

JASPERSE
Ch 24 Amines

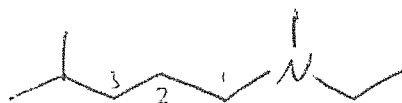
CHEM 342
Ch 20 Carboxylic Acids

TEST 4

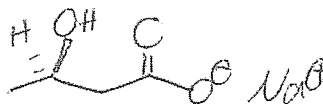
VERSION 3
Ch 21 Carboxylic Acid Derivatives

1. Nomenclature. Provide Either the Name or the Structure for the Following Chemicals. (10 points)

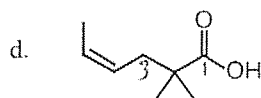
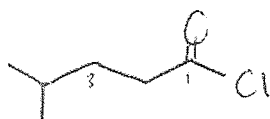
a. N-ethyl-N-methyl-4-methyl-1-pentanamine



b. sodium (R)-3-hydroxybutanoate



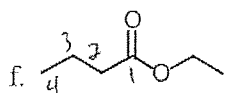
c. 4-methylpentanoyl chloride



cis-2,2-dimethyl-4-hexenoic acid
(Z)

e.

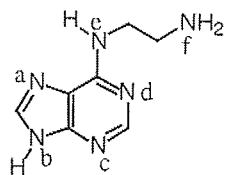
(R)-4-amino-5-methyl hexanoic acid



ethyl pentanoate

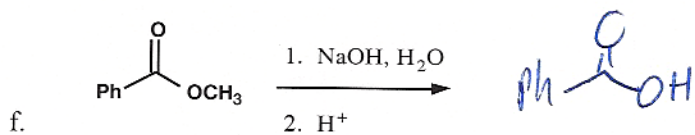
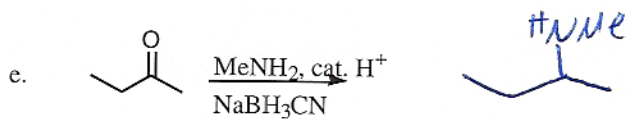
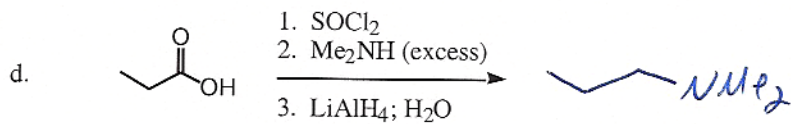
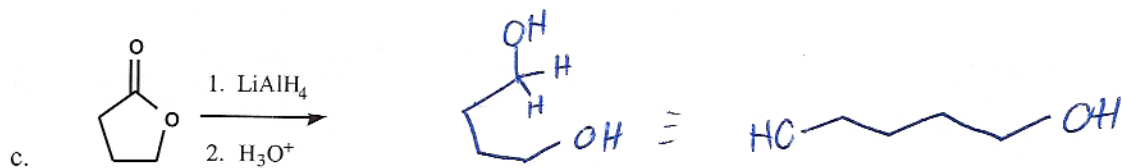
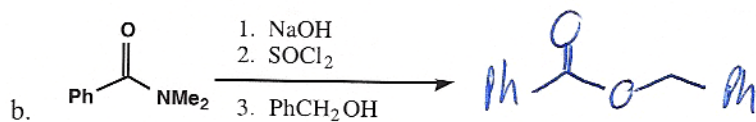
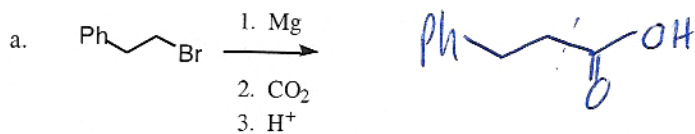
Oops! Ethyl Butanoate,
not pentanoate

2. For each nitrogen a-f, identify the hybridization of the nitrogen atom, and identify the hybridization of the nitrogen lone pair. [Adenine is an important player in information transfer (DNA, RNA, genetics, etc.) and energy storage/release (ATP/ADP).]

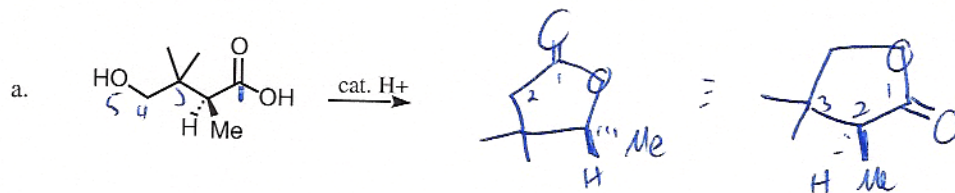


Nitrogen Atom	Hybridization of the Nitrogen Atom	Hybridization of the Nitrogen Lone Pair
a	sp^2	sp^2
b	sp^2	p
c	sp^2	sp^2
d	sp^2	sp^2
e	sp^2	p
f	sp^3	sp^3

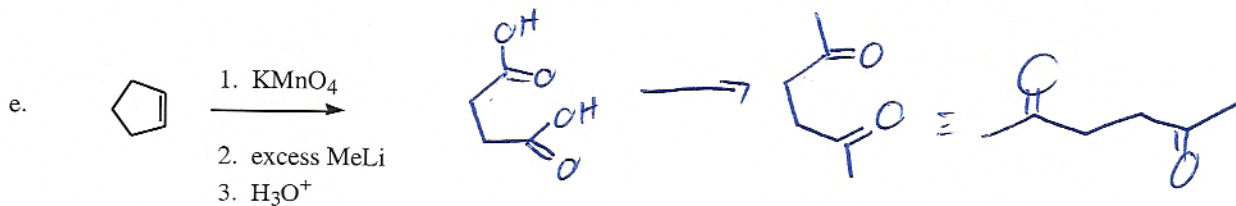
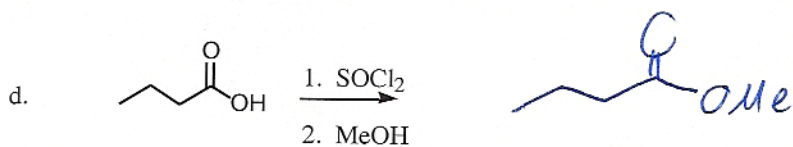
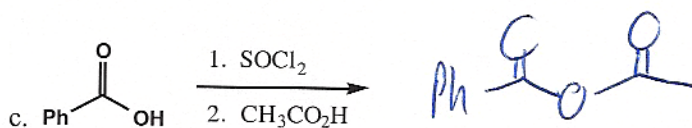
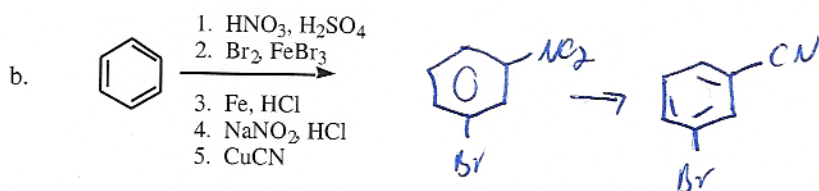
3. Synthesis Reactions. Draw the feature product of the following reactions (need not show any byproducts). (15 points)



4. Synthesis Reactions. Draw the feature product of the following reactions (need not show any byproducts). (15 points)

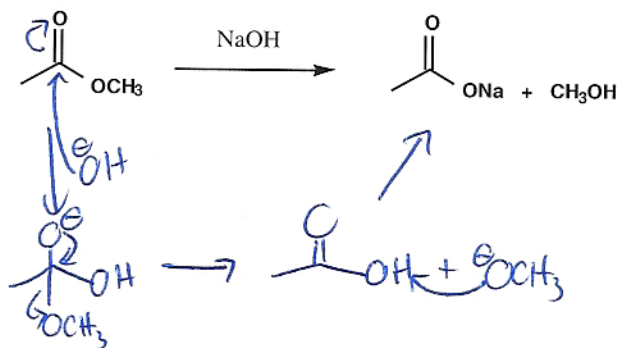
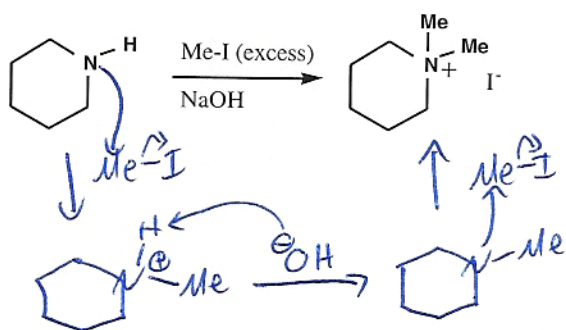
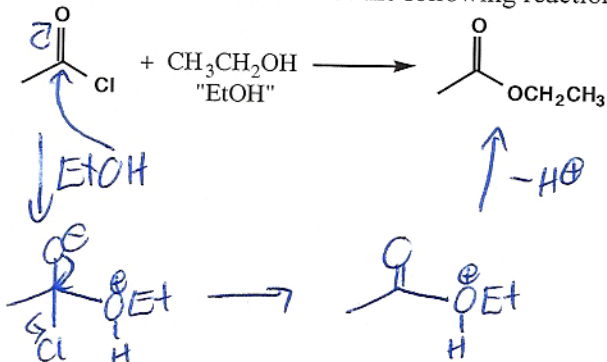


note: easiest to get stereo right if you keep chiral C in original orientation

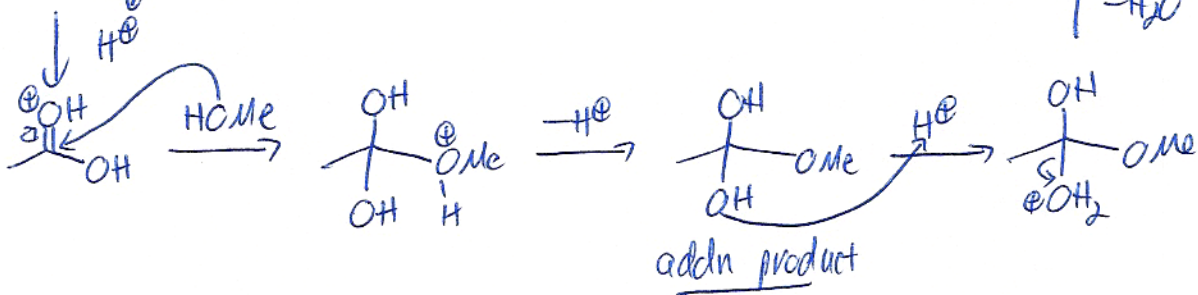
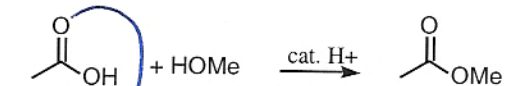


Oops! These answers are each short one carbon!

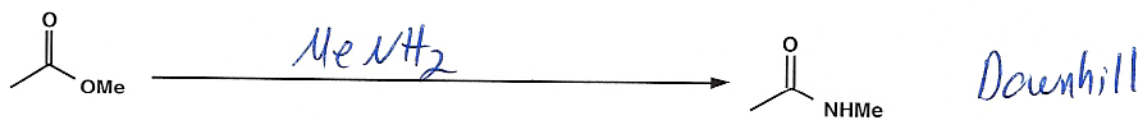
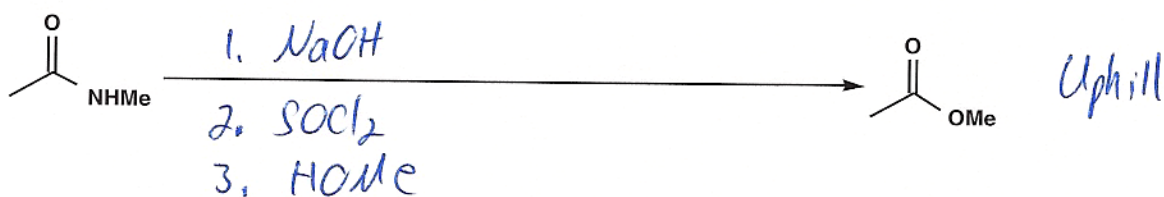
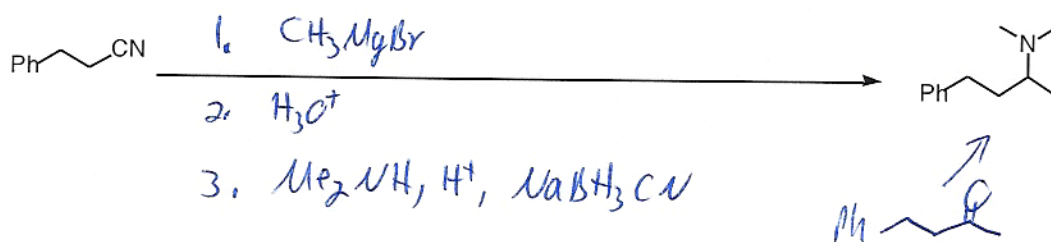
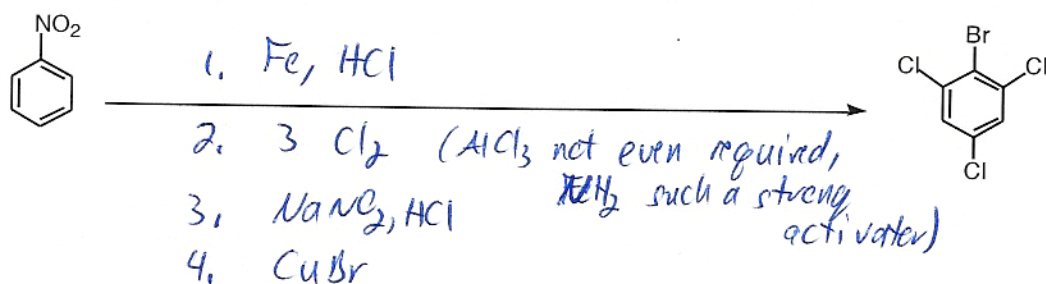
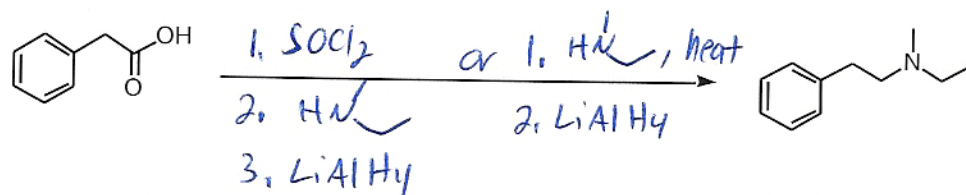
5. Draw the mechanisms for the following reactions. (5 points)



Na⁺ is a spectator counterion. Needs no consideration in mech.



6. Provide Reagents for the following Transformations (15 points)



7. Which, when dissolved in diethyl ether, will: (5 points each)

a) Extract into NaOH/H₂O?

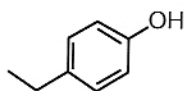
A + D (resonance)

b) Extract into HCl/H₂O?

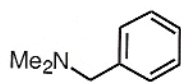
B

c) Extract into water?

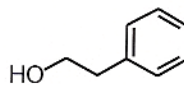
None



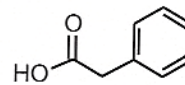
A



B

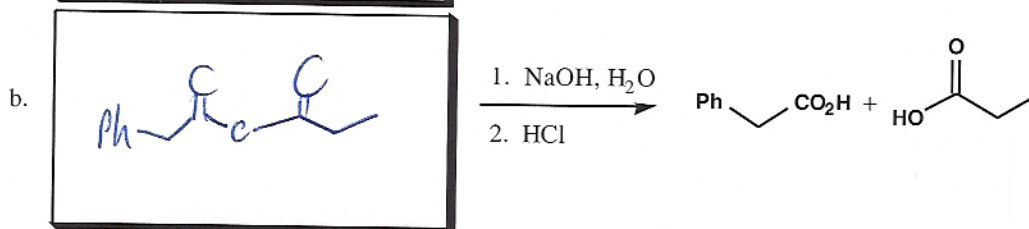
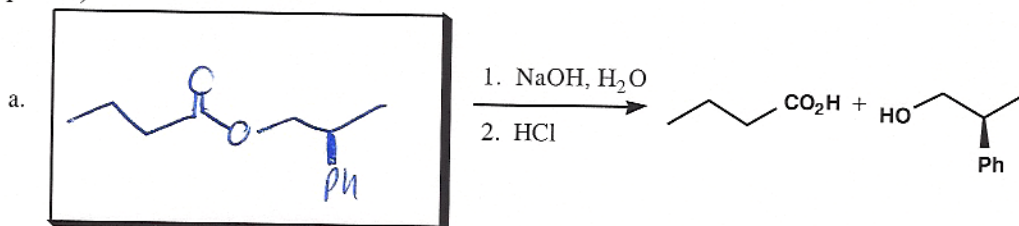


C

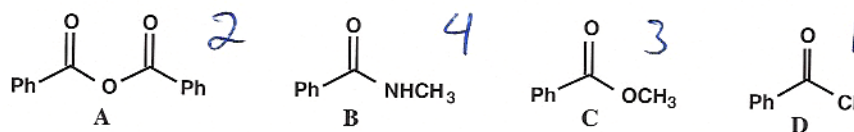


D

8. Hydrolysis Reactions. Draw the starting materials for the following hydrolysis reactions. (6 points)



9. Rank the following according to their reactivity toward NaOH/H₂O hydrolysis.



Given the structures A-D above, which of the following reactions will proceed spontaneously? (2 points)



Yes



Yes



No

10. Rank the acidity of the following, 1 being most acidic, 3 being least (3 points each)

a. acetic acid vs. water vs. NH_4^+Cl^-

1 3 2

b. CH_3OH vs. CH_3NH_2 vs. F_2CHOH

2 3 1

c. p-methoxybenzoic acid vs. benzoic acid vs. acetone

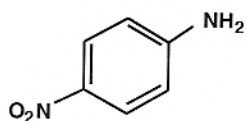
2 1 3

11. Rank the basicity of the following, 1 being most basic, 3 being least (3 points each)

a. CH_3OH vs. PhNH_2 vs. CH_3NH_2

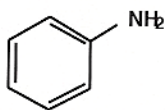
3 2 1

b.



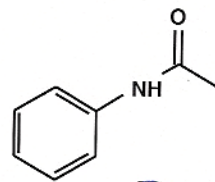
2

vs.



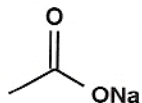
1

vs.

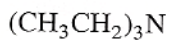


3

c.



2



1



3