

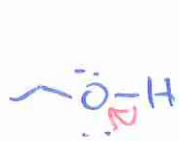
MTW

2/27/17

(1)

# Character of Molecules

Ethanol



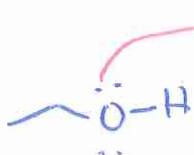
Acid



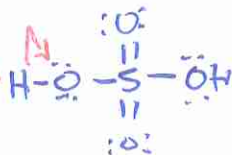
Very Strong Base



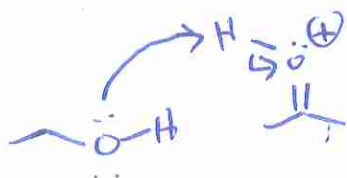
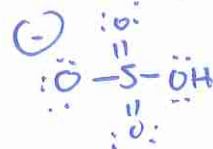
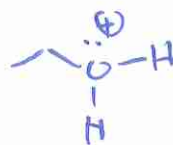
$\text{N}^\ominus$



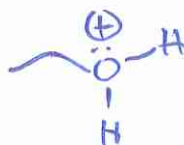
Base



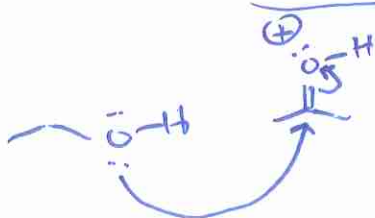
Very Strong Acid



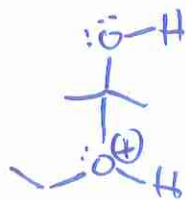
Base



Similar to the last step of Fischer Esterification



Nucleophile



One step in Acetal formation mechanism

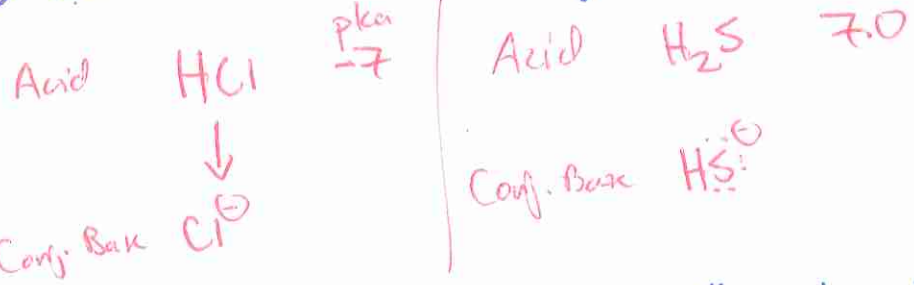
Acid-Base rxns favor the side with the weaker acid and the more stable ion(s).

Note: smaller pKa → stronger acid → more stable conjugate base

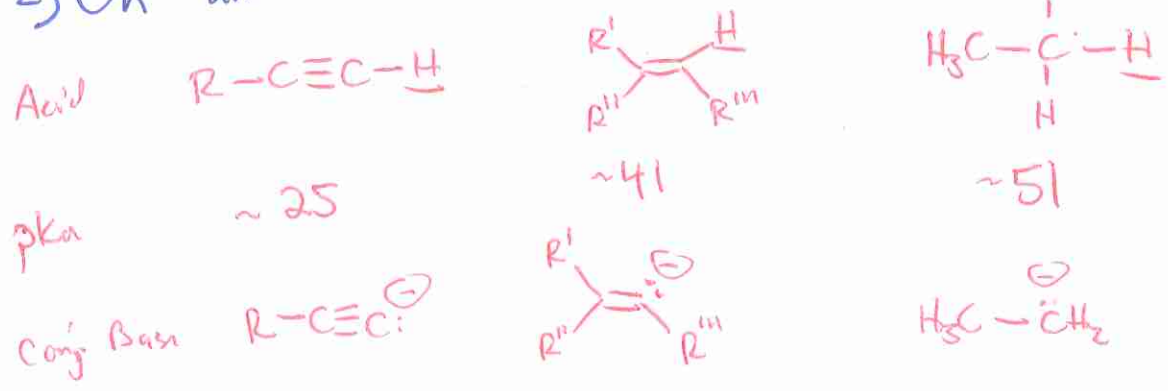
The anion is more stable when the negative charge is:

Charge is neutralized by nuclear positive charge

1) On a more electronegative (EN) element

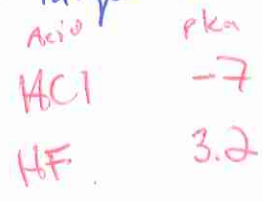


2) On an atom with more "s-character"

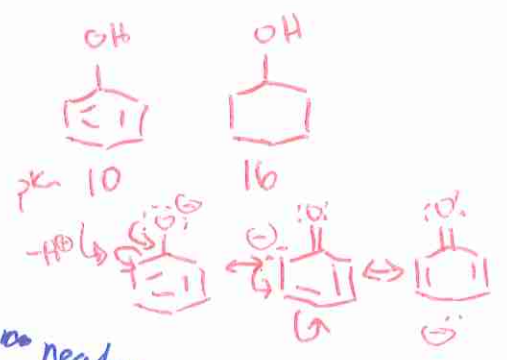


Delocalizing charge over a larger volume is stabilizing

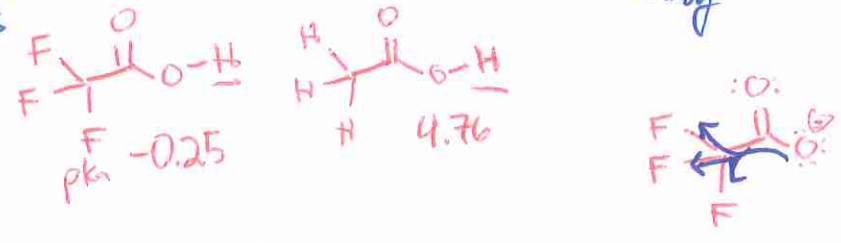
\*3) On a larger atom

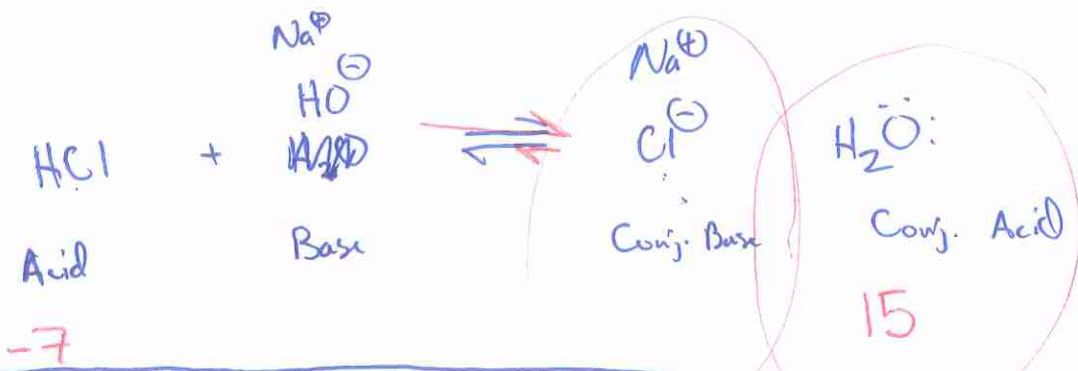


4) Stabilized by Resonance delocalization

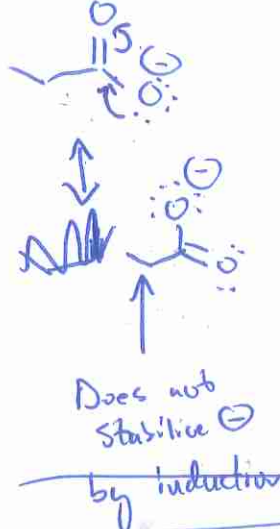
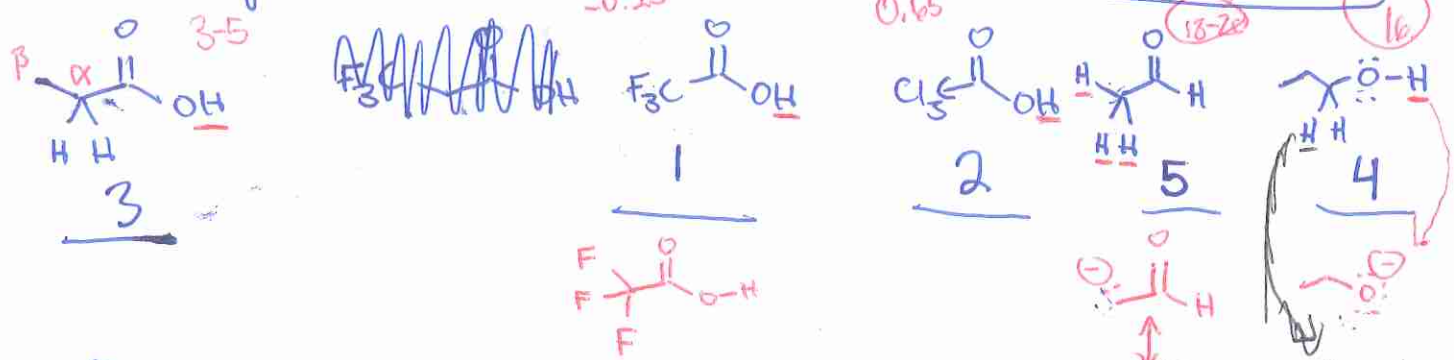


5) Stabilized by the inductive effect of nearby E.N. atoms

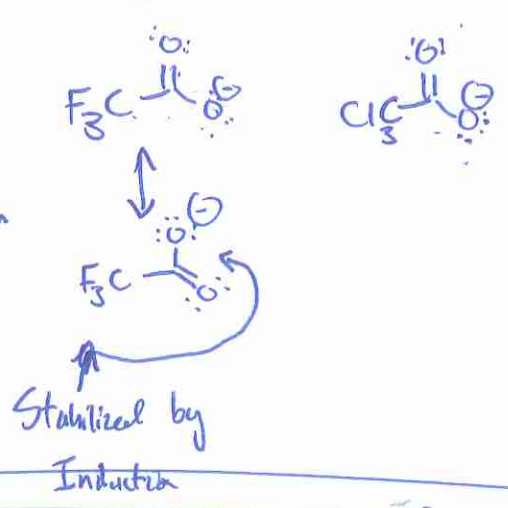




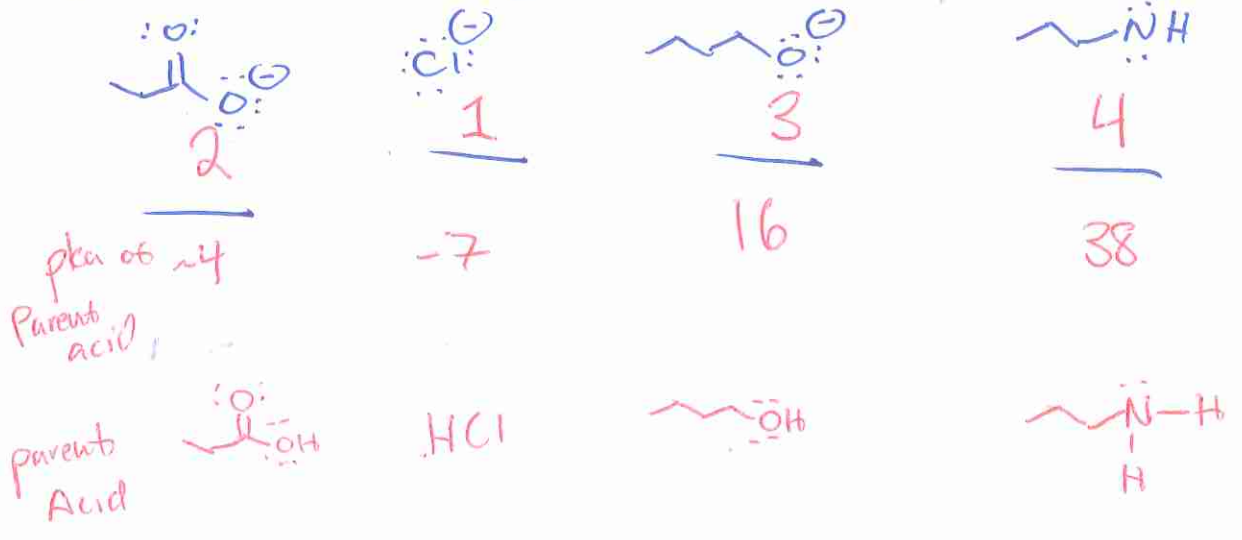
Rank Acidity below: 1 is most Acidic, 5 is least acidic



Same Resonance Stabilization



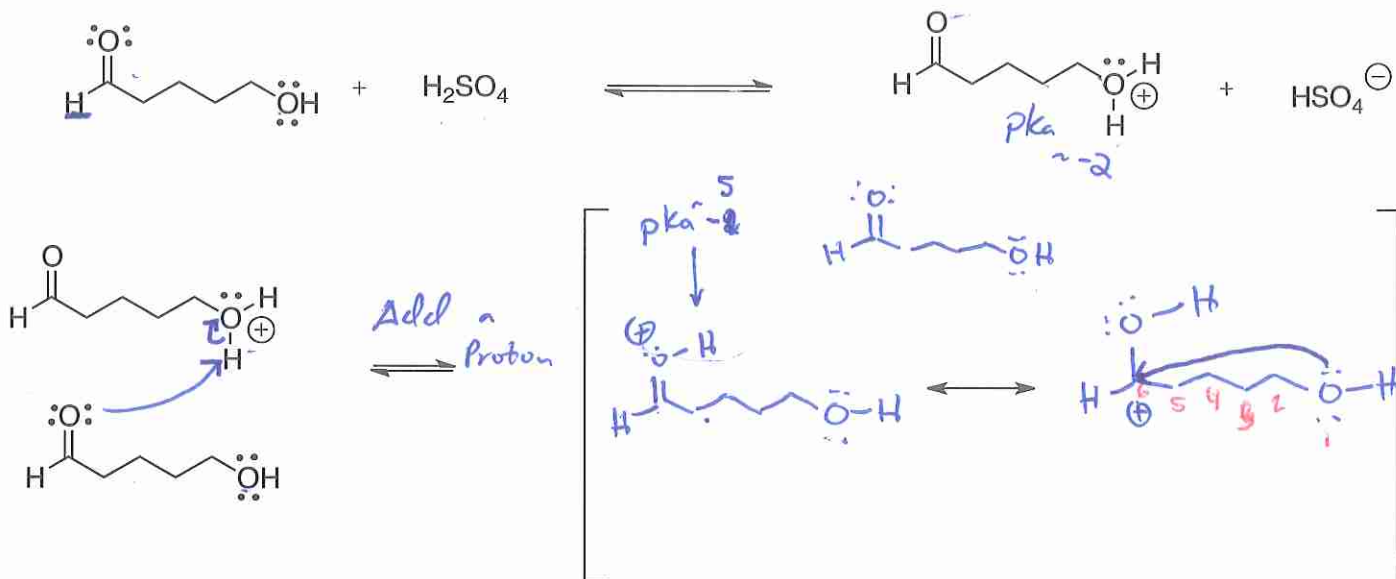
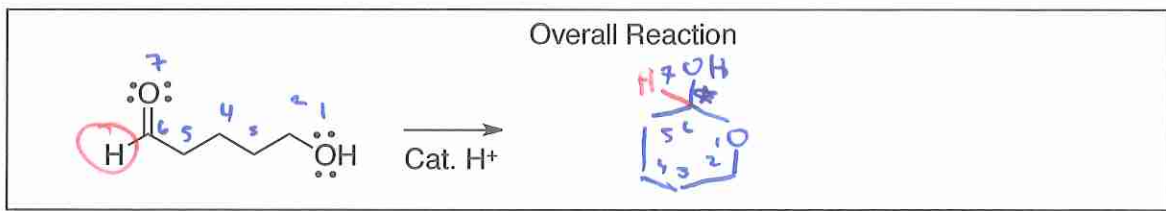
Rank anion stability: 1 is most stable, 4 is least stable



4

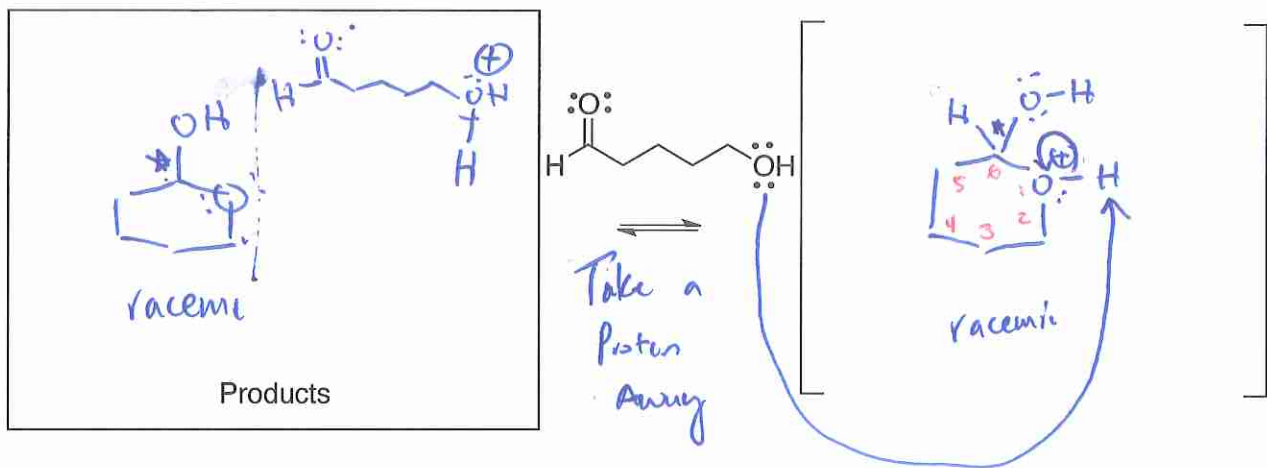
### Missed the Wave Recitation

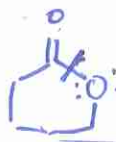
Complete the mechanism for the following acetal formation reaction. Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step. Remember, I said all the products for each step. IF A NEW CHIRAL CENTER IS CREATED MARK IT WITH AN ASTERISK AND WRITE RACEMIC IF APPROPRIATE. Do not draw arrows to indicate how one contributing structure relates to the other.



(Draw both contributing structures)

Make a Bond





5

Complete the mechanism for the following acid-catalyzed lactone formation reaction. Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step. Remember, I said all the products for each step. IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE, MARK IT WITH AN ASTERISK AND LABEL AS RACEMIC IF APPROPRIATE. IF A CHIRAL CENTER IS CREATED IN THE PRODUCTS YOU NEED TO DRAW BOTH ENANTIOMERS, AND LABEL THE PRODUCT MIXTURE AS RACEMIC IF APPROPRIATE. In the boxes provided adjacent to the first two sets of arrows, write which of the four basic mechanistic elements are involved (i.e. "Make a bond", "Add a proton", etc.) I realize these directions are complex, so please read them again to make sure you know what we want.

