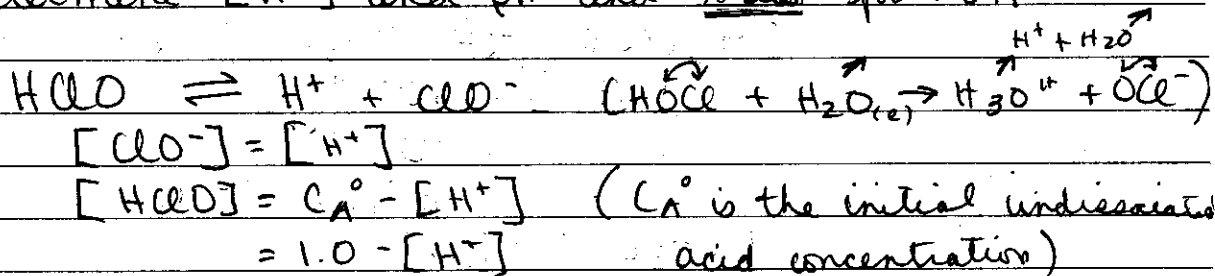


## Strong vs Weak Acid

- different from concentration (independent of concentration)
- strong acid  $\rightarrow$  100% (or close to) dissociation
  - $\rightarrow$  non-equilibrium
  - $\rightarrow$  stoichiometric
  - $\rightarrow$  eg  $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$   
 $0.01 \quad \quad 0.01$
- weak acid  $\rightarrow$  partial dissociation (less than 10% or even less than 0.001%)
  - $\rightarrow$  equilibrium
  - $\rightarrow$  not stoichiometric (use variables etc)
  - $\rightarrow$  eg  $\text{HNO}_2 \rightleftharpoons \text{H}^+ + \text{NO}_2^-$

eg Determine  $[\text{H}^+]$  and pH and % dis for 1.0M  $\text{HClO}$



$$K_A = \frac{[\text{H}^+][\text{ClO}^-]}{[\text{HClO}]}$$

$$3 \times 10^{-8} = \frac{[\text{H}^+]^2}{1.0 - [\text{H}^+]}$$

\* could use the quadratic eq<sup>n</sup> at this point

$$[\text{H}^+] = \sqrt{3 \times 10^{-8} (1.0 - [\text{H}^+])}$$

guess a number less than 1.0  
 keep solving using answer until  
 the # you plug in = the # you get  
 out

eg guess 0.1

answer ① 0.00017391

② 0.000173190

③ 0.000173190

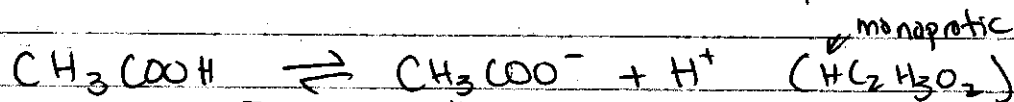
$$[\text{H}^+] = 0.00017319 \text{ M}$$

$$\begin{aligned} \text{pH} &= -\log [\text{H}^+] \\ &= -\log 0.00017319 \\ &= 3.76 \end{aligned}$$

$$\% \text{dis} = \frac{[\text{H}^+]}{C_A^0} \times 100\%$$

$$\begin{aligned} &= \frac{0.00017319}{1.0} \times 100\% \\ &= 0.01732\% \end{aligned}$$

Determine the initial concentration of acetic acid if the solution is found to have a pH of 4.06



$$\begin{aligned} [\text{H}^+] &= 10^{-\text{pH}} \\ &= 10^{-4.06} \\ &= 8.71 \times 10^{-5} \text{ M} \end{aligned}$$

$$\begin{aligned} [\text{CH}_3\text{COO}^-] &= [\text{H}^+] \\ &= 8.71 \times 10^{-5} \text{ M} \end{aligned}$$

$$\begin{aligned} [\text{CH}_3\text{COOH}] &= C_A^0 - [\text{H}^+] \\ &= C_A^0 - 8.71 \times 10^{-5} \text{ M} \end{aligned}$$

$$K_A = \frac{[\text{CH}_3\text{COO}^-][\text{H}^+]}{[\text{CH}_3\text{COOH}]}$$

$$1.8 \times 10^{-5} = \frac{(8.71 \times 10^{-5} \text{ M})^2}{C_A^0 - 8.71 \times 10^{-5} \text{ M}}$$

$$C_A^0 = 5.085 \times 10^{-4} \text{ M}$$