

# Preparation and Standardization of 1 N HCl Solution

## □ preparation of 100 mL of 1 N HCl solution

Dilute 9 mL of HCl with distilled water to a final volume of 100 mL using a 100 mL- volumetric flask.

$$N_1 \times V_1 = N_2 \times V_2$$

**$N_1$** : the normality of concentrated HCl used

**$V_1$** : the volume of concentrated HCl to be used for dilution

**$N_2$** : the requested normality of HCl (1 N in our experiment)

**$V_2$** : final volume after dilution (100 mL in our experiment)

# Preparation and Standardization of 1 *N* HCl Solution

$$N = \frac{\% * sp. gr. * 1000}{eq. wt.}$$

***N*** :the normality of the concentrated acid

**%** : the weight by weight concentration of the acid

***sp. gr.*** : the specific gravity of the acid

***eq. wt.*** :the equivalent weight of the acid

# Preparation and Standardization of 1 N HCl Solution

## □ standardization



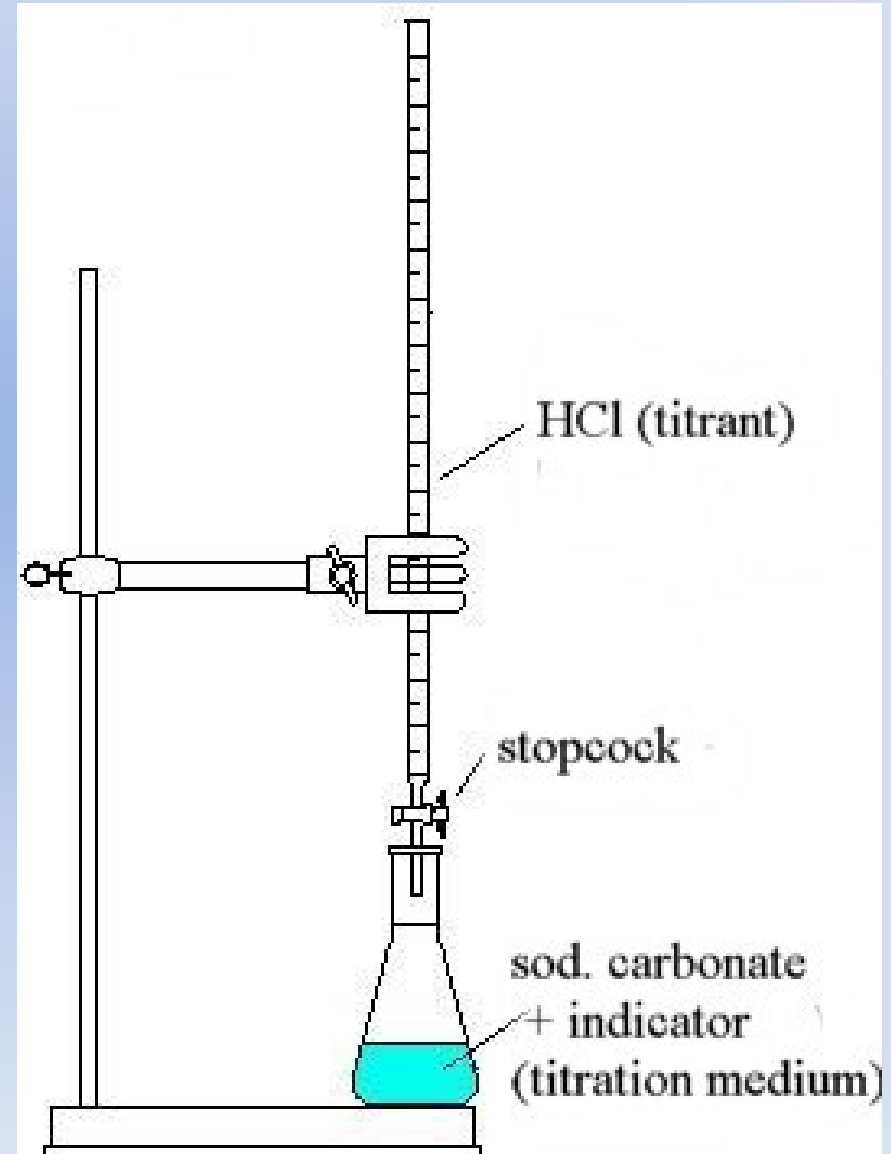
- anhydrous sodium carbonate is used as the primary standard
- methyl red is used as the indicator

*yellow*  $\longrightarrow$  *faint pink*

**pH = 6** **4.4**

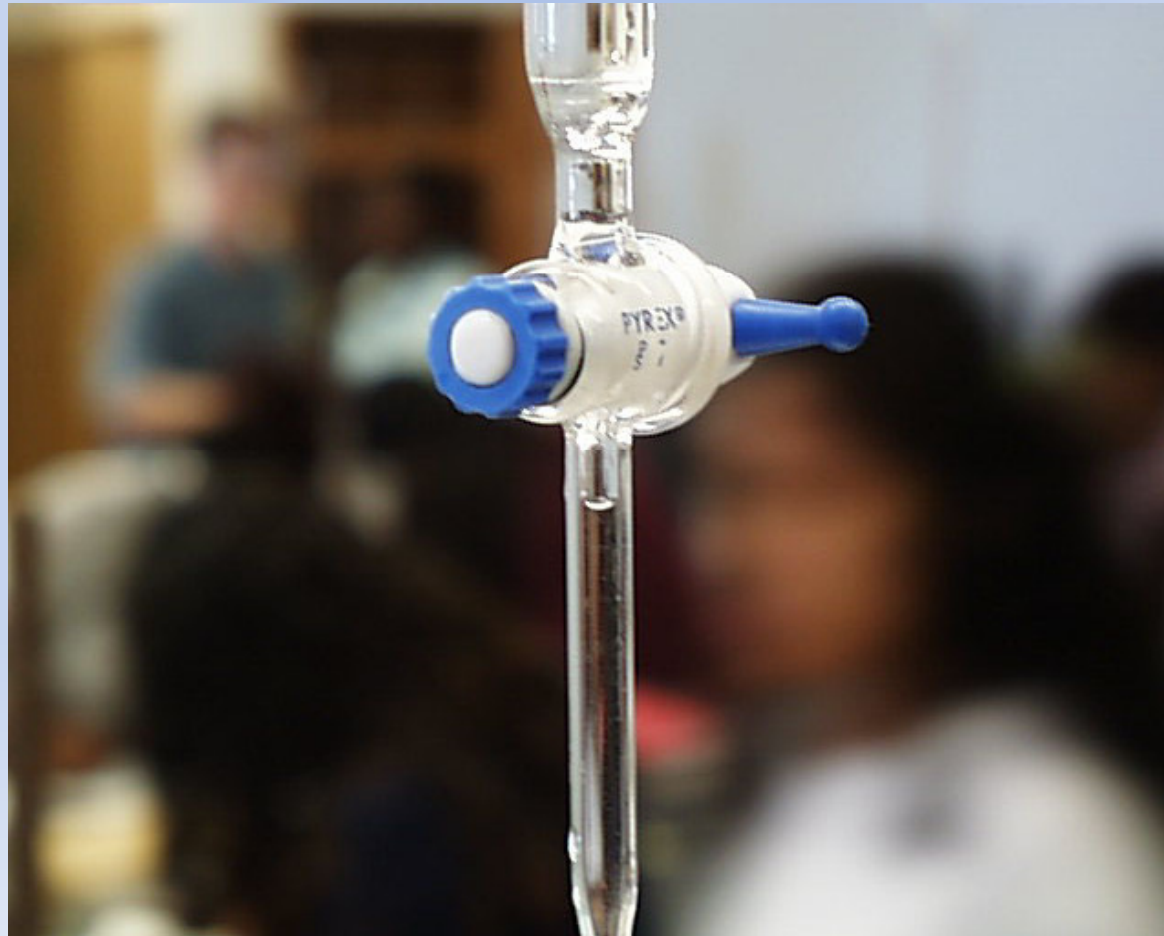
# Preparation and Standardization of 1 N HCl Solution

## □ titration apparatus



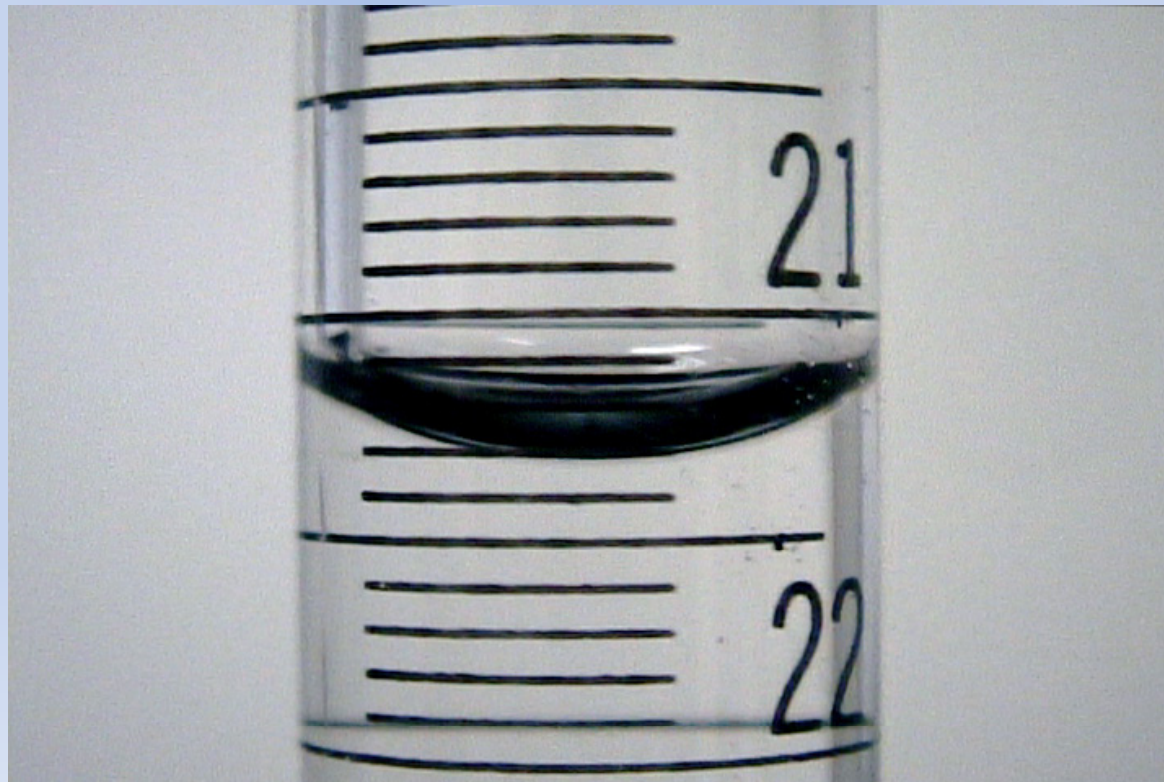
# Preparation and Standardization of 1 N HCl Solution

## burette adjustment



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# Preparation and Standardization of 1 N HCl Solution

## □ procedure

- wash the burette with the D. W. and the titrant (HCl)
- fill the burette with HCl to a level (adjust it)
- dissolve the primary standard ( $\text{Na}_2\text{CO}_3$ ) in enough D. W. (100 mL) using the conical flask
- add 2 drops of methyl red
- start titration by adding HCl drop wise with continuous stirring until the solution becomes faint pink
- heat the solution to boiling so that the colour changes back into yellow, cool, and titrate again until the faint pink colour is no longer affected by boiling
- record the volume of HCl used and calculate the normality

# Preparation and Standardization of 1 N HCl Solution

## □ procedure



end point  
(faint pink)



# Preparation and Standardization of 1 *N* HCl Solution

## □ calculations

$$\underbrace{\text{HCl}}_{N \times V} = \frac{\underbrace{\text{Na}_2\text{CO}_3}_{wt.}}{eq. wt.} \times 1000$$

***N***: the normality of HCl to be calculated

***V***: the volume of HCl used (in mL)

***wt.*** : the weight of sodium carbonate (in g)

***eq. wt.*** : the equivalent weight of sodium carbonate