

Chem12 Acids/pH : Notes/W.S.-90

If we know the pH of a solution, we can find the hydronium ion concentration or the hydroxide ion concentration.

Since : **$\text{pH} = -\log [\text{H}_3\text{O}^+]$**

we can find the hydronium ion concentration using the equation :

$$[\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$

The above equations come about because logarithmic functions are inverse to exponential functions. There are similar equations relating pOH and $[\text{OH}^-]$

Examples : If $[\text{H}_3\text{O}^+] = 0.0010 \text{ M}$, $\text{pH} = -\log [0.0010] = 3.0$.

Using the second equation we have :

$$[\text{H}_3\text{O}^+] = 10^{-3.0} = 0.0010.$$

This shows that both of the above equations are different forms of the same equation.

Exercises :

1) Find the $[\text{H}_3\text{O}^+]$ in mol/L given the pH.

a) $\text{pH} = 4.0$

b) $\text{pH} = 13$

c) $\text{pH} = 8.7$

2) Find the $[\text{OH}^-]$ in mol/L given the pH. (hint; use $\text{pH} + \text{pOH} = 14$)

a) $\text{pH} = 3.0$

b) $\text{pH} = 8.0$

c) $\text{pH} = 3.2$

Answers : 1)a) 10^{-4} , b) 10^{-13} , c) $10^{-8.7} = 2.0 \times 10^{-9}$, 2)a) 10^{-11} , b) 10^{-6} , c) $10^{-10.8} = 1.6 \times 10^{-11}$.