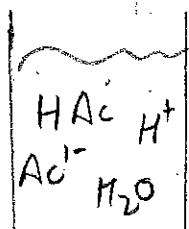


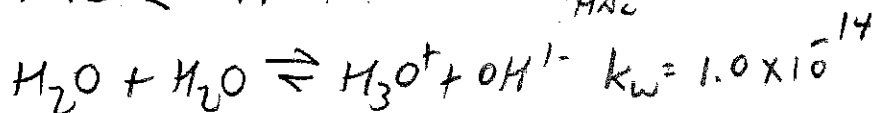
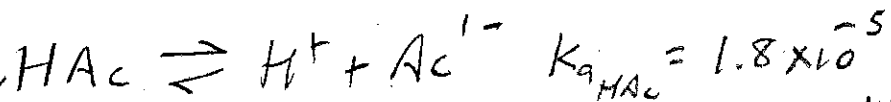
Weak Acid Titrated by Strong Base

Add 0.0 ml of 0.100M NaOH to 50.0 ml of a 0.10M $\text{HC}_2\text{H}_3\text{O}_2$ (HAc)

Since we have not added any NaOH, we just have a HAc weak acid bucket ($\text{Ac}^- \equiv \text{C}_2\text{H}_3\text{O}_2^{1-}$)



Weak acid bucket



since $K_{a_{\text{HAc}}} \gg K_w$, this reaction "run" bucket

$$K_{a_{\text{HAc}}} = \frac{[\text{H}^+]_E [\text{Ac}^{1-}]_E}{[\text{HAc}]_E}$$

	HAc	H ⁺	Ac ¹⁻
I	0.10M	0M	0M
C	-x	+x	+x
E	0.10M - x	x	x

Assume 5% rule

$$[\text{HAc}] = 0.10\text{M} - x \approx 0.10\text{M}$$

$$1.8 \times 10^{-5} = \frac{x^2}{0.10\text{M}}$$

$$\frac{1.341 \times 10^{-3}\text{M}}{0.1\text{M}} \cdot 100\% = 1.34\%$$

$$x = \sqrt{(1.8 \times 10^{-5}\text{M})(0.10\text{M})}$$

$$[\text{Ac}^{1-}] = [\text{H}^+] = x = 1.341 \times 10^{-3}\text{M}$$

$$\text{pH} = -\log[\text{H}^+] = -\log(1.341 \times 10^{-3}\text{M}) = -(-2.872)$$

$$\text{pH} = 2.87$$