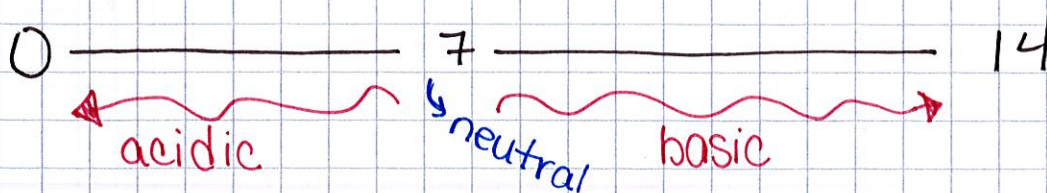


pH

A scale of how acidic or basic a substance is.



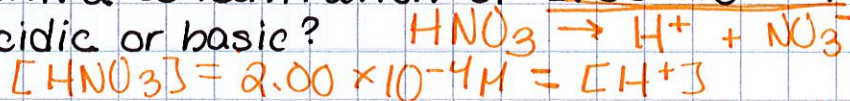
$$pH = -\log [H^+]$$

$$pOH = -\log [OH^-]$$

$$pH + pOH = 14.00$$

Examples

(1) What is the pH & pOH of a solution of HNO_3 with a concentration of $2.00 \times 10^{-4} M$? Is it acidic or basic?



$$[HNO_3] = 2.00 \times 10^{-4} M = [H^+]$$

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

$$pH = -\log [2.00 \times 10^{-4}]$$

$$pH = 3.70$$

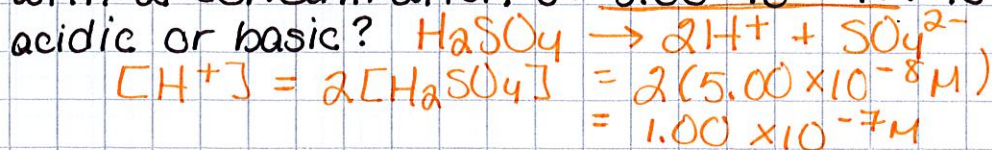
$$pH + pOH = 14.00$$

$$3.70 + pOH = 14.00$$

$$pOH = 10.30$$

Acidic

(2) What is the pH & pOH of a solution of H_2SO_4 with a concentration of $5.00 \times 10^{-8} M$? Is it acidic or basic?



$$[H^+] = 2[H_2SO_4] = 2(5.00 \times 10^{-8} M) = 1.00 \times 10^{-7} M$$

$$pH = -\log [1.00 \times 10^{-7}]$$

$$pH = 7.00$$

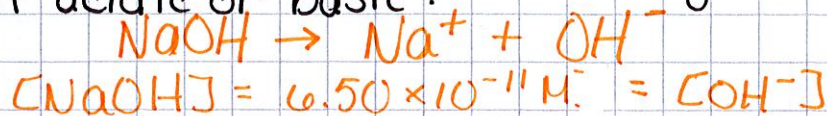
$$pH + pOH = 14.00$$

$$7.00 + pOH = 14.00$$

$$pOH = 7.00$$

Neutral

(3) What is the pH & pOH of a solution of NaOH with a concentration of $6.50 \times 10^{-11} \text{ M}$? Is it acidic or basic?



$$\text{pOH} = -\log[\text{OH}^-]$$
$$\text{pOH} = -\log[6.50 \times 10^{-11}]$$

$$\text{pOH} = 10.19$$

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

$$\text{pH} + 10.19 = 14.00$$

$$\text{pH} = 3.81$$

Acidic

(4) What is the pH & pOH of a solution of $\text{Ca}(\text{OH})_2$ with a concentration of $3.34 \times 10^{-3} \text{ M}$? Is it acidic or basic?



$$[\text{OH}^-] = 2[\text{Ca}(\text{OH})_2] = 2(3.34 \times 10^{-3} \text{ M})$$
$$= 6.68 \times 10^{-3} \text{ M}$$

$$\text{pOH} = -\log[\text{OH}^-]$$
$$\text{pOH} = -\log[6.68 \times 10^{-3}]$$

$$\text{pOH} = 2.18$$

$$\text{pH} + \text{pOH} = 14.00$$
$$\text{pH} + 2.18 = 14.00$$

$$\text{pH} = 11.82$$

basic