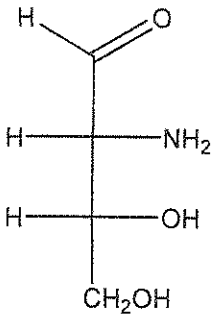
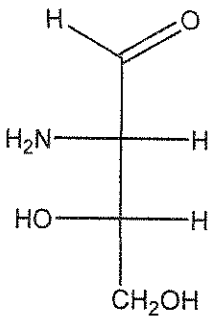
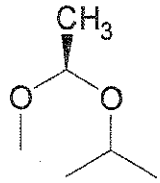
1. What is the relationship between the following two molecules? Are they identical, enantiomers or diasteriomers? (5 pts)



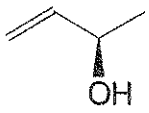


2. Determine the R/S configuration of each chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon. (10 pts)

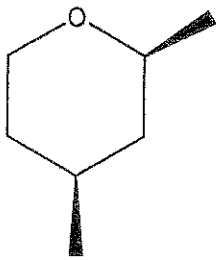
a.



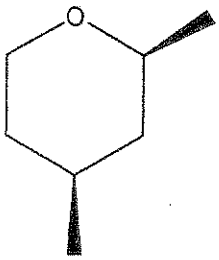
b.



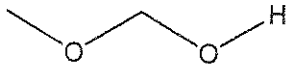
3. Draw a diasteriomer of the following compound. (5 pts)

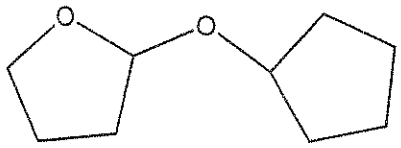


4. Draw an enantiomer of the following compound. (5 pts)



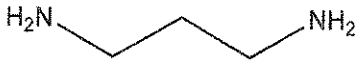
5. Which functional group (acetal or hemiacetal) is shown in each of the following molecules? (2 pts)

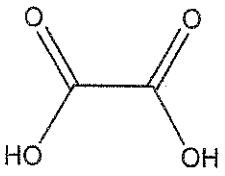
a. 

b. 

6. For each molecule from question 5 above, draw the structure of the ketone/aldehyde plus alcohol that were used to synthesize it. (12 pts)

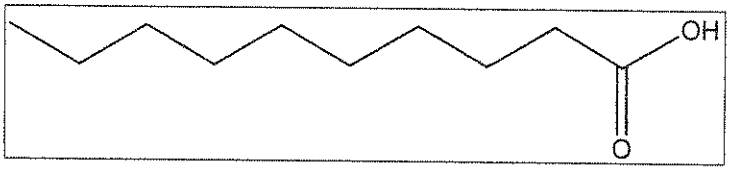
7. Draw the structure of the polymer that would form upon polymerization of the following two compounds with each other. (6 pts)



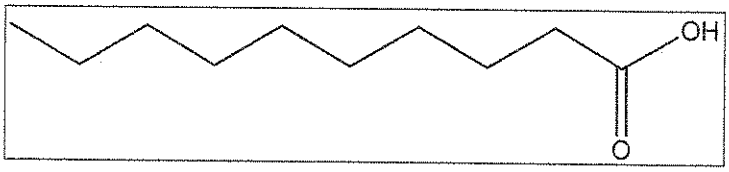


8. Fill in the templates below to create: (10 pts)

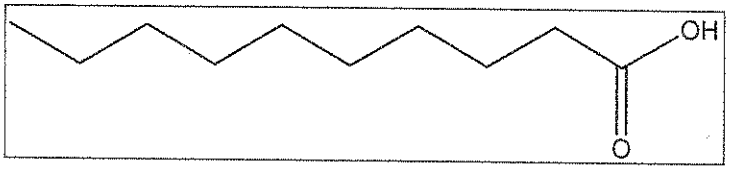
a. a monounsaturated omega-3 fatty acid



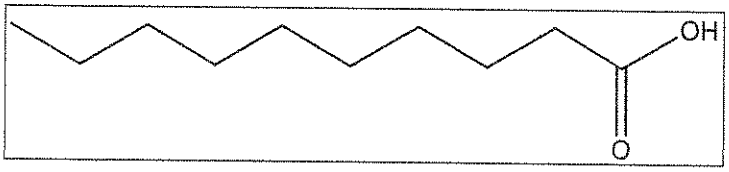
b. a monounsaturated, omega-6 fatty acid



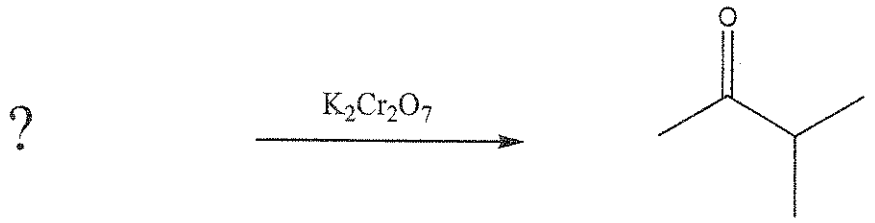
c. a monounsaturated, trans fatty acid

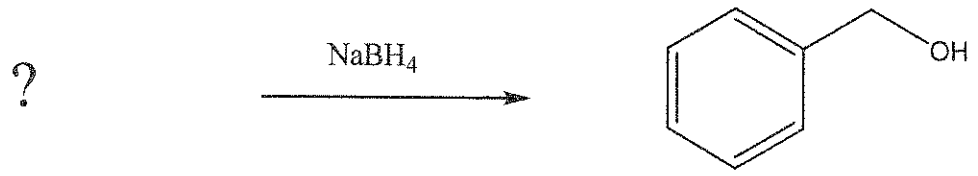


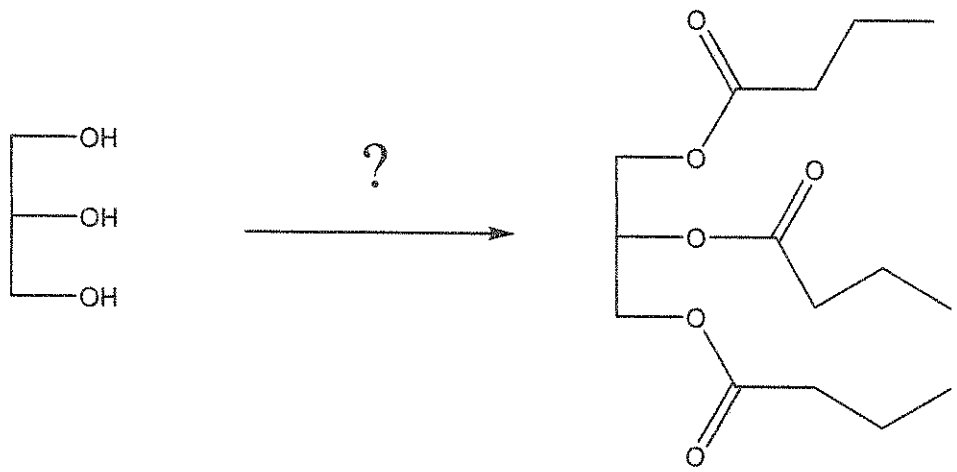
d. a saturated fatty acid

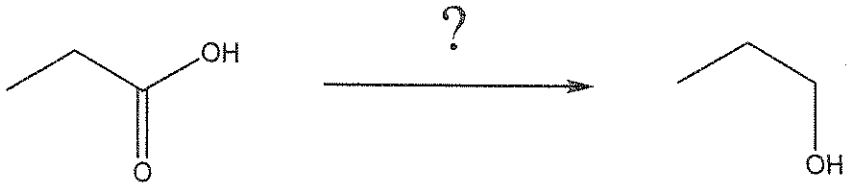


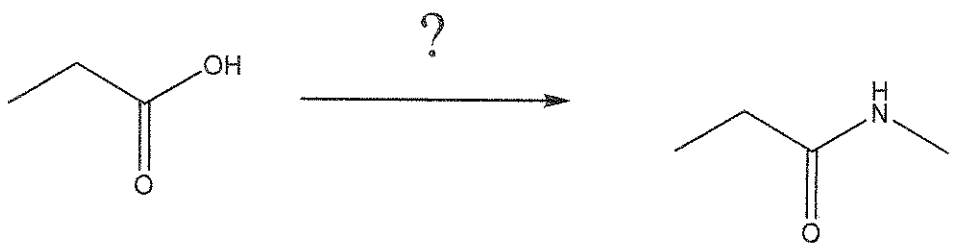
9. Fill in the missing reagent(s) needed to accomplish each of the following reactions. (20 pts)

a. 

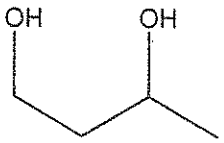
b. 

c. 

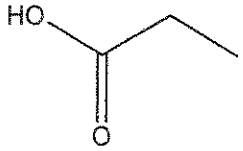
d. 

e. 

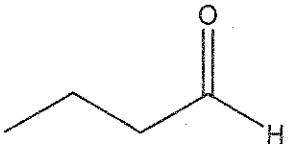
10. Give the product of each of the following reactions. (25 pts)

a. 

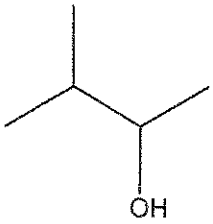
excess
$K_2Cr_2O_7$
⟶

b. 

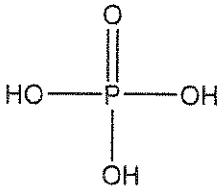
NH_3
⟶

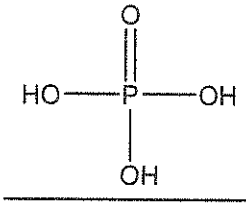
c. 

$Ag(NH_3)_2^+$
⟶

d. 

H_2SO_4
⟶
heat

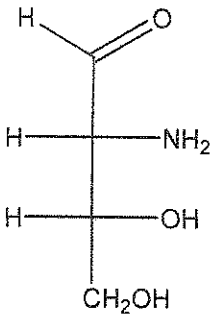
e. 

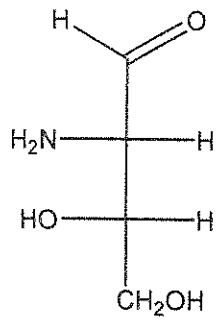


⟶

key

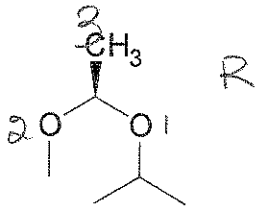
1. What is the relationship between the following two molecules? Are they identical, enantiomers or diasteriomers? (5 pts)



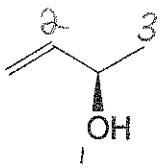


2. Determine the R/S configuration of each chiral center shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to the chiral carbon. (10 pts)

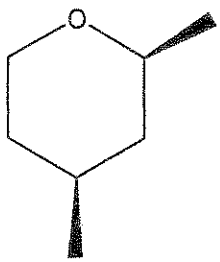
a.

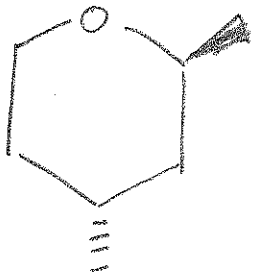


b.

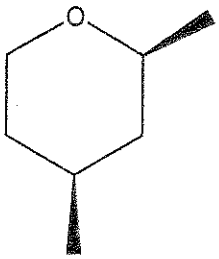


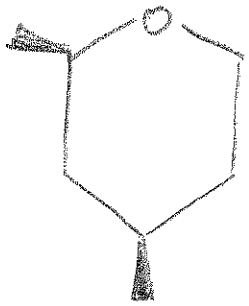
3. Draw a diasteriomer of the following compound. (5 pts)



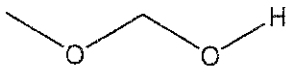


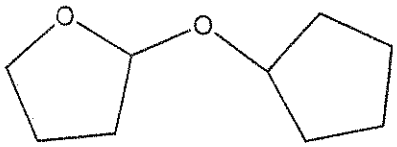
4. Draw an enantiomer of the following compound. (5 pts)





5. Which functional group (acetal or hemiacetal) is shown in each of the following molecules? (2 pts)

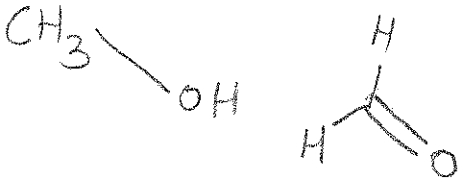
a. 

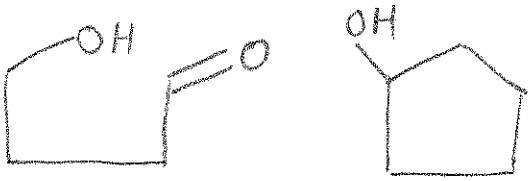
b. 

acetal

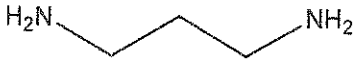
hemiacetal

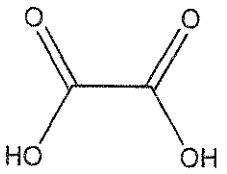
6. For each molecule from question 5 above, draw the structure of the ketone/aldehyde plus alcohol that were used to synthesize it. (12 pts)

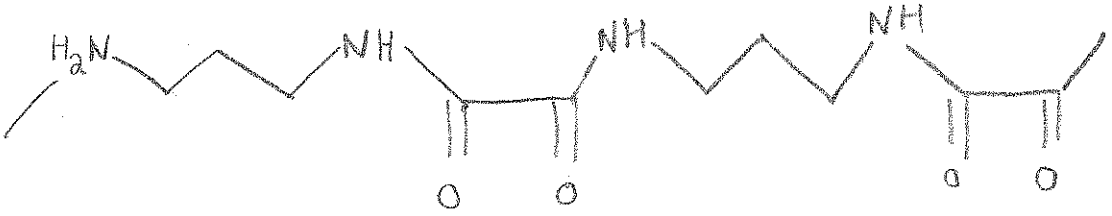




7. Draw the structure of the polymer that would form upon polymerization of the following two compounds with each other. (6 pts)

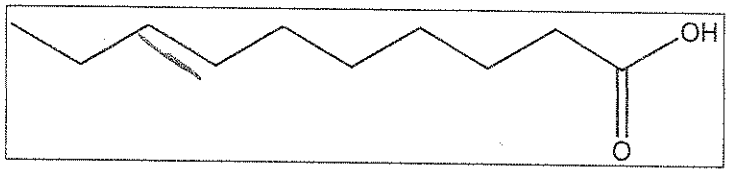




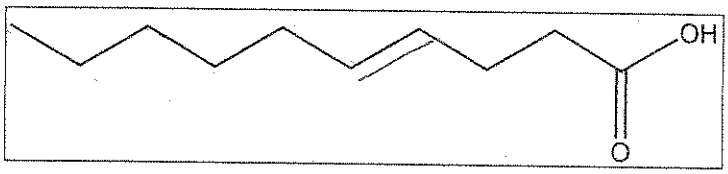


8. Fill in the templates below to create: (10 pts)

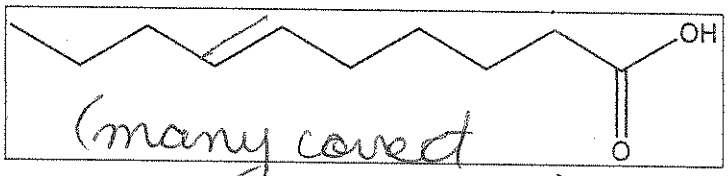
a. a monounsaturated omega-3 fatty acid



b. a monounsaturated, omega-6 fatty acid

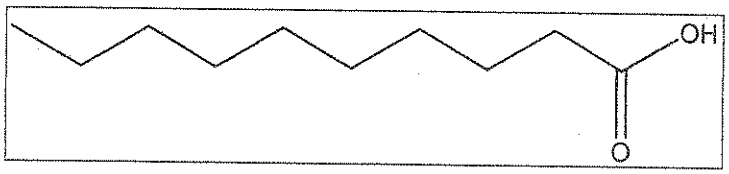


c. a monounsaturated, trans fatty acid

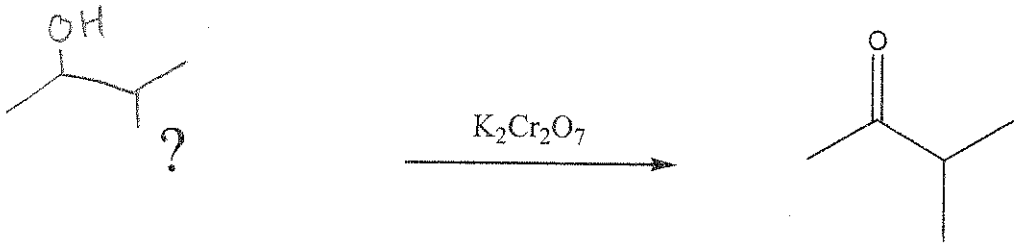


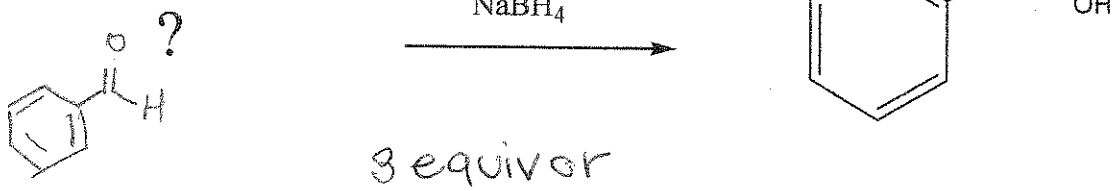
d. a saturated fatty acid

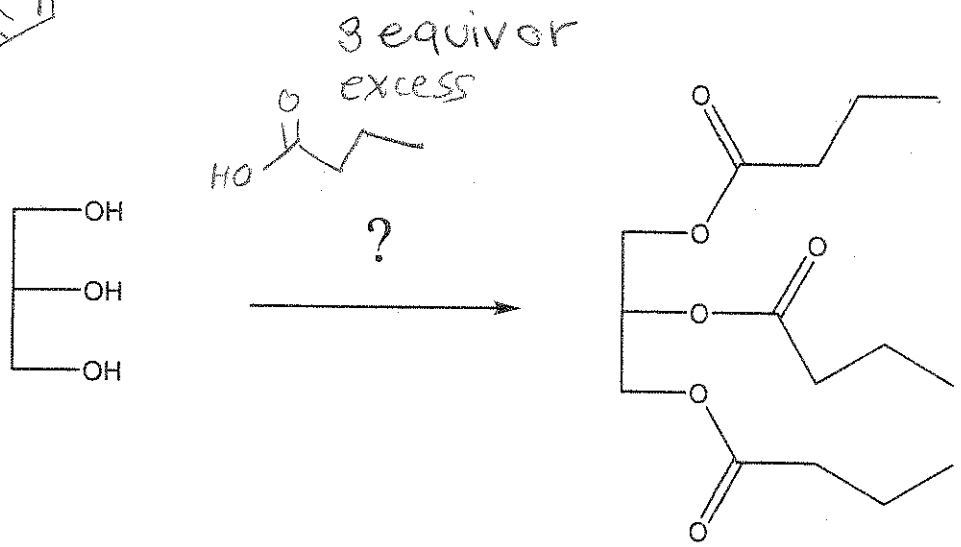
(many correct answers)

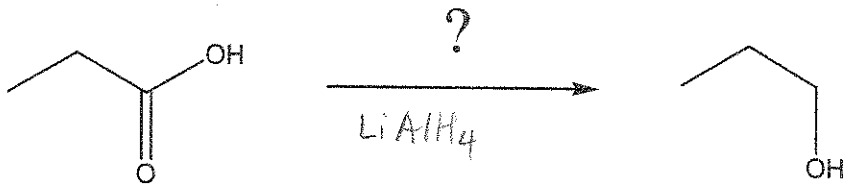


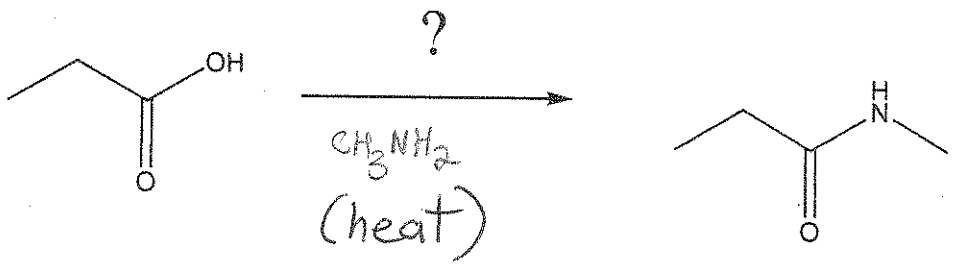
9. Fill in the missing reagent(s) needed to accomplish each of the following reactions. (20 pts)

a. 

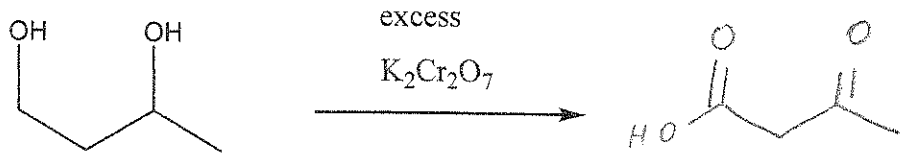
b. 

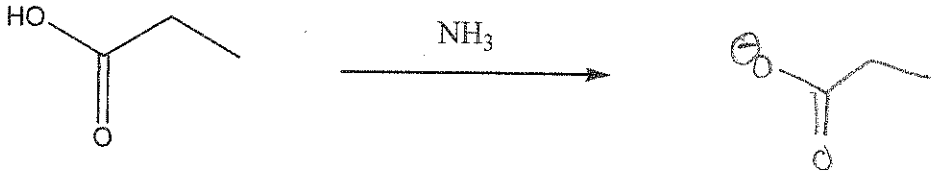
c. 

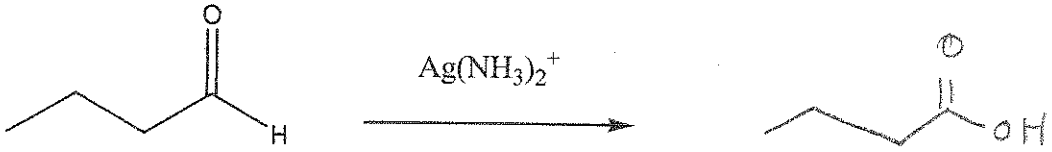
d. 

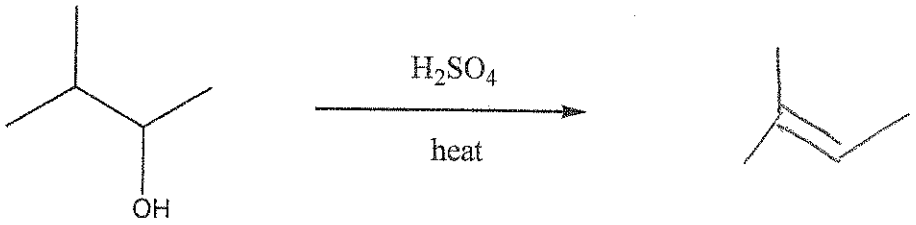
e. 

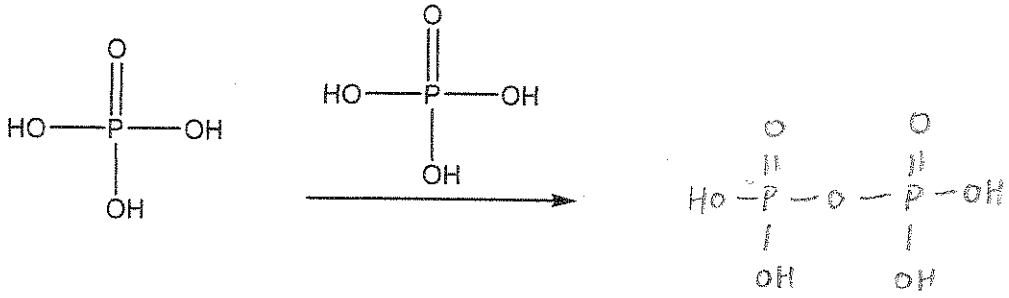
10. Give the product of each of the following reactions. (25 pts)

a. 

b. 

c. 

d. 

e. 

trimer/polymer ok too