Salts :

Salts are ionic compounds composed of cations and anions held together by ionic bonds, they are solid at room temperature.

Salt is formed by the reaction of an acid and base. Some salts are quite soluble in water. Others are classified as slightly soluble or insoluble.

preparation of Salts :

1- Reaction of metal with no metal.

$Mg + CI_2 \rightarrow MgCI_2$

2- Reaction of acid with the base.

$Ca(OH)_2 + 2HCI \rightarrow CaCI_2 + 2H_2O$

3- Replace of acids hydrogen by metal.

$Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$

4- Exchange of anions between salts.

$NaCI + AgNO_3 \rightarrow AgCI + NaNO_3$

Solubilities of salts in water :

Salts are compounds that release ions when dissolved in water. But not all salts not soluble in water, we can make the following general statement about the solubility's of salts :

1- All salts containing ions of elements of Li^+, Na^+, and K^+ are soluble in water.

2- All salts containing ammonium **ions** NH_4^+ are soluble in water.

3- All salts containing nitrate ions No_3^- and acetate ions $C_2H_3O_2^-$ are soluble in water.

4- All salts containing chloride ions CI^- are soluble in water except the cations are pb^+, Ag^+ and Hg^+.

5- All salts containing sulfate ions $So_4^=$ are soluble in water except when the cations are Ca^{+2+}, Ba^{+2}, Fe^{+3}, Ag^+, Hg^+, and pb^+.

6- All salts containing sulfur **S** are insoluble in water.

Uses of Salts :

1- Salts are necessary for the proper growth and metabolism of the body. Iron salt is necessary for the formation of hemoglobin, iodine salts for the proper functioning of the thyroid gland, calcium and phosphorus salts for the formation of bones and teeth, sodium and potassium salts help regulate the acid-base balance of the body.

2- Many salts regulate the irritability of nerve and muscle cell. Salts regulate the beating of the heart. Salt helps maintain the proper osmotic pressure of the cell.

3- Many salts have specific uses. Barium sulfate ($BaSO_4$) is used for x-ray work and (KBr) is used for IR work.

The following table lists some common salts and specific uses in medicine :

	Chemical name	Formula	Uses
1	Sodium bicarbonate (Baking soda) Calcium carbonate	$NaHCO_3$ $CaCO_3$	Anti acid
2	Sodium sulfate Magnesium sulfate Magnesium carbonate Mercurious chloride	Na_2SO_4 $MgSO_4$ $MgCO_3$ Hg_2CI_2	Cathartic
3	Ammonium chloride	NH_4CI	Diuretic
4	Silver nitrate	$AgNO_3$	Germicide and antiseptic
5	Stannous fluoride Sodium fluoride	SnF_2 NaF	Caries reduction
6	Calcium sulfate	$(CaSO_4)_2.H_2O$	Plaster casts
7	Potassium permanganate	$KMnO_4$	antiseptic
8	Ferrous sulfate	$FeSO_4$	Treatment of anemia
9	Barium sulfate	$BaSO_4$	Gastrointestinal radiographs
10	Zinc sulfate	$ZnSO_4$	Skin condition treatment such as eczema
11	Sodium iodide Potassium iodide	NaI KI	Thyroid treatment
12	Sodium chloride Calcium chloride	NaCI $CaCI_2$	Physiologic saline Decrease of blood clotting time

PH measurement :

By a PH -meter which standardized by placing it is a pair of the special electrode into a solution of known PH. Then the electrodes are placed in a solution of unknown PH and the PH is determined by reading the value on the PH-meter for neutral solutions or pure water PH = 7.

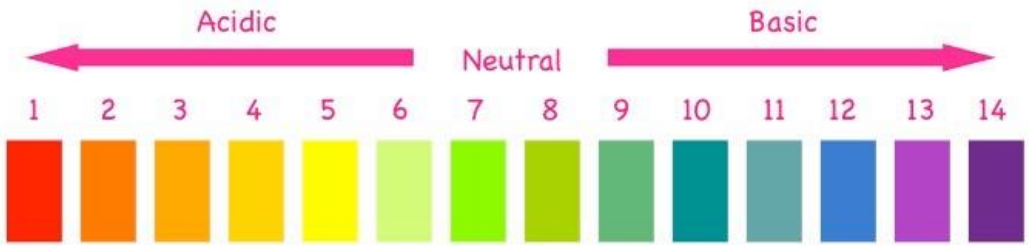
PH the negative logarithm of the molar concentration of hydrogen ion

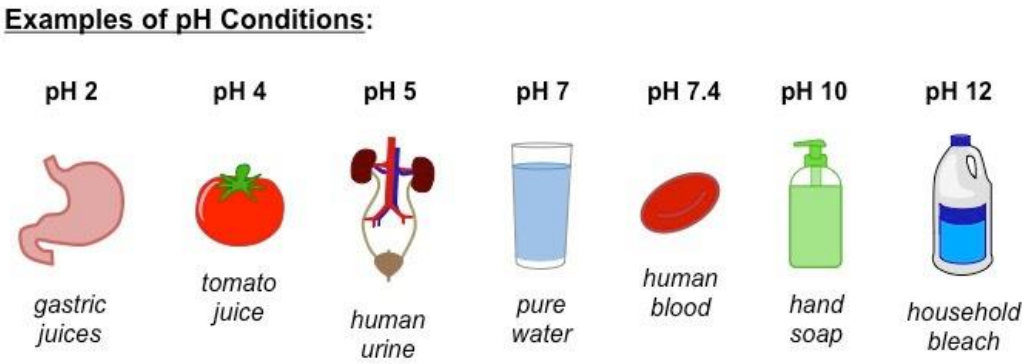
$$\mathbf{PH = -log\,[H^+]}$$

Water dissociated very slightly producing equal concentration of H^+ and OH^-

$$\mathbf{H_2O \leftrightharpoons H^+ + OH^-}$$

At 25 C° the $[H^+] = [OH^-] = 1x\ 10^{-7}$ mole / L and so has PH equal to 7. Addition of an acid which either releases H^+ or absorbs OH^- ions increases the (H^+) and produce PH less than 7. A base which either releases (OH^-) ions or absorbs (H^+) decreases the (H^+) in solution and produces PH greater than 7.





PH is measured using either acid-base indicator or a PH-meter.

A PH-meter measure the potential difference between two electrodes of an electrochemical cell. One is a reference electrode usually a calomel electrode which has a fixed potential. The other is the indicating electrode called the glass electrode and it potentially depends on the hydrogen ion concentration in solution.

pH in the Digestive System :

Mouth-pH around 7 : Saliva contains amylase, an enzyme which begins to break carbohydrates into sugars.

Stomach- pH around 2 : Proteins are broken down into amino acids by the enzyme pepsin.

Small intestine-pH around 8 : Most digestion ends. Small molecules move to bloodstream toward cells that use them.