Standard solution-

A solution of known concentration is called standard solution.

Titration;-

The process of adding the solution taken in the burette dropwise to a fixed volume of other solution taken in the conical flask till the endpoint ,is called titration.

End point-

The stage at which the reaction is just completed.

Indicators-

The endpoint is detected with the help of some substance is called indicators. They exhibit a marked colour change at the endpoint.

Acid -base titration

Two type;- **i) Acidimetry-determination of amount of base in a solution by titrating with a standard acid solution.**

ii) Alkalimetry;- determination of amount of acid in a acid solution by titrating against a standard base solution.

pH range of indicators-

orange red to golden yellow.

Indicator	pH Range	Colour	
		Acid Medium	Basic Medium
Phenolphthalene	8.3 - 10	Colourless	Pink
Methyl Orange	3.1 - 4.5	Pink	Yellow
Litmus	4.5 - 8.3	Red	Blue

Choice of indicators in acid -Base titration

- **Titration of strong acid against strong base:-**

  Eg- $HCl/HNO_3/H_2SO_4$ VS NaOH/KOH

  Methyl orange or Phenolphthalein

- **Titration of weak Acid Against Strong Base**

  Eg-Oxalic acid/Acetic acid vs NaOH/KOH

  Phenolphthalein

- **Titration of Strong acid against Weak Base**

  $HCl/HNO_3/H_2SO_4$ vs Na_2CO_3/K_2CO_3

  Methyl orange

- **Titration of Weak acid against weak Base**

  Oxalic acid/Acetic acid vs Na_2CO_3/K_2CO_3

  Titration has no sharp pH change ,none of the indicator cannot be used

Principle of Volumetric analysis;-

N1V1=N2V2

N1=normality of titrant

V1=volume of titrant

N2=normality of titrate

V2=volume of titrate

1. 500ml of a decinormal solution is diluted by adding 300ml of water.what is the normality of resulting solution?

V1=24Ml
N1=?
V2=20ml
N2=0.1N
V1N1=V2N2
Then N1=V2N2/V1
=20*0.1/24
=0.083N
v=400ml
E=49gm
N=0.083N
N=w*1000/E*V
Then w=N*E*V/1000
=0.08*49*400/1000
=1.63gm

w=0.252g
v=200ml
E=45g

N=w*1000/E*V
=0.252*1000/45*200
=0.028N

Calculate the normality of KoH solution containing 1.4g kOH in 700ml?

w=1.4g

V=700ml

E=56gm

N=w1000/EV

=1,4*1000/56*700

=0.0357N

Calculate the pH of o.02M NaOH?

[OH]=0.02M

pOH=-log[OH]

=-log[0.02]

=1.69

pH+pOH=pKw=14

So pH=14-pOH

=14-1.69

=12.30