

Chapter 14 – Problems 2, 12, 30

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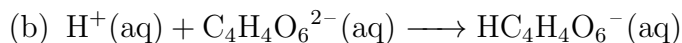
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2. (a) $\text{H}^+(\text{aq}) + \text{C}_2\text{H}_3\text{O}_2^-(\text{aq}) \longrightarrow \text{HC}_2\text{H}_3\text{O}_2(\text{aq})$
 (b) $\text{OH}^-(\text{aq}) + \text{H}^+(\text{aq}) \longrightarrow \text{H}_2\text{O}$
 (c) $\text{HOCl}(\text{aq}) + \text{CN}^-(\text{aq}) \longrightarrow \text{HCN}(\text{aq}) + \text{OCl}^-(\text{aq})$
 (d) $\text{HNO}_2(\text{aq}) + \text{OH}^-(\text{aq}) \longrightarrow \text{NO}_2^-(\text{aq}) + \text{H}_2\text{O}$
12. $\text{H}^+(\text{aq}) + \text{F}^-(\text{aq}) \longrightarrow \text{HF}(\text{aq})$

$$\begin{aligned}
 [\text{H}^+] &= k_a \cdot \frac{n_{\text{HF}}}{n_{\text{F}^-}} \\
 6.9 \cdot 10^{-4} \cdot \frac{.127 \cdot .0399}{.062} &= 5.64 \cdot 10^{-5} \\
 -\log_{10}(5.64 \cdot 10^{-5}) &= 4.25
 \end{aligned} \tag{1}$$

30. (a)

$$\begin{aligned}
 .137 \cdot .288 &= .039456[\text{mol}] \\
 .239 \cdot .187 &= .044693[\text{mol}] \\
 [\text{H}^+] &= \frac{.044693}{.039456} \cdot 4.55 \cdot 10^{-5} \\
 &= 5.154 \cdot 10^{-5} \\
 -\log_{10}(5.154 \cdot 10^{-5}) &= 4.288
 \end{aligned} \tag{2}$$



$$\begin{aligned}
 .187 \cdot .239 &= .0447[\text{mol}] \\
 .288 \cdot .137 &= .0395[\text{M}] \\
 4.34 - \log_{10}\left(\frac{.0447 + .025}{.0395 - .025}\right) &= 3.66
 \end{aligned} \tag{3}$$

(c)

$$\begin{aligned} .187 \cdot .239 &= .0447[\text{mol}] \\ .288 \cdot .137 &= .0395[\text{M}] \\ 4.34 - \log_{10} \left(\frac{.0447 - .025}{.0395 + .025} \right) &= 4.86 \end{aligned} \tag{4}$$