

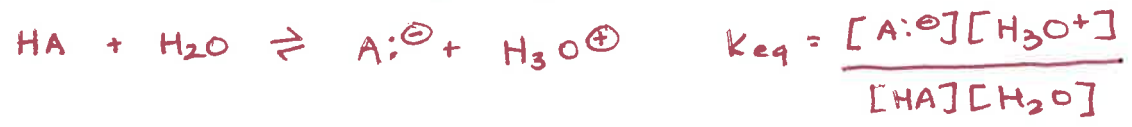
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Dr. MacDonald

Recall:

"Strengths of Brønsted acids (pKa scale)

From general chemistry: for general acid



Since $[H_2O]$ generally doesn't vary.

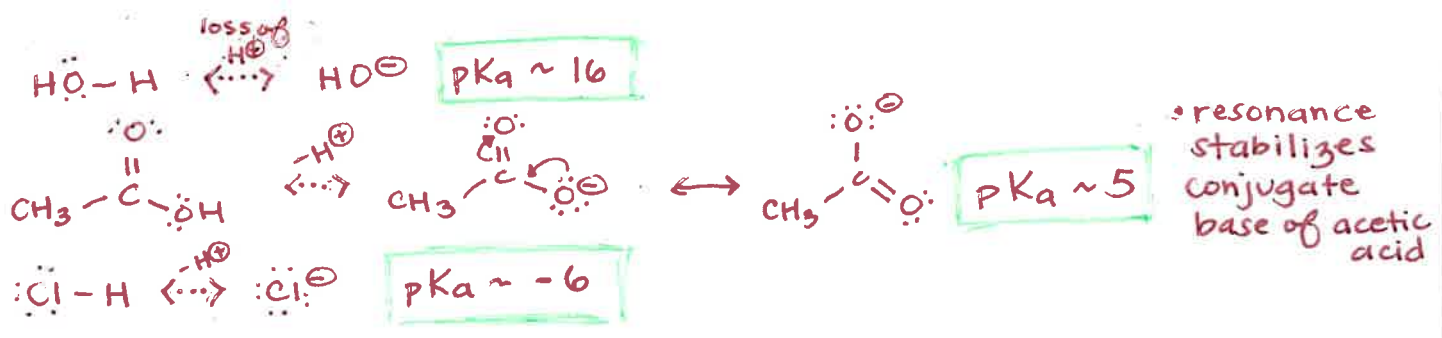
- define K_a (acid dissociation constant)

$$K_{eq}[H_2O] = K_a = \frac{[A:^{\ominus}][H_3O^{\oplus}]}{[HA]}$$

use log scale

$$pK_a = -\log K_a$$

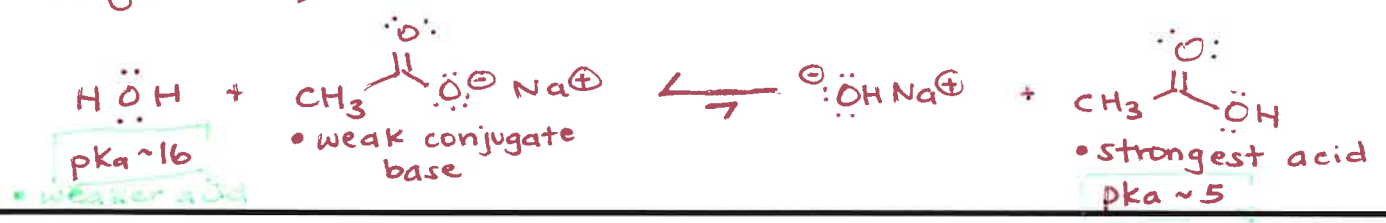
∴ STRONGER ACID ⇔ LOW pKa



It is important to understand how variations in molecular structure influence acidity of H's

- Need to develop mental database of characteristic pKa values

- Predict position of equilibria (weaker acid/weaker base is favored)



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→ Judge relative basicity (based on pKa of conjugate acid)

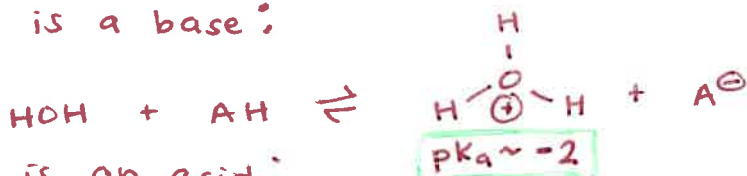


* easier than keeping track of pKa's

Caution

Don't be confused by "amphoteric" Brønsted acids — multiple protons ⇒ multiple pKa values

Water is a base:



Water is an acid:



Molecular Structure & Acidity

- to compare acids, we can often anticipate trends in acidity based on structure

① Periodic Table

- acidity generally increases left to right

ie.

	$\text{H}_3\text{C}-\text{H}$	$\text{H}_2\text{N}-\text{H}$	$\text{HO}-\text{H}$	$\text{F}-\text{H}$
pKa	~55	~35	~16	~3

* Key factor (electronegativity of atom bearing charge)



effects acidity { resonance size inductive effect

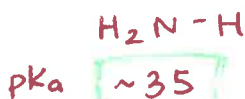
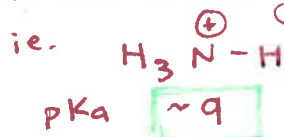
EN charge

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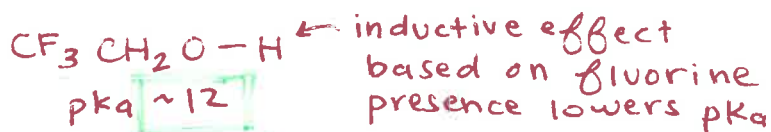
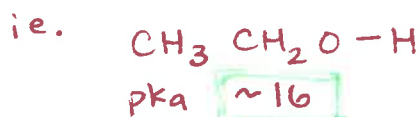
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② Charge effects

- cationic acids generally more acidic than neutral

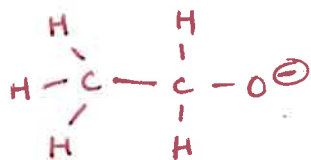


③ Polar Substituent

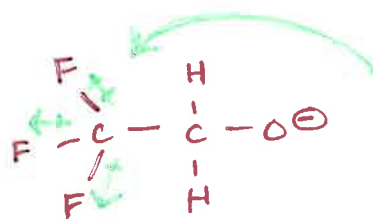


"electronegative substituents near site of proton loss
can increase acidity"
- also stabilizes conjugate base

Consider



vs.



create a dipole

C-F bond dipole pulls e^- density
away from O^\ominus which confers
stability.

Chapter 4: Alkenes

Problems 2, 3, 6-10, 13, 16, 27, 30-39, 42-44, 47-55,
57-67

Alkene \Rightarrow hydrocarbon containing at least one $\text{C}=\text{C}$ double
bond

\Rightarrow simplest $\text{H}_2\text{C}=\text{CH}_2$

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Recall

Double bond ($\sigma + \pi$), one common way to depict an alkene emphasizes the nature of the π MO

