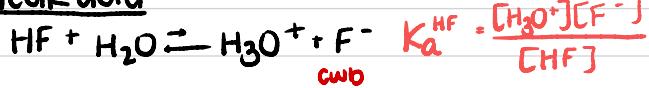


I. complete the following table of Bronsted-Lowry weak acid/weak base pairs

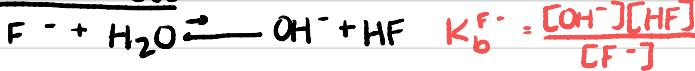
February 21st

WA	WB
HF	F ⁻
H ₂ C ₂ H ₃ O ₂	C ₂ H ₃ O ₂ ⁻
HCO ₃ ⁻	CO ₃ ²⁻
H ₂ CO ₃	HCO ₃ ⁻
NH ₄ ⁺	NH ₃
H ₃ PO ₄	H ₂ PO ₄ ⁻
HOCl	OCl ⁻

weak acid



weak bases



$$K_a^{\text{HF}} * K_b^{\text{F}^-} = K_w$$

2. Given $\text{p}K_a^{\text{HOCl}} = 7.46$, calculate K_a^{HOCl} & $K_b^{\text{OCl}^-}$

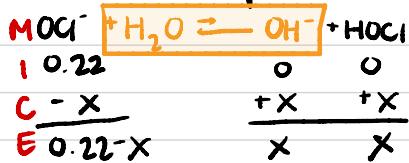
$$\text{p}K_a = -\log K_a$$

$$K_a = 10^{-\text{p}K_a} = 10^{-7.46} = 3.47 \times 10^{-8} \text{ (sig. figs. = } 3.5 \times 10^{-8})$$

$$K_a^{\text{HOCl}} * K_b^{\text{OCl}^-} = K_w$$

$$K_b^{\text{OCl}^-} = 2.9 \times 10^{-7}$$

3. what is the pH of a 0.22 M OCl⁻ solution?



$$K_b^{\text{OCl}^-} = 2.98 \times 10^{-7} = \frac{[\text{OH}^-][\text{HOCl}]}{[\text{OCl}^-]} = \frac{x^2}{(0.22-x)}$$

* passed 400
rate!

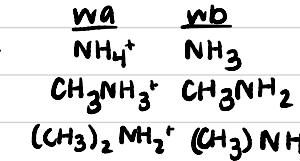
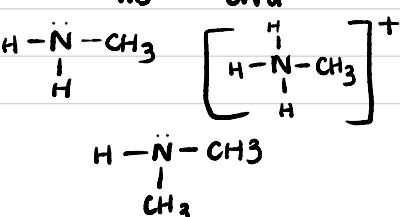
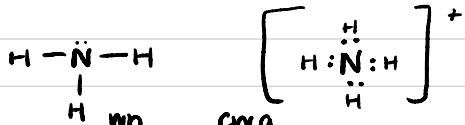
$$x = 2.52 \times 10^{-4}$$

$$\hookrightarrow [\text{OH}^-] = 2.52 \times 10^{-4}$$

$$\text{pOH} = 3.60$$

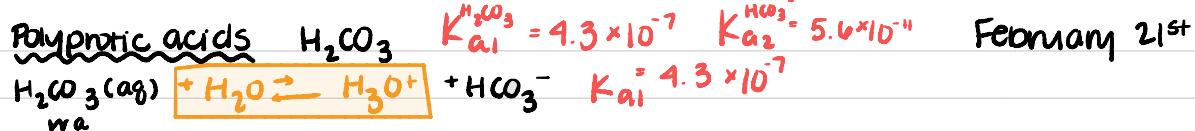
$$\text{pH} = 10.40$$

Neutral bases



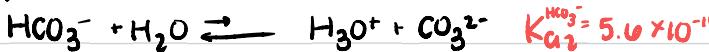
what is the pH of 0.36 M NH₄⁺?





What is the pH of a 0.30M HCO_3^- solution?

Try it as a WA.



$$K_w = 1 \times 10^{-14}$$

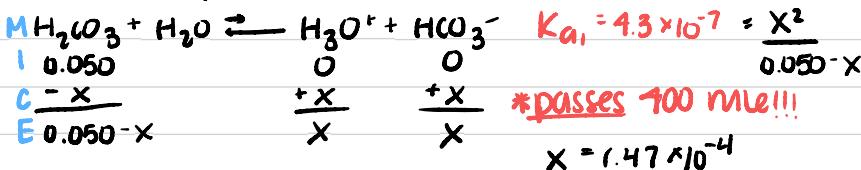
Try it as a WB.



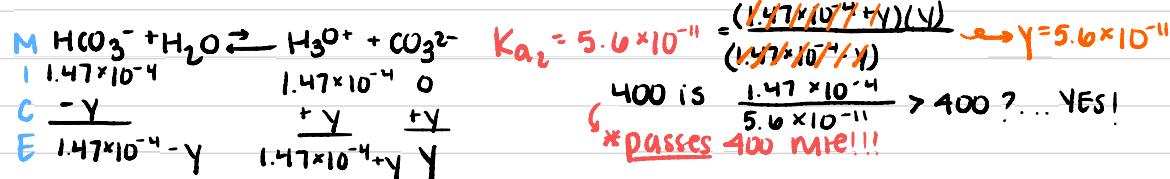
$$\left(K_{\text{a}_1}^{\text{HCO}_3} \cdot K_b^{\text{HCO}_3} \right) = K_w$$

* A BETTER weak base!!!

What is the pH of a 0.050M H_2CO_3 sol'n?



Solve for $[\text{H}_3\text{O}^+] [\text{H}_2\text{CO}_3] [\text{HCO}_3^-] [\text{CO}_3^{2-}]$ pH $[\text{OH}^-]$



$$400 \text{ is } \frac{1.47 \times 10^{-4}}{5.6 \times 10^{-11}} > 400? \dots \text{YES!}$$

$$[\text{H}_3\text{O}^+] = 1.47 \times 10^{-4} \quad [\text{H}_2\text{CO}_3] = 0.050 \quad [\text{HCO}_3^-] = 1.47 \times 10^{-4} \quad [\text{CO}_3^{2-}] = 5.6 \times 10^{-11}$$

$$\text{pH} = 3.83 \quad [\text{OH}^-] = K_w / 1.47 \times 10^{-4} = 6.8 \times 10^{-11}$$