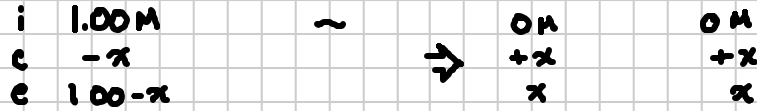
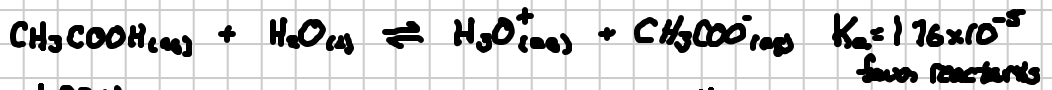


Lecture 11.2 Weak acids and percent ionization

Note Title

9/30/2011



L.M.A.

$$1.76 \times 10^{-5} = \frac{x^2}{(1.00-x)} \quad \left| \quad x = 0.004195 \text{ M} \right.$$

$\leftarrow x \approx 0$

$$x = [\text{H}_3\text{O}^+]_e = 0.004195 \text{ M}$$

5% rule $\frac{x}{(1.00)} \cdot 100 = 0.420\% < 5\% \quad \text{☺}$

pH = $-\log [\text{H}_3\text{O}^+] = -\log (0.004195) = 2.377$ acid pH.

% ionization = $\frac{[\text{H}_3\text{O}^+]_e}{[\text{CH}_3\text{COOH}]_i} \cdot 100 = \frac{(0.004195)}{(1.00 \text{ M})} \cdot 100 = 0.420\% \text{ ionization}$

	Least conc.		conc. increasing →			Most conc.
?						
	0.0100 M	0.0500 M	0.100 M	0.250 M	0.500 M	1.00 M
[H ₃ O ⁺] _e	0.0004195 M ✓	0.000938 M	0.0013266 M	0.0020976 M	0.002966 M	0.004195 M ✓
pH	3.378	3.028	2.878	2.678	2.528	2.377
% ionization	4.195% ✓	1.88%	1.326%	0.839%	0.593%	0.420%

[H₃O⁺] increasing →

pH decreasing →

% ionization decreases

Example: • What is the pH of a 0.500 M weak acid solution that is 2.34% ionized?

⊙ What is K_a for this acid?

$$\bullet \quad \% \text{ ionization} = \frac{[\text{H}_3\text{O}^+]_e}{[\text{HA}]_i} \cdot 100 \quad \left\} \quad 2.34\% = \frac{[\text{H}_3\text{O}^+]_e}{0.500\text{M}} \cdot 100$$

$$\rightarrow [\text{H}_3\text{O}^+] = 0.0117\text{M}$$

$$\rightarrow \text{pH} = -\log(0.0117\text{M}) = \underline{\underline{1.932}} \text{ acidic!}$$

