

$$\textcircled{1} \quad \text{pH} = -\log[\text{H}^+] \quad \textcircled{2} \quad \text{pOH} = -\log[\text{OH}^-]$$

$$\textcircled{3} \quad \text{pH} + \text{pOH} = 14.00$$

$$\textcircled{4} \quad [\text{H}^+] \cdot [\text{OH}^-] = 1.00 \times 10^{-14} \text{ M}^2$$

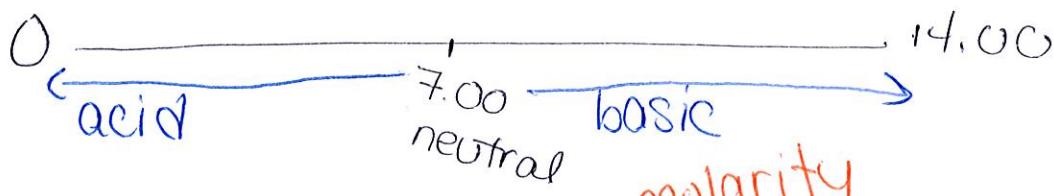
$$\textcircled{5} \quad [\text{H}^+] = 10^{-\text{pH}} \quad \textcircled{6} \quad [\text{OH}^-] = 10^{-\text{pOH}}$$

pH

"power" of hydrogen \rightarrow concentration of H^+ ions

- measures the strength of an acid or base

- pH Scale

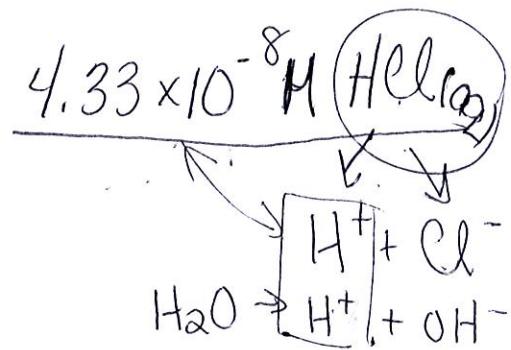


$$pH = -\log[H^+]$$

Ex) what is the pH of a solution

$$pH = -\log[4.33 \times 10^{-8}]$$

$$pH = 7.36 \text{ basic}$$



Ex) what is the pH of a solution made by dissolving 50.0 g HNO_3 in 2.00L of water?

$$M = \frac{n}{V}$$

$$n = 50.0 \text{ g} \left(\frac{1 \text{ mol}}{63.02 \text{ g}} \right) = 0.79 \text{ mol}$$

$$V = 2.00 \text{ L}$$

$$M = \frac{0.79 \text{ mol}}{2.00 \text{ L}} = 0.40 \text{ M}$$

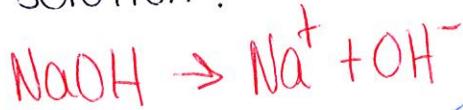
$$pH = -\log[H^+]$$

$$pH = -\log(0.40)$$

$$pH = 0.40$$

①

Ex) what is the pH of a $4.33 \times 10^{-3} M$ NaOH solution?



$$p\text{OH} = -\log[\text{OH}^-]$$

$$p\text{OH} = -\log[4.33 \times 10^{-3}]$$

$$p\text{OH} = 2.36$$

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

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

$$\text{pH} + 2.36 = 14.00$$

$$\boxed{\text{pH} = 11.64}$$

basic

Ex) What is the $[\text{H}^+]$ concentration of a solution with $[\text{OH}^-] = 1.00 \times 10^{-8} M$?

$$[\text{H}^+] \cdot [\text{OH}^-] = 1.00 \times 10^{-14} \text{ M}^2$$

$$\frac{[\text{H}^+] \cdot [1.00 \times 10^{-8} M]}{1.00 \times 10^{-8} M} = \frac{1.00 \times 10^{-14} \text{ M}^2}{1.00 \times 10^{-8} M}$$

$$\boxed{[\text{H}^+] = 1.00 \times 10^{-6} M}$$

Ex) what is the $[\text{OH}^-]$ of a solution with a

$$p\text{OH} = 5.50$$

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

$$[\text{OH}^-] = 10^{-5.50}$$

$$[\text{OH}^-] = 3.16 \times 10^{-6}$$

Ex) what is the $[\text{H}^+]$ of a solution w/a $p\text{OH} = 3.56$

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

$$[\text{OH}^-] = 10^{-3.56}$$

$$[\text{OH}^-] = 2.75 \times 10^{-4}$$

$$[\text{H}^+] \cdot [\text{OH}^-] = 1.00 \times 10^{-14} \text{ M}^2$$

$$[\text{H}^+] \cdot [2.75 \times 10^{-4}] = 1.00 \times 10^{-14} \text{ M}^2$$

$$[\text{H}^+] = 3.64 \times 10^{-11} M$$

(2)