

CH 235 SE  
Acids + Bases

Session 4

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Definition

Acid

Base

Arrhenius

Inc.  $[H_3O^+]$

Inc  $[OH^-]$

Bronsted-Lowry

Donates  $H^+$

Accepts  $H^+$

Lewis

Accepts  $e^-$   
electrophile

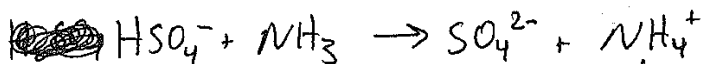
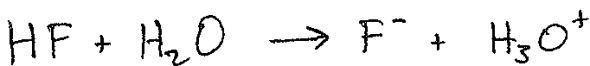
Donates  $e^-$   
nucleophile

Identifying Acid-Base Conjugate Pairs

Conjugate Acid formed from Base +  $\frac{H^+}{\text{(subtract)}}$

Conjugate Base formed from Acid +  $\frac{(-H^+)}{\text{(subtract)}}$

Identify the species in each rxn as conjugate pairs:



$K_a$  Acidity Constant

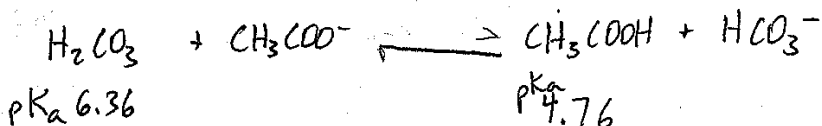
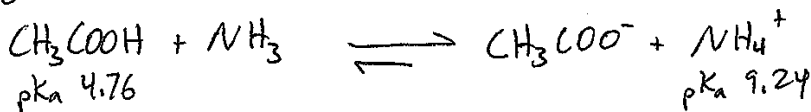
$$K_a = \frac{[H_3O^+][A^-]}{[HA]}$$

\* Larger  $K_a$  = stronger acid

$$pK_a = -\log K_a$$

\* Smaller  $pK_a$  = stronger acid

\*\* Equilibrium favors the weaker acid/base!



Draw appropriate arrows to show direction of equilibrium

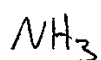
# Structure + Acidity

More stable anion = more acidic acid

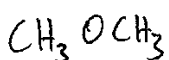
## 5 Ways to Stabilize an Anion

- 1) Resonance
- 2) Electronegative Atom w/ neg charge
- 3) Inductive effect
- 4) Size of Anion  $I^- > Br^- > Cl^-$
- 5) S character  $sp > sp^2 > sp^3$

Identify the following as either a Lewis Acid (electrophile) or Lewis Base (nucleophile)



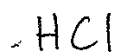
L.B.



L.B.



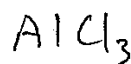
L.B.



L.A.



L.B.



L.A.

### Generalizations

- Electron rich = nucleophile
- electron poor = electrophile

Identify the better acid in each pair:

