ACID/BASE CHEMISTRY:

Definitions.

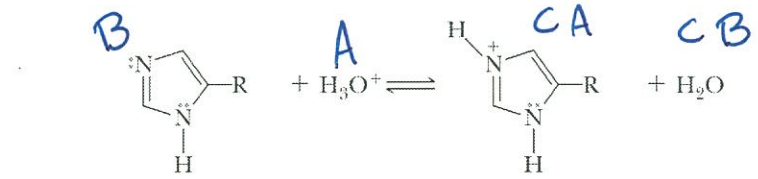
	Acid	Base
Brønsted-Lowry (BL)	H^+ donor	H^+ acceptor
Lewis	Electron pair acceptor	Electron pair donor

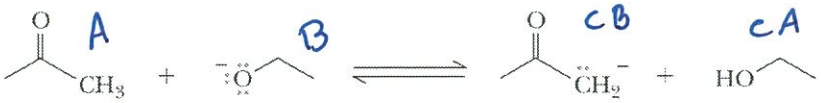
A hydrogen atom is made up of one proton (H^+) and one electron.

A proton (H^+) is a hydrogen atom MINUS its electron.

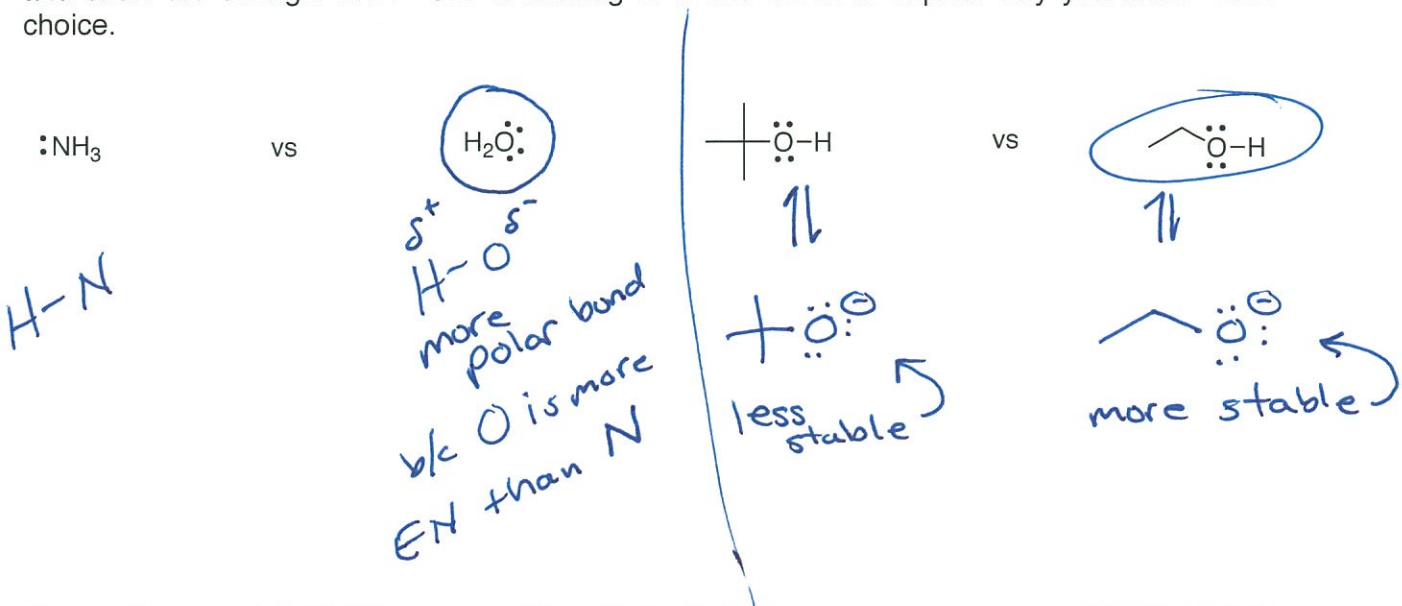
Acids react (with bases) to give conjugate bases, and bases react (with acids) to give conjugate acids.

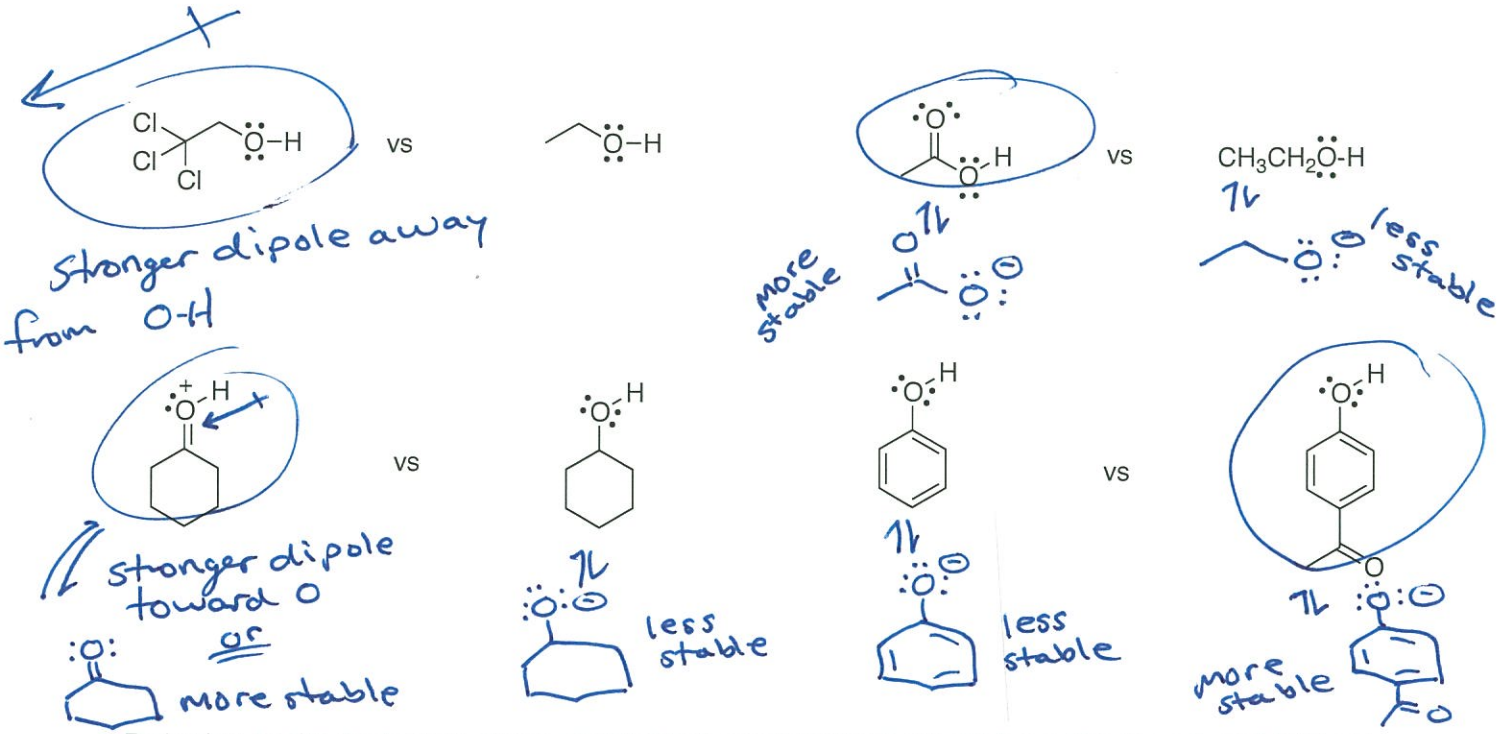
For these three reactions, label the acid (A), base (B), conjugate acid (CA) and conjugate base (CB):



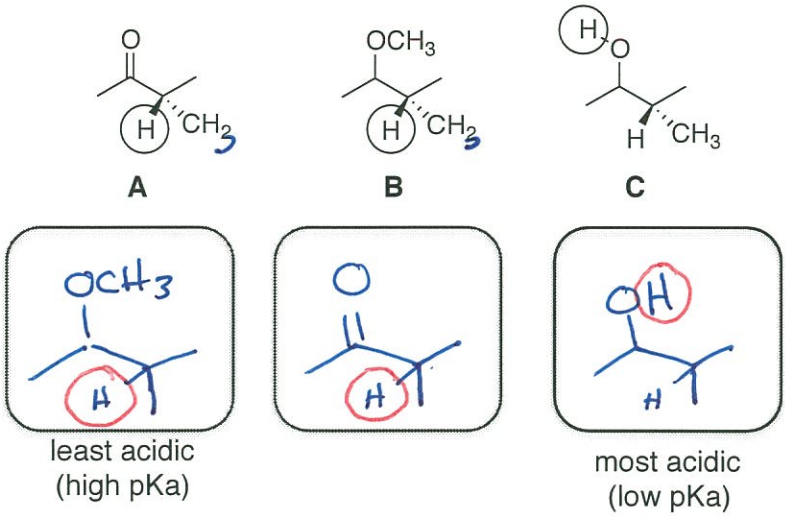


Relative acidities. Without consulting a table of pKa values, consider each pair of acids below and circle the stronger one. Use a drawing or a few words to explain why you made each choice.

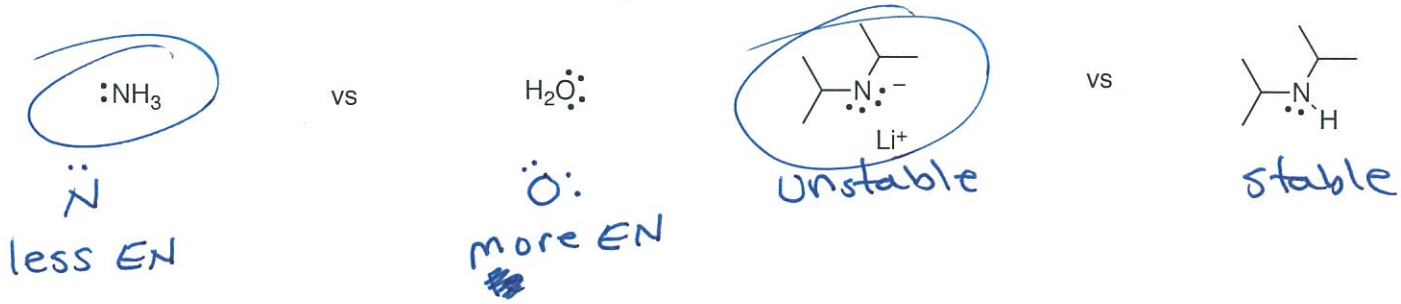


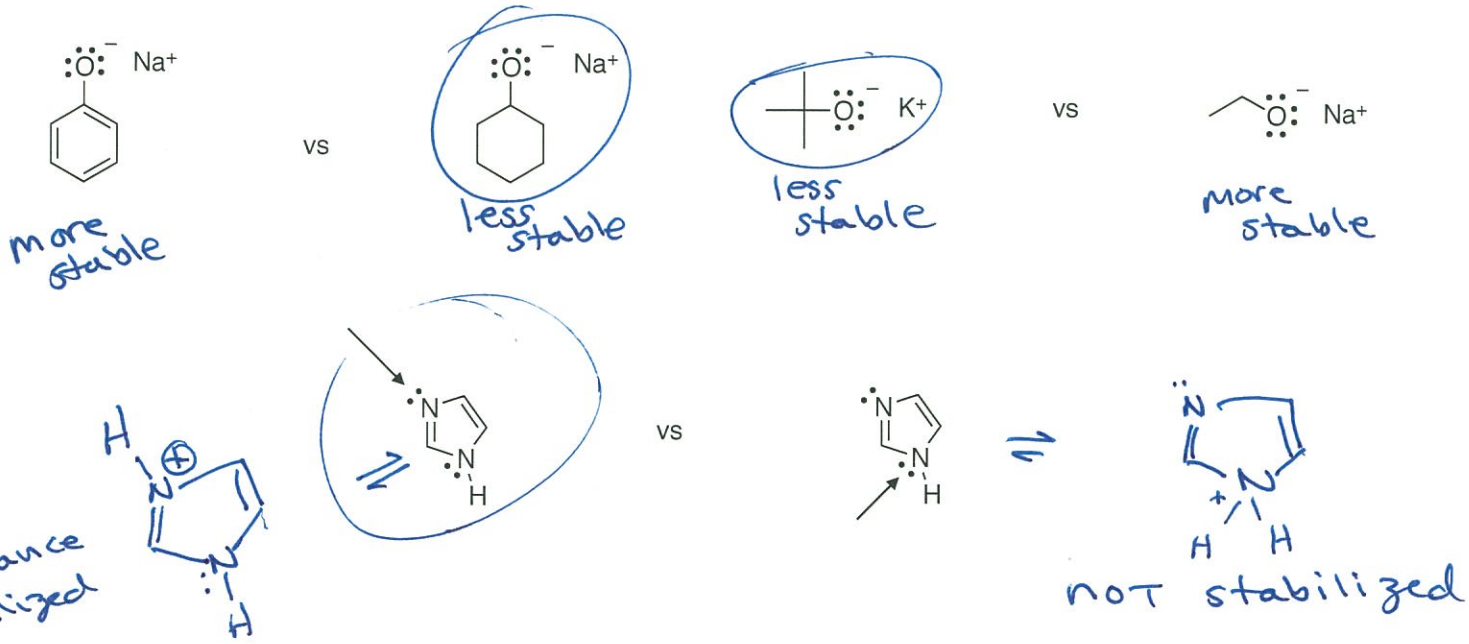


Referring to the hydrogen atoms highlighted, predict which would have the lowest and highest pKa; place the molecules in order of increasing acidity (high pKa to low pKa):

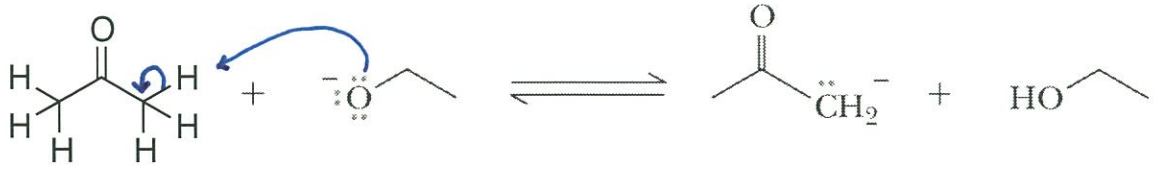


Relative basicities. Without consulting a table of pKa values, consider each pair of bases below and circle the stronger one. Use a drawing or a few words to explain why you made each choice.

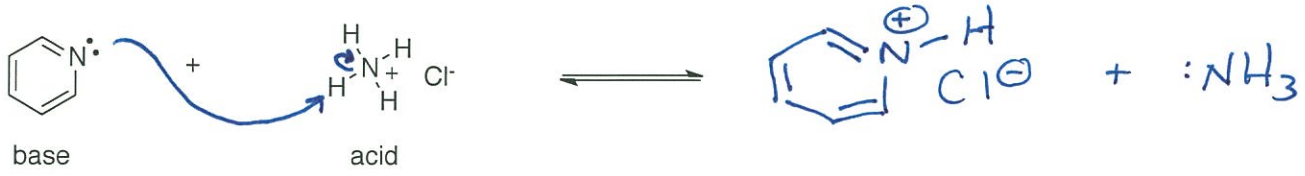




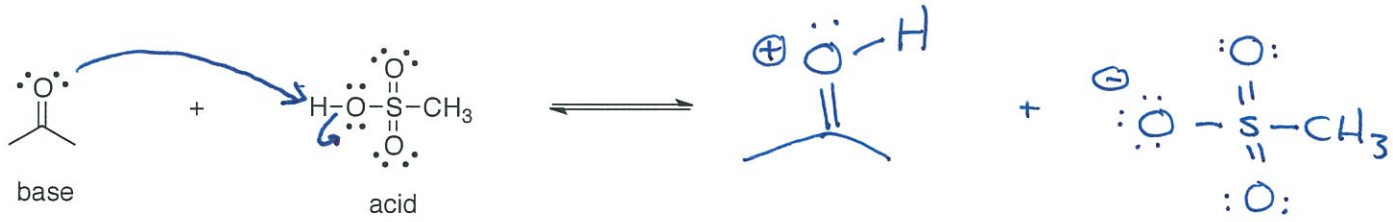
Mechanisms are curved arrows used to show electron *motion* in a chemical reaction (sometimes called electron-pushing). For the next three reactions, draw an arrow-pushing mechanism that shows how an electron pair on the base removes a proton from the acid. For these reactions, make sure your arrows originate from electrons and end at atoms. While drawing these arrows, always ask yourself *why* the electrons move in the direction you propose.



Another aspect of drawing mechanisms is being able to draw the product(s) on the other side of the reaction arrow. A lot of this has to do with 'electron book-keeping'; that is, being able to follow the electrons, identifying broken or new bonds, and placing charges and/or lone pairs of electrons when necessary. For the following reactions, draw an arrow-pushing mechanism that shows the acid / base reaction, then draw the products on the other side of the equilibrium arrow. Remember, always ask yourself *why* the electrons move in the direction you propose.



base acid



base acid