

Solutions

Each answer shows the steps, then the **result**.

2.1

- $K_a = \frac{[\text{H}^+][\text{F}^-]}{[\text{HF}]}$

2.2

- Weak

2.3

- $x = \sqrt{(4 \times 10^{-7})(0.10)} = \sqrt{4 \times 10^{-8}} = 2 \times 10^{-4} \text{ M}$

3.1 B

- $[\text{H}^+] \approx \sqrt{K_a C}$

3.2

(a)

- $[\text{H}^+] = \sqrt{(1.0 \times 10^{-5})(0.20)} = \sqrt{2.0 \times 10^{-6}} = 1.41 \times 10^{-3} \text{ M}$

(b)

- $\text{pH} = -\log(1.41 \times 10^{-3}) = 2.85$

3.3

- A weak acid ionizes only slightly, so x is tiny compared to C and $C - x \approx C$; a strong acid ionizes fully, so $x \approx C$ and the approximation fails