

#11-16

$$13. a) [H_{(aq)}^+] = 10^{-pH}$$

$$[H_{(aq)}^+] = 10^{-5.00}$$

$$[H_{(aq)}^+] = 1.0 \times 10^{-5} M$$

$$15. a) [OH_{(aq)}^-] = 4.3 \times 10^{-5} M$$

pH = ?

$$pH = -\log [H_{(aq)}^+]$$

$$pH = -\log [2.3 \times 10^{-10}]$$

$$pH = 9.64$$

$$K_w = [H_{(aq)}^+] [OH_{(aq)}^-]$$

$$[H_{(aq)}^+] = \frac{K_w}{[OH_{(aq)}^-]}$$

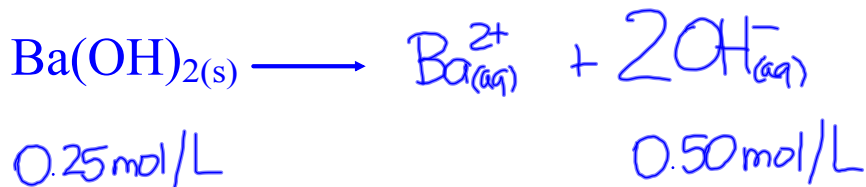
$$[H_{(aq)}^+] = \frac{1.0 \times 10^{-14}}{4.3 \times 10^{-5} M}$$

$$[H_{(aq)}^+] = 2.3 \times 10^{-10} M$$

Sample Problem 2

IONIC HYDROXIDES (STRONG BASE)

Calculate the hydrogen ion concentration, pH and pOH of a 0.25 mol/L solution of barium hydroxide.



$$[\text{H}_{(aq)}^{+}] = ?$$

$$\text{pH} = ?$$

$$\text{pOH} = ?$$

$$K_w = [\text{H}_{(aq)}^{+}][\text{OH}_{(aq)}^{-}]$$

$$1.0 \times 10^{-14} = [\text{H}_{(aq)}^{+}][0.50]$$

$$[\text{H}_{(aq)}^{+}] = \frac{1.0 \times 10^{-14}}{0.50}$$

$$[\text{H}_{(aq)}^{+}] = 2.0 \times 10^{-14} \text{ M}$$

$$\text{pH} = -\log[\text{H}_{(aq)}^{+}]$$

$$\text{pH} = -\log[2.0 \times 10^{-14}]$$

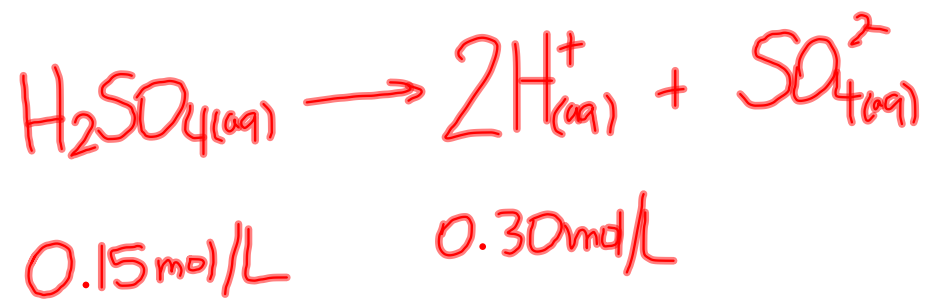
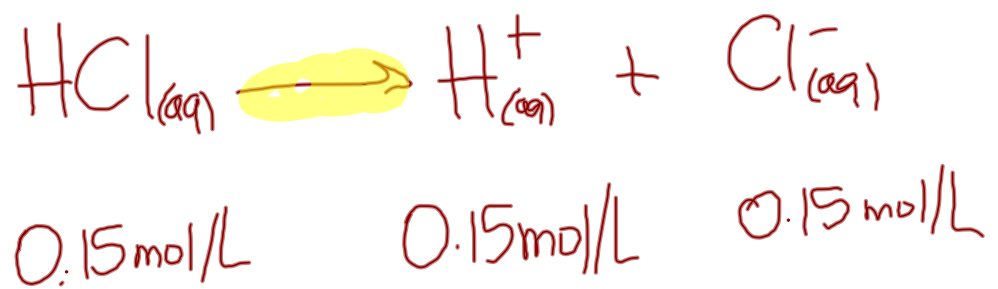
$$\text{pH} = 13.70$$

$$\text{pOH} = -\log[\text{OH}_{(aq)}^{-}]$$

$$\text{pOH} = -\log[0.50]$$

$$\text{pOH} = 0.30$$

$$\text{pH} + \text{pOH} = 14.00$$



Water Equilibrium Worksheet