

Class - U.G. Semester - II

Subject - Chemistry (MJC)

Paper - MJC-II

Name - Rashmi Singh

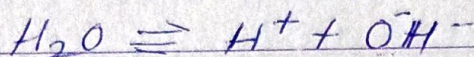
Dept. of Chemistry

H.D. Jain College, Aq

PH Value :-

"PH is defined as the negative logarithm of $[H^+]$ ions concentration"

Water ~~ionize~~ ^{ionize} to small extent as :-



According to law of mass action,

$$K = \frac{[H^+][OH^-]}{[H_2O]}$$

$$[H_2O]$$

$$K[H_2O] = [H^+][OH^-]$$

Since, water is in large excess $[H_2O]$ may be taken to be constant.

$$\text{Hence, } K_w = [H^+][OH^-]$$

Where K_w = const. called ionic product of water.

At $25^\circ C$ the value of K_w is found to be 10^{-14} . Since in water $[H^+] = [OH^-] = 10^{-7}$

Because pure water is neutral. Hence

PH of any neutral solⁿ is 7.

PH is also defined to be negative exponent to which when 10 is raised to the becomes equal to hydrogen concentration.

Mathematically

$$10^{-PH} = [H^+]$$

taking log both sides

$$\log 10^{-PH} = \log [H^+]$$

$$-PH \log 10 = \log [H^+]$$

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

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

$$\text{But } \log_{10} = 1$$

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

$$pH = \log \frac{1}{[H^+]}$$

Hence, pH is equal to -ve value of logarithm of H^+ ion concentration to the base 10

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