Preparation of Solutions – Normal solutions

The gramme equivalent of a compound is the number of grammes of the compound which can replace, or is in any way equivalent to 1 gm of hydrogen.
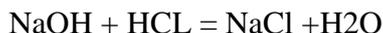
Normal solution of HCL

Relative molecular mass of HCL is 36.5. In 36.5 g of HCL, there is 1gm of replaceable hydrogen. Therefore the equivalent of HCL is 36.5.

Normal solution of H2SO4

The relative mass of Sulphuric acid is 98. In 98 gm of H2SO4, there is 2 gm replaceable hydrogen. In 49 gms of H2SO4, there is 1gm of replaceable hydrogen. Therefore the equivalent of H2SO4 is 49.

Since equivalents of compounds react with one another, the figures obtained above can be used to obtain the equivalents of bases and salts. This is done by working from the equiation for the reaction between the compound needed and one whose equivalent is known.

Consider the equation

NaOH + HCL = NaCl +H2O

40g + 36.5g

40 Gm of NaOH is equivalent to 36.5 gm HCL. Therefore the equivalent of NaOH is 40.

Consider the equation

AgNO3 + HCL = AgCl + HNO3

170GM + 36.5 GM

170 gm of AgNO3 is equivalent to 36.5gm HCL. Therefore the equivalent of AgNO3 is 170.

How to prepare a normal solution?

After calculating the equivalent of the compound, the next step is to determine how many gms of the compound is required for making a given volume of solution of known normality.

4 N NaOH Solution

Required quantity of 4N NaOH	5 Litres	(Equivalent is 40)
Therefore 1 litre of IN NaOH contains	40gm NaOH.	
Therefore 1 litre of 4N NaOH contains	4 x 40 gm NaOH	= 160 gm NaOH.
Therefore 5 litres of 4N NaOH contains	5 x 160gm	= 800 gm NaOH.

So 5 Litres of 4N NaOH solution can be prepared by dissolving 800 gms NaOH in 5 litres of distilled water.