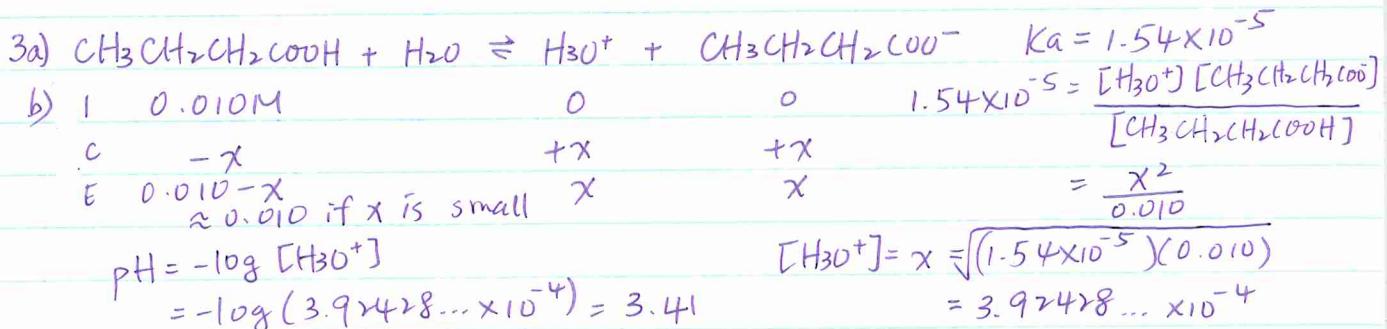
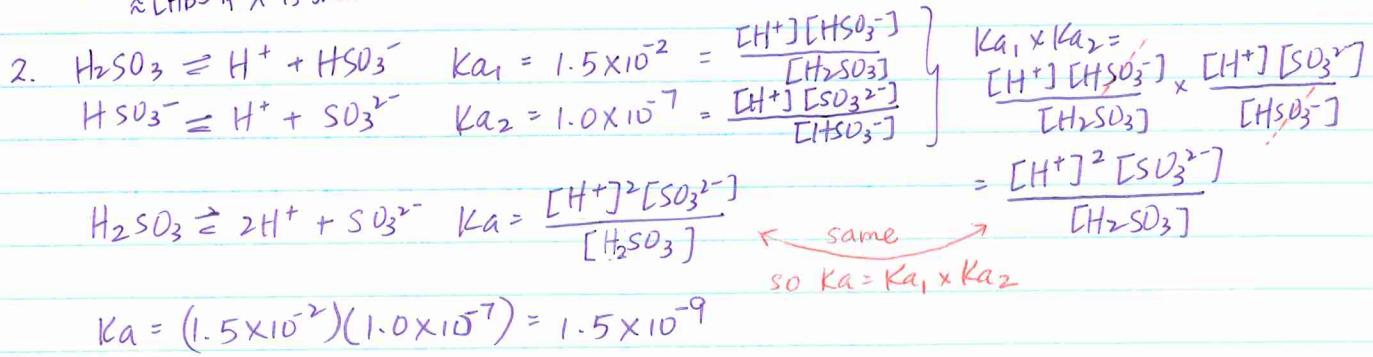
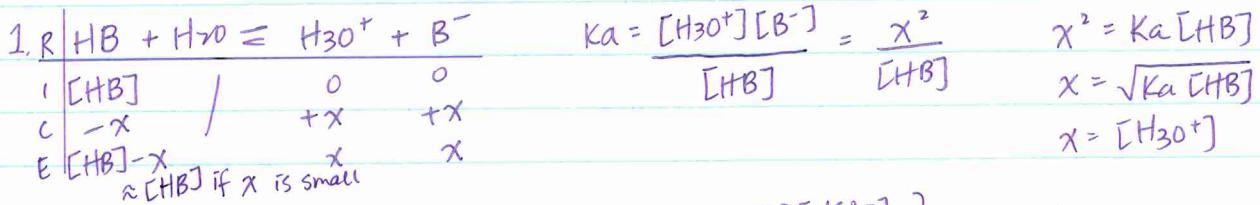


Chem 12 Acid Base Worksheet #7



$$\text{moles of CH}_3\text{CH}_2\text{CH}_2\text{COOH} = M \times V = (0.010\text{M})(0.100\text{L}) = 0.0010\text{mol}$$

$$\text{moles of NaOH} = 0.00100\text{mol} \quad \text{CH}_3\text{CH}_2\text{CH}_2\text{COOH} \times \frac{1\text{mol NaOH}}{1\text{mol CH}_3\text{CH}_2\text{CH}_2\text{COOH}} = 0.00100\text{mol}$$

$$M = \frac{n}{V} \quad \text{so} \quad V = \frac{n}{M} = (0.00100\text{mol}) \div 0.35\text{M} = 2.9 \times 10^{-3}\text{L}$$

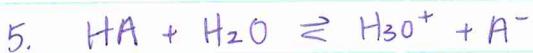
d) H₂O water NaCH₃CH₂CH₂COO sodium butanoate

4. Total moles of H₂SO₄ present = $M_1V_1 + M_2V_2$

$$= (0.50\text{M})(0.050\text{L}) + (0.25\text{M})(0.100\text{L}) = 0.050 \text{ mol}$$

$$\text{Total volume} = 0.050\text{L} + 0.100\text{L} = 0.150\text{L}$$

$$[\text{acid}] = \frac{n}{V} = 0.050\text{mol} \div 0.150\text{L} = 0.33\text{M}$$

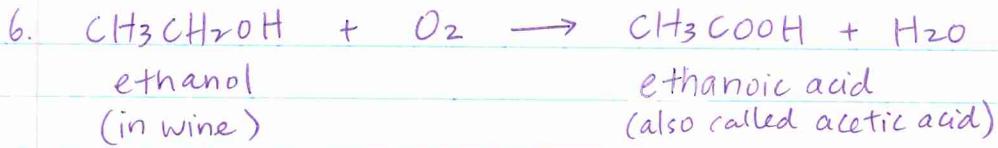


\uparrow reacts to form H₂O

$$[\text{H}_3\text{O}^+] \downarrow$$

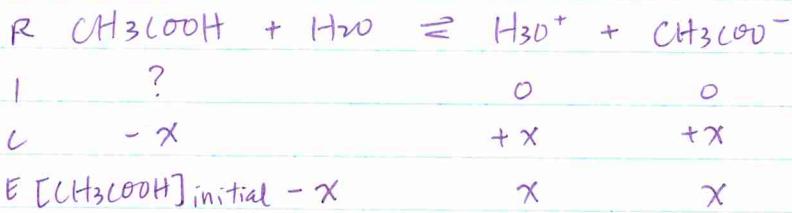
eqm shifts \rightarrow and so $[\text{HA}] \downarrow$ ($\text{HA}_{(\text{aq})} \rightleftharpoons \text{HA}_{(\text{aq})}$)

\downarrow shifts \rightarrow
so HA_(solids) dissolves



$$pH = 2.80 \rightarrow [H_3O^+] = 10^{-pH} = 10^{-2.80} = 1.584893... \times 10^{-3} M \\ = x$$

(2 s.f.)



$$K_A = \frac{[CH_3COO^-][H_3O^+]}{[CH_3COOH]}$$

$$1.8 \times 10^{-5} = \frac{x^2}{[CH_3COOH]_{\text{initial}} - x}$$

$$1.8 \times 10^{-5} = \frac{(1.584893... \times 10^{-3})^2}{[CH_3COOH]_i - (1.584893... \times 10^{-3})}$$

$$1.8 \times 10^{-5} \left([CH_3COOH]_i - 1.584893 \dots \times 10^{-3} \right) = (1.584893 \dots \times 10^{-3})^2$$

$$(1.8 \times 10^5) [\text{CH}_3\text{COOH}]_i - (1.8 \times 10^5)(1.584893 \dots \times 10^{-3}) = (1.584893 \dots \times 10^{-3})^2$$

$$[\text{CH}_3\text{COOH}]_i = \frac{(1.584893... \times 10^{-3})^2 + (1.8 \times 10^{-5})(1.584893... \times 10^{-3})}{(1.8 \times 10^{-5})}$$

$$\text{moles of } \text{CH}_3\text{COOH} = M \times V = (0.141 \text{ mol/L}) (1 \text{ L}) = 0.141 \text{ mol}$$

$$\text{moles of ethanol } \text{CH}_3\text{CH}_2\text{OH} = 0.141 \dots \text{mol } \text{CH}_3\text{COOH} \times \frac{1 \text{ mol } \text{CH}_3\text{CH}_2\text{OH}}{1 \text{ mol } \text{CH}_3\text{COOH}}$$

$$= 0.141 \dots \text{mol}$$

$$\begin{aligned}\text{molar mass of ethanol} &= 2(12.0) + 6(1.0) + 16.0 \text{ g/mol} \\ &= 46.0 \text{ g/mol}\end{aligned}$$

$$\text{mass of ethanol} = 0.141\ldots \text{mol} \times \frac{46.0\text{g}}{1\text{ mol}} = 6.5\text{g}$$