



Practical Experiment Instruction Sheet

EXPERIMENT TITLE :

Determination of pH value of different solutions by pH paper & pH meter

EXPERIMENT NO. : 8 MIT(T)/BSH/Engg. Chemistry Lab/ Engg. Chemistry /Manual No

Class: F.Y. BTech.

DEPARTMENT: Basic Sciences & Humanity

LABORATORY : Engg. Chemistry

Location:- 214

PART:

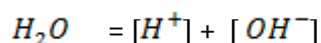
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Aim:- Determination of pH of given solution by pH paper and pH meter method.**Theory:-**

1. The degree of acidity or by the alkalinity of a solution is expressed by pH scale which is series of numbers between 0 to 14. The term pH first introduced in 1909 by Sorensen and was defined as the negative logarithm of hydrogen ion concentration expressed in molarity: $\text{pH} = -\log \{H^+\}$ or $\text{pH} = \log c_{H^+}$
2. The nature of solution can be determined from its pH value. If the pH is between 0 to 7 the solution is acidic in nature. If the pH is 7 then it is considered as neutral solution and if the pH is between 7 to 14 the solution is considered as basic in nature.

Since pure water ionizes to $[H^+]$ and $[OH^-]$ 3. $[H^+]$ concentration = 1×10^{-7} moles/lit4. $[OH^-]$ concentration = 1×10^{-7} moles/lit

5. Hence p^H value pure water or neutral compound is 7. The 'p' in these expression denoted by $-\log$ of that quantity. Water dissociates into $[OH^-]$ and $[H^+]$ of a very small degree so that we have equilibrium



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

K = water dissociation constant.

$$K_w = [H^+][OH^-]$$

K_w = ionic product of water.

Taking log of both sides

$$\log K_w = \log [H^+] + \log [OH^-]$$

Multiplied by -1,

$$\log K_w = \log [H^+] - \log [OH^-]$$

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

$$pK_w = 7 + 7$$

$$= 14$$

$$\text{It means } \text{pH} = 14 - \text{pOH} \text{ or } \text{pOH} = 14 - \text{pH}$$

Apparatus:- pH meter, beaker, glass rod, etc.**Chemicals:-** pH paper, different pH solutions etc.

Procedure:-

1. pH by pH paper
 - a. Take 0.5 ml of given solution in test tube.
 - b. Deep the small piece of pH paper in it and observe the colour change
 - c. Compare the colour change with standard colour pattern on box and record the pH of the given solution
 - d. Repeat same procedure for rest of solution and determine pH of them.
2. pH by pH meter
 - a. Calibrate the pH meter by using known buffer solutions of pH 4,7 and 9.2 pH
 - b. Wash the combine glass electrode with distilled water
 - c. Gently clean the electrode by using filter paper
 - d. Deep the electrode into the solution whose pH is to be determine
 - e. Note down the readings
 - f. Repeat the steps 2 to 5 for other solutions and find out the pH value of it.

Observation table:-

Sr. no.	Given solution	pH by pH paper colour change	pH by pH meter	pH value
1.	Sample A			
2.	Sample B			
3.	Sample C			
4.	Sample D			

Result:-

1. pH of given solution by pH paper.
 - a. Sample A =(colour) =(nature)
 - b. Sample B =(colour) =(nature)
 - c. Sample C =(colour) =(nature)
 - d. Sample D =(colour) =(nature)
2. pH of given solution by pH meter
 - a. Sample A =pH =(nature)
 - b. Sample B =pH =(nature)
 - c. Sample C =pH =(nature)
 - d. Sample D =pH =(nature)