

Topic - PH Value

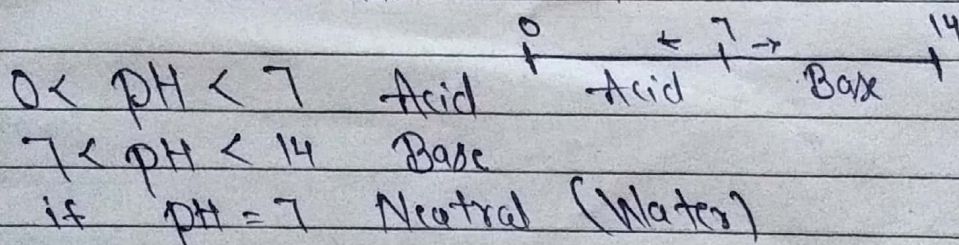
Acid - Which gives H^+
Ex- HCl, HNO_3, H_2SO_4

PH Means
 → Potential of hydrogen ion

Base - Which gives OH^-
Ex- $NaOH, KOH$

PH Value - It is a value by which we can find the strength of acid or base. It depends on the concentration of hydrogen ion.

This scale has number from 0 to 14.



PH Scale is derived by Sorenson.

Formulas -

1 $pH = -\log [H^+]$

$[H^+]$ Means

→ Hydrogen ion Concentration

2 $[H^+] = 10^{-pH}$

3 $[H^+][OH^-] = 10^{-14}$

$[OH^-]$ Means

→ Hydroxide ion Concentration

4 $pH + pOH = 14$

5 $[OH^-] = 10^{-pOH}$

Consider
 Also $\log 2 = 0.3010$, $\log 3 = 0.4771$, $\log 5 = 0.6990$
 $\log 10 = 1$

Numericals

BY NISHANT GUPTA

2015-16

① find pH of an acid whose $[H^+]$ is 0.0001.

Soln

$$[H^+] = 0.0001$$

$$= 10^{-4}$$

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

$$\text{So } \boxed{pH = 4}$$

2020

② find pH of $\frac{M}{100}$ HCl solution.

Soln

$$[H^+] = \frac{1}{100} = 10^{-2}$$

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

$$\text{So } \boxed{pH = 2}$$

③

find pH of a solution whose $[H^+]$ is 2×10^{-3} .

Soln

$$[H^+] = 2 \times 10^{-3}$$

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

$$= -\log (2 \times 10^{-3})$$

$$= -(\log 2 - 3 \log 10) = -(0.3010 - 3)$$

$$= 2.6990$$

2018

④

find the pH of a soln whose pOH is 10.

Soln

$$pH + pOH = 14$$

$$10 + pOH = 14$$

$$pOH = 14 - 10$$

$$= 4 \quad \text{Ans}$$

2019

⑤

find the pH of $\frac{N}{10}$ NaOH soln.

Soln

$$[OH^-] = \frac{1}{10}$$

$$\text{So } [OH^-] = 10^{-1}$$

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

$$\text{So } pOH = 1$$

$$\therefore pH + pOH = 14$$

$$pH + 1 = 14$$

$$\text{So } \boxed{pH = 13}$$

2018, 2019

⑥

Calculate the OH^- Conc of solution where pH is 10.

Soln

$$pH = 10$$

$$pH + pOH = 14$$

$$10 + pOH = 14$$

$$pOH = 4$$

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

$$= 10^{-4} \quad \underline{\text{Ans}}$$

2018

⑦

BY NISHANT GUPTA

The $[H^+]$ of a fruit juice is 3.3×10^{-2} . find pH of solution. $\log 3.3 = 0.5185$ (Ans - 1.4815)

⑧

Calculate the pH of 0.01M HCl

Ans - 2

⑨

find the pH of 0.01M H_2SO_4 .Ans - 1.6990

⑩

find the pH of $\frac{N}{100}$ NaOH solutionAns - 12

⑪ Calculate the pH of 0.0001 M H_2SO_4 Ans - 3.699

⑫ If pH of a soln is 7 find its pOH Ans - 7

⑬ If hydrogen ion Conc of a soln is 5×10^{-4} . find its pH and pOH. Ans 3.3010, 10.6990

⑭ The pH of NaOH soln is 9. find its pOH and hydroxide ion Concentration Ans 5, 10^{-5} .

⑮ Calculate the pH of $\frac{N}{500}$ HCl solution.

BY NISHANT GUPTA (Ans - 2.6990)