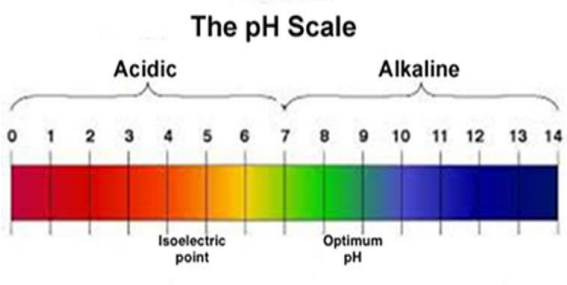
SORENSON'S pH SCALE

***Defination*:-**It is defined as as the logarithm of reciprocal of the hydrogen ion or hydronium ions conc.[H_3O^+].

*Inventor of sorenson's pH scale =S.P.L Sorensen's



***pH of 1 to 7*=**Acidic in nature [1 is most acidic]

***pH of 7* =** Neutral [Neither Acidic nor Bacic]

***pH 7 to 14*=** Basic in nature [14 is most basic]

pH and sorensen's scale pH

Ions are produced when elecetrolytes dissociate in water. As acid reacts with water, hydrogen ion or hyronium ion are produced. According to Thermodynamics, pH can be calculated by calculation the negative logarithm of hydrogen ion activity.

Specifically,

$pH = -\log aH+$ ---------- (1)

where,

aH+ = activity of hydronium ion

In terms of actuvity hydronium ion concentration, divided by rational activity coefficient, is equal to the hydronium ion activity.

$aH+ = c \times Y \pm$ ---------- (2)

Putting equation (2) in the place of equation (1) gives

$pH = -\log (c \times Y \pm)$ ---------- (3)

when salts are not added, activities are equal to concentration, since ionic strength is small. When neutral salts are added , the hydronium ions' activity is altered and activity coefficient should therefore be used, that is equation (3)

For Sorenson, pH is the logarithm of hydrogen ion concentration times the reciprocal.

Specifically,

You can write pH as

pH = log1 ----------(4)

Putting the [H3O+] Equation 4 in another way

pH = log1 – log [H3O+] ----------(5)

log 1 being zero, the equation 5 becomes:

pH = -log[H3O+] ---------(6)

The pH value is therefore defined as the negative logarithm of the hydrogen ion concentration. Sorensen created the term pH, which stand for Hydroyen ion potential negative

logarithms are expressed by P.

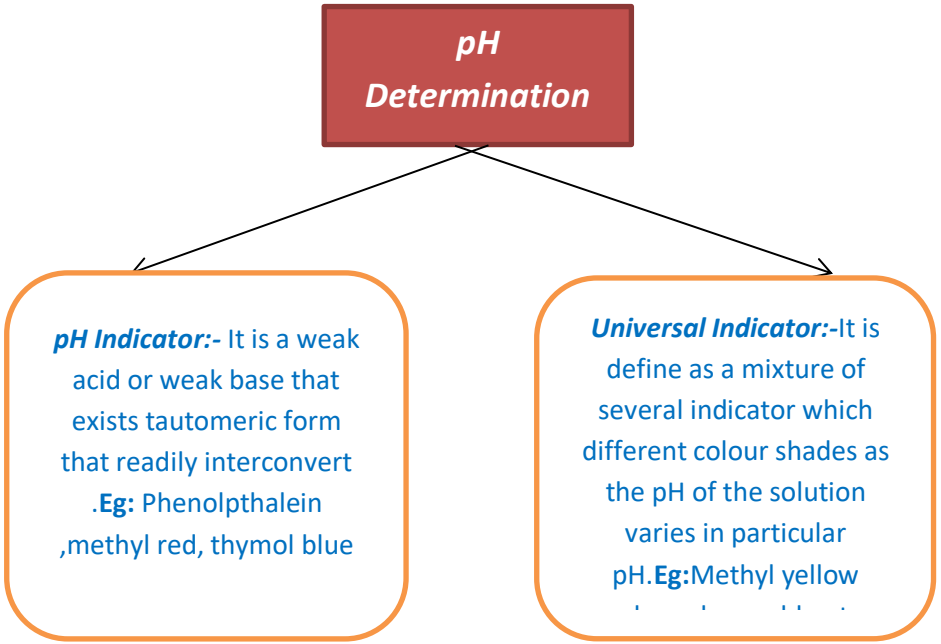
Molecules/litre and moles/litre are the units of concentration for H3O+.

- ***Certain factor allow to guess whether solution is acidic or alkaline :***

1]Acidic Solution:The solution having $[H^+]$ value greater than 10^{-7} are called as acidic solution.

2]Basic Solution[Alkaline solution]: The solution having $[OH^-]$ value less than $10^{-7}$is called as basic solution. Basic have bitter taste.

****pH Determination:-***



A]Colorimetric Method: It is based on principle of colour comparison of the test solution to that of the standard both treated with universal Indicator.

Precautions: Standard solution must be protected from light to avoid colour fading. All tubes have same dimension i.e tube diameter.

Advantages:

1]Less expensive

2] Acid Base reaction of non-aqueous solution can be studied.

3]Easy estimation of pH unless the drug Shows buffer action.

Disadvantages:

1]This method is less accurate and less convenient.

2] It is not useful for coloured or turbid solution.

B]Electrometric Method:Magnitude in potential difference between glass and solution containing hydrogen ion varies with conc. Of H^+conc..Hence the pH of the solution are determined by means of electrodes.

Advantages:

1]It gives an accurate measurement ofpH.

2]Glass electrode is not affected byoxidation, reduction system.

3]The electrode established equilibrium rapidly.
4]Indicator need not required.

Disadvantages:

1]The cost of pH meter is high compared to colorimetric method

2] This method is not suitable for viscous solution and gets because of poor ionic mobility.

- ***Applications:***

1)Enhancing solubility and stability

2) Improving purity

3)Absorbtion pf drug

4)Optimising biological activity

5)Comforting the body

6)Storage of product

•pH scale corresponding hydrogen and Hydroxyl ion :

Sr.No	pH	$[H_3O^+]$(mol/liter)	$[OH^-]$(mol/liter)	Nature
01	0	10^{0}	10^{-14}	
02	1	10^{-1}	10^{-13}	
03	2	10^{-2}	10^{-12}	
04	3	10^{-3}	10^{-11}	**Acidic**
05	4	10^{-4}	10^{-10}	
06	5	10^{-5}	10^{--9}	
07	6	10^{-6}	10^{-8}	
08	7	10^{-7}	10^{-7}	**Neutral**
09	8	10^{-8}	10^{-6}	
10	9	10^{--9}	10^{-5}	
11	10	10^{-10}	10^{-4}	
12	11	10^{-11}	10^{-3}	**Basic**
13	12	10^{-12}	10^{-2}	
14	13	10^{-13}	10^{-1}	
15	14	10^{-14}	10^{0}	

Example -

Strong Acid	HCL,HNO_3
Strong Base	KOH,NaOH
Neutral	NO,CO
Weak Acid	CH3COOH, C_6H_5
Weak Base	NH3,(N(CH3)3)

Prepared By :-

Ms. Pate Pooja Goraksha

Mr. Patel Aliahemad Mahebub

Ms. Patil Saniya Sanjiv

Mentor :- Dr. Devhadrao Nitin

Department:- Pharmaceutics

Subject:- Physical Pharmaceutics I

Class:- S.Y.B-Pharm

Academic Year:- 2021-22