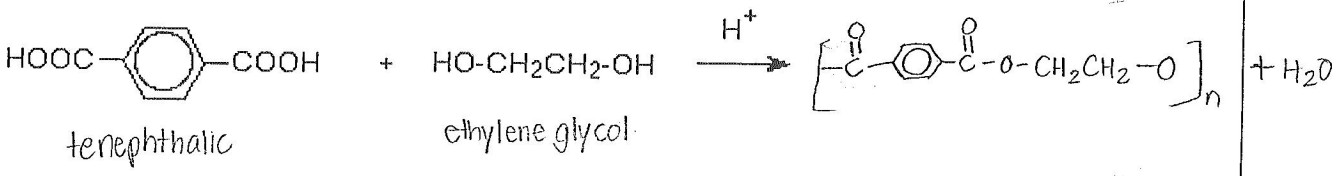
3. $R-C(=O)-OH \xrightarrow{SOCl_2} R-C(=O)-Cl$
triol
glycerol

4. $CH_3-C(=O)-OH + HOCH_2CH_3 \xrightarrow{H^+} CH_3-C(=O)-OCH_2CH_3 + H_2O$
Carboxylic Acid Alcohol

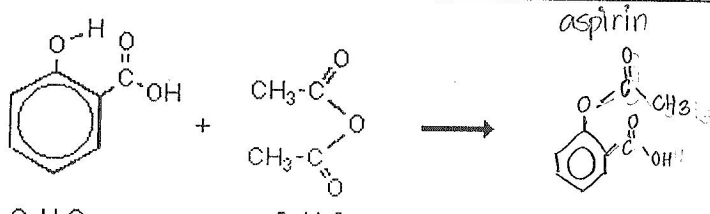
5. $CH_3-C(=O)-Cl + CH_3OH \xrightarrow[\text{heat}]{H^+} CH_3C(=O)OCH_3 + HCl$

6. $CH_3-C(=O)-Cl + CH_3-C(=O)-O^-Na \longrightarrow$ anhydride $CH_3C(=O)OC(=O)CH_3 + NaCl$

7) (3 pts) Name and complete following reactions.

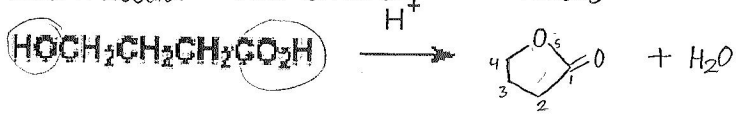
1. 

terephthalic ethylene glycol

2. 

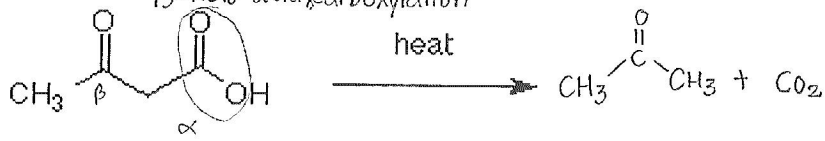
$C_7H_6O_3$ Salicylic acid — $C_4H_6O_3$ Acetic anhydride

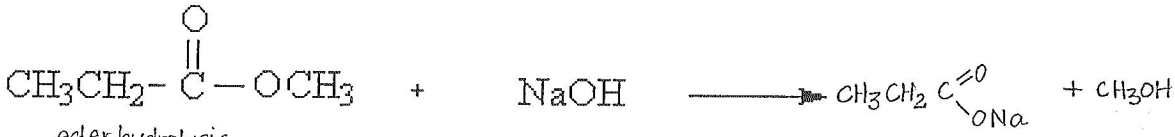
3. intra molecular ester formation



lactone

4. β-keto acid decarboxylation



5. 

ester hydrolysis

6. saponification