Preparation of 250 ml. standard decinormal (N/10 or 0.1N) solution of Na₂CO₃

Mol.wt. of $Na_2CO_3 =$ Volume marker 106 (calibration mark) Eqvt. wt.of $Na_2CO_3 =$ Weighed amount 106/2 = 53of solute Now, $w = \frac{NEV}{1000} =$ (c) FIGURE 4.10 Steps involved in the preparation of a standard aqueous solution (the solute) into the volumetric flask, and add a small (ta) the by gently swirling the flask (*with the same are prepare*) to Add m a weighed amount of a substance $\frac{0.1 x 53 x 250}{1000} = 1.325 \text{ g}.$ vater. (b) Dissolve the solid in the water Add more water (with gentle swirling) until the and on the neck of the flask. Then mix the solution Some AR (analytical reason grade antodrous Sodium carbonne is dried in a electric oven at 260 to C for a 200 and cooled in a desiccator. About 1.325 g. of sodium carbonate is weighed out and

transferred in a 250 ml. volumetric flask containing little water. It is dissolved in water and the volume is made up to the mark. The flask is well shaken to make the solution homogeneous.

Concentration of solution = $\frac{N}{10}$ if exactly 1.325 g.is taken. If 1.320 g. is taken, the concentration of solution = $\frac{N}{10}$ (f=0.996). 3. When acid and alkali neutralize each other exactly then the following relation must hold good.

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V<sub>1</sub>S<sub>1</sub> = V<sub>2</sub>S<sub>2</sub> OR V<sub>a</sub>S<sub>a</sub> = V<sub>b</sub>S<sub>b</sub>
Where, V<sub>1</sub> = vol. of acid
S<sub>1</sub> = normality of acid
V<sub>2</sub> = vol. of alkali
S<sub>2</sub> = normality of alkali
The above equation can also be written as,
N<sub>1</sub>V<sub>1</sub> = N<sub>2</sub>V<sub>2</sub> OR N<sub>a</sub>V<sub>a</sub> = N<sub>b</sub>V<sub>b</sub>
Where, N<sub>1</sub> = normality of acid
V<sub>1</sub> = vol. of acid
N<sub>2</sub> = normality of alkali
V<sub>2</sub> = vol. of alkali
V<sub>2</sub> = vol. of alkali
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Thoughthe principles e explained with the reference
of acid and alkali, they are applicable to all substances
reacted.
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Derivation of normality equation $(N_1 V_1 = N_2 V_2)$

From the law of equivalent, at the equivalence point No. of g. eqvt. Of substance A = No. of g. eqvt. Of substance B.....eq (I) From the definition of normality,

Apparatus used in titration:



- i) Equivalence point: It is the point at which equivalent quantity of titrant is added to titrand or vice versa. It is the theoretical end point.
- j) Titration error: The difference between end point and equivalence point is titration error.

Note: In ideal titration, the end point and equivalence point are always same and titration error is zero

Different types of titration

- There are four types of titrationtesale.co.uk 1. Acid-base titration 1. Acid-base titration in the attration at the second seco
- 3. Precipitation titration
- 4. Complexometric titration

1. Acid –base titration:

Titrations in which acid base reactions occur are called acid-base titrations. In this type of titrations we find the concentration of acid or base i.e. it is either acidimetry or alkalimetry. E.g. titration of NaOH vs HCl

 $NaOH + HCI \rightarrow NaCI + H_2O$

We have.

G.eqvt. of mixture = g.eqvt. Of HCl + g.eqvt. Of H_2SO_4 g.eqvt of NaOH

Or, $(N V)_m = (N V)_{HCl} + (N V)_{H2SO4} - (\frac{\text{given wt.}}{\text{eqvt. wt.}})_{NaOH}$ Or, N x $\frac{150}{1000} = \frac{1}{10} \times \frac{50}{1000} + \frac{1}{10} \times \frac{100}{1000} - \frac{1}{40}$ Or, 0.15N = 0.005 +0.01 - 0.025 Or, $N_m = -0.01/0.15 = -0.066$ (- sign indicates solⁿ is alkaline.)

Therefore, the mixture is alkaline with normality 0.066. **Otesale**. **Otesale** ure neutralized concentration of

Solution

Here, mass of ammonia is calculated from ideal gas equation.

PV = nRT

Or, 0.9 x 2 = n x 0.0821 x 303

Or, n = 0.07236

Mass of ammonia = $n \times mol.wt$.

= 0.07236 x 17 = 1.23 g.

Now, g. eq. of NH_3 = g. eq. of H_2SO_4