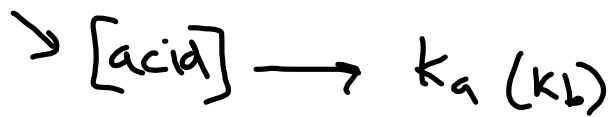
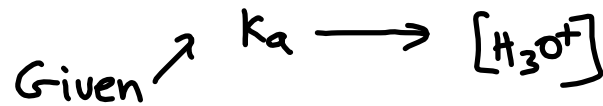
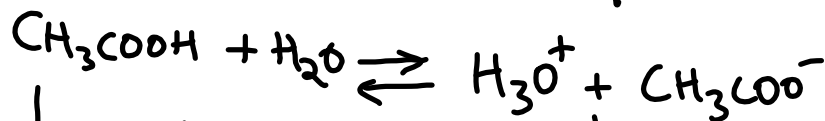


Ionization Constant Calculations



Ex. 1 Find $[H_3O^+]$ in a 0.010 mol/L Solution of CH_3COOH
 $K_a = 1.8 \times 10^{-5}$



I	0.010	}	0	0
C	$-x$	}	$+x$	$+x$
E	$0.010 - x$	}	x	x

$$K_a = \frac{x \cdot x}{0.010 - x}$$

$$K_a = \frac{x^2}{0.010 - x} \leftarrow \text{assume } x \text{ is small}$$

$$1.8 \times 10^{-5} = \frac{x^2}{0.010 - x}$$

$$1.8 \times 10^{-5} \cdot 0.010 = x^2$$

$$1.8 \times 10^{-5} \times 0.010 = x^2$$

$$\sqrt{1.8 \times 10^{-7}} = \sqrt{x^2}$$

$$4.2 \times 10^{-4} = x = [H_3O^+] \text{ mol/L}$$

Ionization Constant Calculations Continued

Ex 2. Calculate K_a for a 0.15 mol/L acid HA which has $[\text{H}_3\text{O}^+]$ of 0.0080 mol/L .

$$\text{HA} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{A}^-$$

I	0.15	}	0	0
C	-0.0080		0.0080	0.0080
E	0.142		0.0080	0.0080

$$K_a = \frac{[\text{H}_3\text{O}^+][\text{A}^-]}{[\text{HA}]}$$

$$K_a = \frac{0.0080 \times 0.0080}{0.142}$$

$$= 4.5 \times 10^{-4}$$

Handout: 18B, 18c A/B extra pract.
See p.850 (text) table