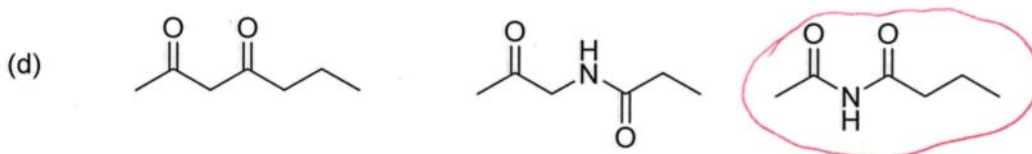
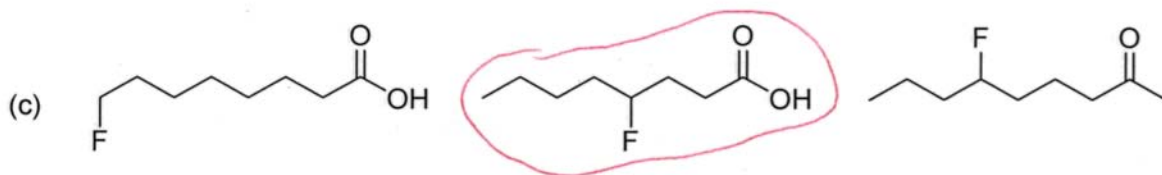
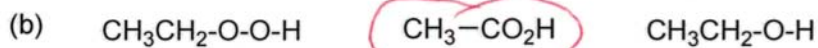
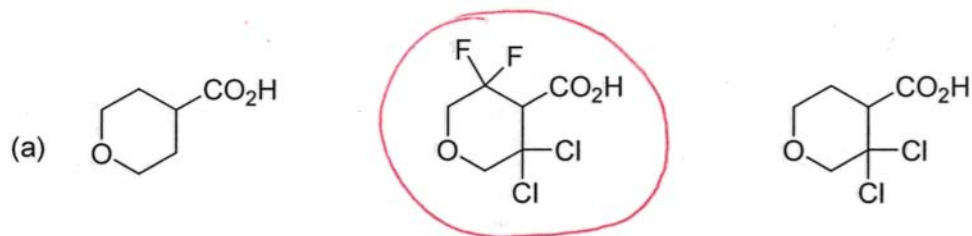
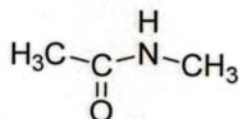
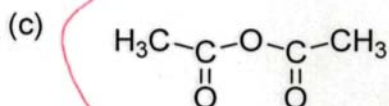
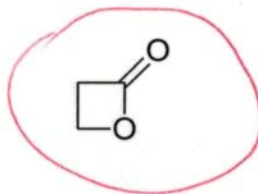
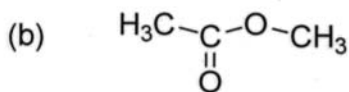
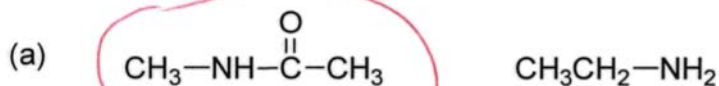


5) Circle the strongest acid in the following sets. (12pts)

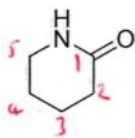


6) Circle the more reactive molecule with respect to nucleophilic acyl substitution. (6pts)

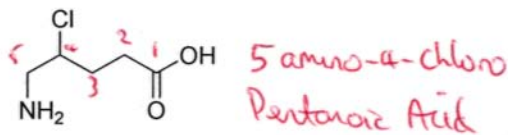
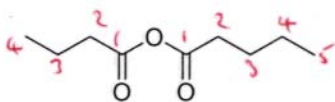


7) Name the following compounds in IUPAC acceptable terms. (20pts)

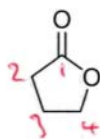
5-amino pentanoic acid lactam



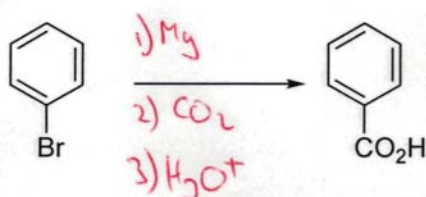
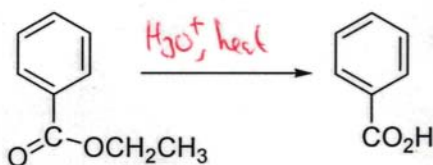
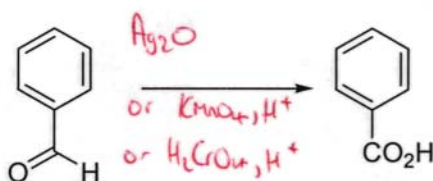
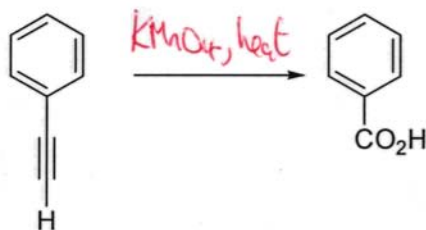
Pentanoicbutanoic anhydride



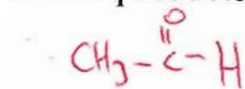
4-Hydroxybutanoic acid lactone



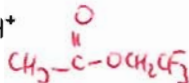
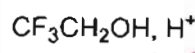
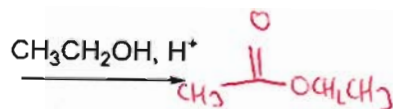
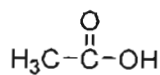
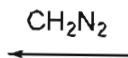
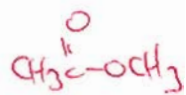
8) Benzoic acid can be made from a wide variety of benzene derivatives. Fill in the missing reagents. (12pts)



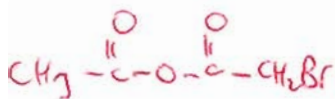
9) Provide the five products. (10pts)



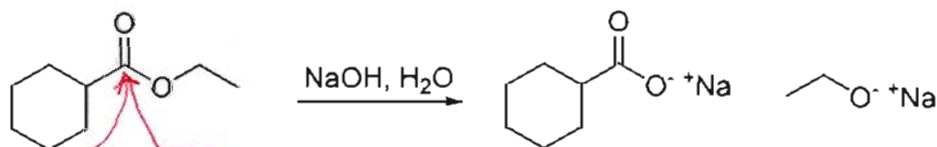
↑
1) SOCl_2
2) $\text{LiAlH}(\text{OBu})_3$



↓
1) SOCl_2
2) $\text{BrCH}_2\text{CO}_2\text{K}$



10) (10pts) Carboxylic acid derivatives provide excellent examples of nucleophilic acyl substitution mechanistic processes.



For the above ester:

-which is the most electrophilic carbon?

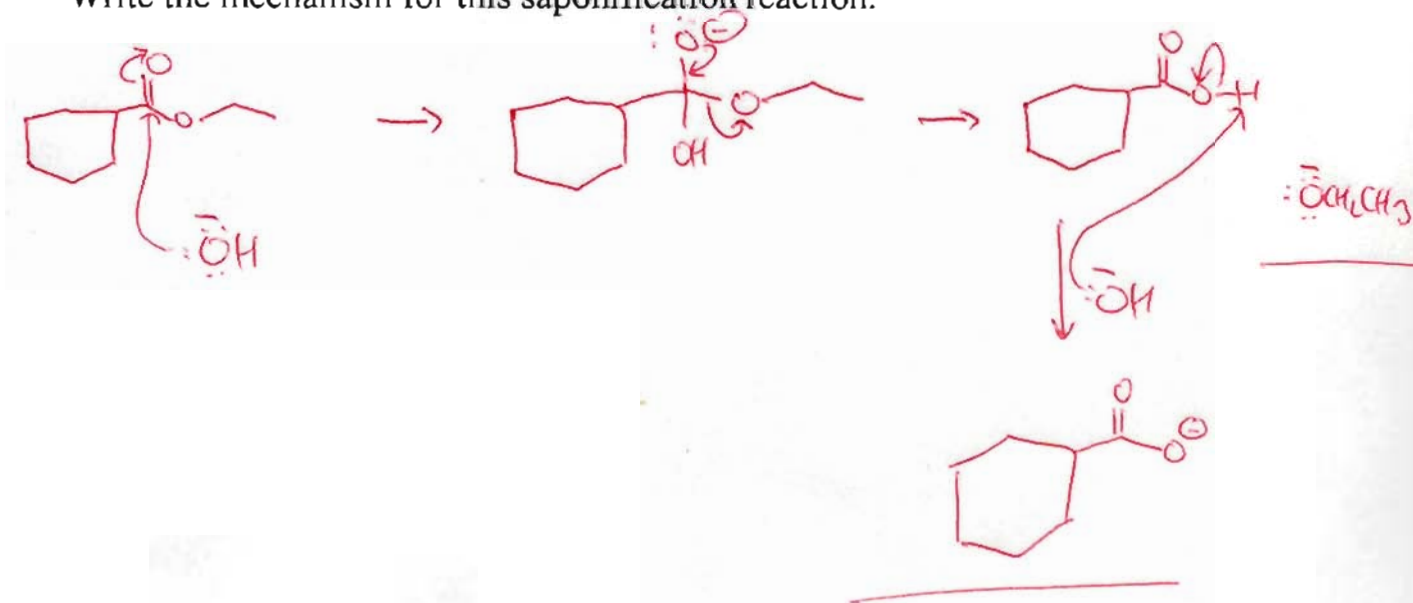
-which carbon has the greatest amount of positive charge?

Same one,

-which is the weakest covalent bond?

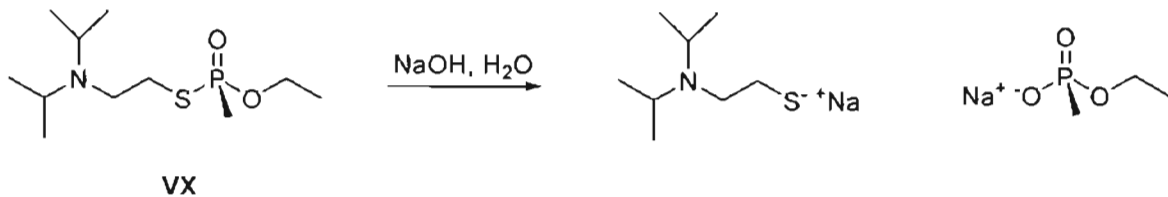
The C-O π bond

Write the mechanism for this saponification reaction.



11) VX (shown below) is one of the most toxic nerve agents ever synthesized and used in chemical warfare. (As little as 200 micrograms is enough to kill an average person).

However, VX can be safely destroyed by reaction with strongly basic media, as shown below.



Using your organic knowledge, propose a mechanism for this transformation. (6pts)

Nucleophilic Acyl Substitution at P

