Sample Sheet

Acid-Base Eq ① : Calculating pH of acid ①

* Calculate the expected pH of 1.00M CH_3COOH ($k_a = 1.8 \times 10^{-5}$)

	CH_3COOH	$\rightleftharpoons$	CH_3COO^-	+	H_3O^+
I	1.00		0		0
C	$-x$		$+x$		$+x$
E	$(1.00-x)$		x		x

$$k_a = 1.8 \times 10^{-5} = \frac{(x)(x)}{(1.00-x)} = \frac{[H_3O^+][CH_3COO^-]}{[CH_3COOH]}$$

ignore x b/c it's small.

$$\sqrt{1.8 \times 10^{-5} = \frac{x^2}{1.00}}$$ take square root of both sides.

$$x = 4.2 \times 10^{-3}$$

$$pH = -\log 4.2 \times 10^{-3} \approx \boxed{2.38}$$

ignoring x

(a) if dissociation $x < 5\%$ of M of acid.

5% of 1.00 = 0.05. $x = 4.2 \times 10^{-3}$.

if less than 5% then ignore.

(b) $\frac{M_{acid}}{k_a} > 100$ then ignore x

$\frac{1.00}{1.8 \times 10^{-5}} >>> 100$ ignore x.

Sapna Sule

Acid-Base Eq (1) Calculating pH of acid (1)

* Calculate the expected pH of 1.00M CH_3COOH ($K_a = 1.8 \times 10^{-5}$)

	CH_3COOH	$\rightleftharpoons$	CH_3COO^-	+ H_3O^+
I	1.00		0	0
C	$-x$		$+x$	$+x$
E	$(1.00 - x)$		x	x

$$K_a = 1.8 \times 10^{-5} = \frac{(x)(x)}{(1.00 - x)} = \frac{[H_3O^+][CH_3COO^-]}{[CH_3COOH]}$$

↑ ignore x b/c its small.

$$\sqrt{1.8 \times 10^{-5} = \frac{x^2}{1.00}}$$

take square root of both sides.

$$x = 4.2 \times 10^{-3}$$

$$pH = -\log 4.2 \times 10^{-3} = \boxed{2.38}$$

Ignoring x

(a) if dissociation $x < 5\%$ of M of acid.

5% of 1.00 = 0.05. $x = 4.2 \times 10^{-3}$.

if less than 5% then ignore.

(b) $\frac{M_{acid}}{K_a} > 100$ then ignore x.

$$\frac{1.00}{1.8 \times 10^{-5}} >>> 100$$ ignore x.