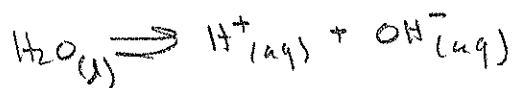


Name Key

2. (25) What are the pH and pOH at 25° C of a 0.150 m solution of $\text{Ca}(\text{NO}_3)_2(\text{aq})$? Please remember that $K_w = 1.00 \times 10^{-14}$ at this temperature, and that

$$\log_{10} \gamma_{\pm} = -0.51 |z_+ z_-| \left\{ I^{1/2} / (1 + I^{1/2}) - 0.30 I \right\}$$

$$I = 3m = 0.450 \text{ mol/kg}$$



$$\log_{10} \gamma_{\pm} = -0.51 |(+1)(-1)| \left\{ \frac{\sqrt{0.450}}{1 + \sqrt{0.450}} - 0.30 (0.450) \right\}$$

$$= -0.1359$$

$$\gamma_{\pm} = 10^{-0.1359} = 0.73$$

$$\gamma_{\pm}^2 m_{\text{H}^+} m_{\text{OH}^-} = 1.00 \times 10^{-14}$$

$$m_{\text{H}^+}^2$$

$$m_{\text{H}^+} = \frac{(1.00 \times 10^{-14})^{1/2}}{0.73} = 1.37 \times 10^{-7} \frac{\text{mol}}{\text{kg}}$$

$$\text{pH} = -\log_{10} (1.37 \times 10^{-7})$$

$$= 6.86$$

$a_{\text{OH}^-} = a_{\text{H}^+}$ because both ions come from the same source and have the same activity coefficient

$$\text{so, } \text{pOH} = \text{pH} = 6.86$$