

Name: _____

17. Calculate the pH of a lithium hydroxide solution with a $[\text{OH}^-]$ of 7.6×10^{-4} .

$$\text{pOH} = -\log(7.6 \times 10^{-4}) = 3.1$$

$$\text{pH} + \text{pOH} = 14$$

$$\text{pH} = 14 - 3.1 = \boxed{10.9}$$

18. What is the $[\text{H}^+]$ of a solution with a pOH of 13.5?

$$\begin{array}{r} \text{pH} + \text{pOH} = 14 \\ -13.5 \quad -13.5 \\ \hline \text{pH} = 0.5 \end{array}$$

$$[\text{H}^+] = 10^{-\text{pH}}$$

$$[\text{H}^+] = 10^{-0.5} = \boxed{0.32}$$

19. If the hydrogen ion concentration of a solution is 4.0×10^{-9} , is the solution acidic, alkaline (basic), or neutral?

$$\text{pH} = -\log(4 \times 10^{-9}) = 8.39 \quad \boxed{\text{Basic}}$$

20. If a solution has a pH of 4.5, what is the $[\text{OH}^-]$?

$$\text{pH} + \text{pOH} = 14$$

$$4.5 + \text{pOH} = 14$$

$$\begin{array}{r} -4.5 \quad -4.5 \\ \hline \text{pOH} = 9.5 \end{array}$$

$$[\text{OH}^-] = 10^{-\text{pOH}}$$

$$[\text{OH}^-] = 10^{-9.5} = \boxed{3.16 \times 10^{-10}}$$

21. What is the concentration of NaOH needed to neutralize 500 mL of a 4.3 M HCl. Assume 35 mL of NaOH is needed for the neutralization.

$$M_1 V_1 = M_2 V_2$$

$$(4.3)(500) = (x)(35)$$

$$\frac{2150}{35} = \frac{35x}{35}$$

$$\boxed{x = 61.4 \text{ M}}$$