

Preparation and Standardization of 1 N HCl Solution

$$N = \frac{\overset{35\%= 0.35}{\%} * \overset{1.18}{sp. gr.} * 1000}{\underset{36.5}{eq. wt.}}$$

$$N=11.315$$

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

□ 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.

$$\begin{array}{ccccccc} N_1 & \times & V_1 & = & N_2 & \times & V_2 \\ \uparrow & & & & \uparrow & & \uparrow \\ 11.315 & & ? & & 1 & & 100 \end{array}$$

$$V_1 = 8.837 \text{ mL}$$

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

□ standardization



➤ anhydrous sodium carbonate is used as the primary standard

➤ methyl red is used as the indicator

yellow $\longrightarrow$ *faint pink*

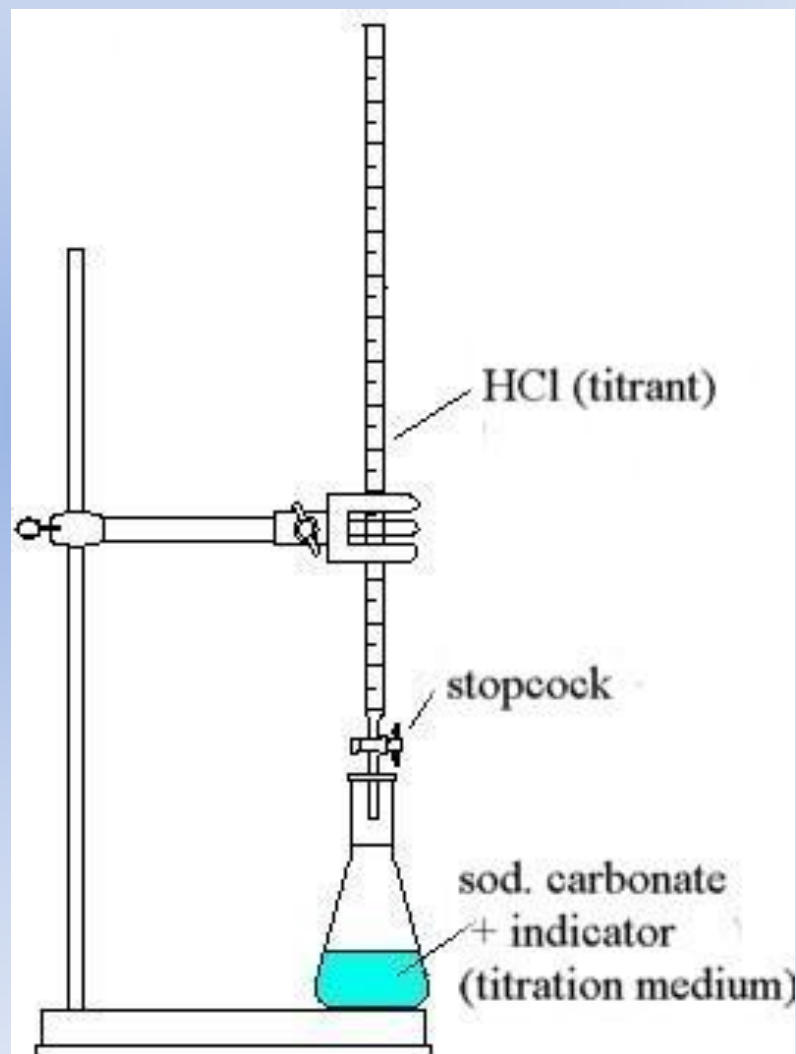
$\text{pH} = 6$

4.4



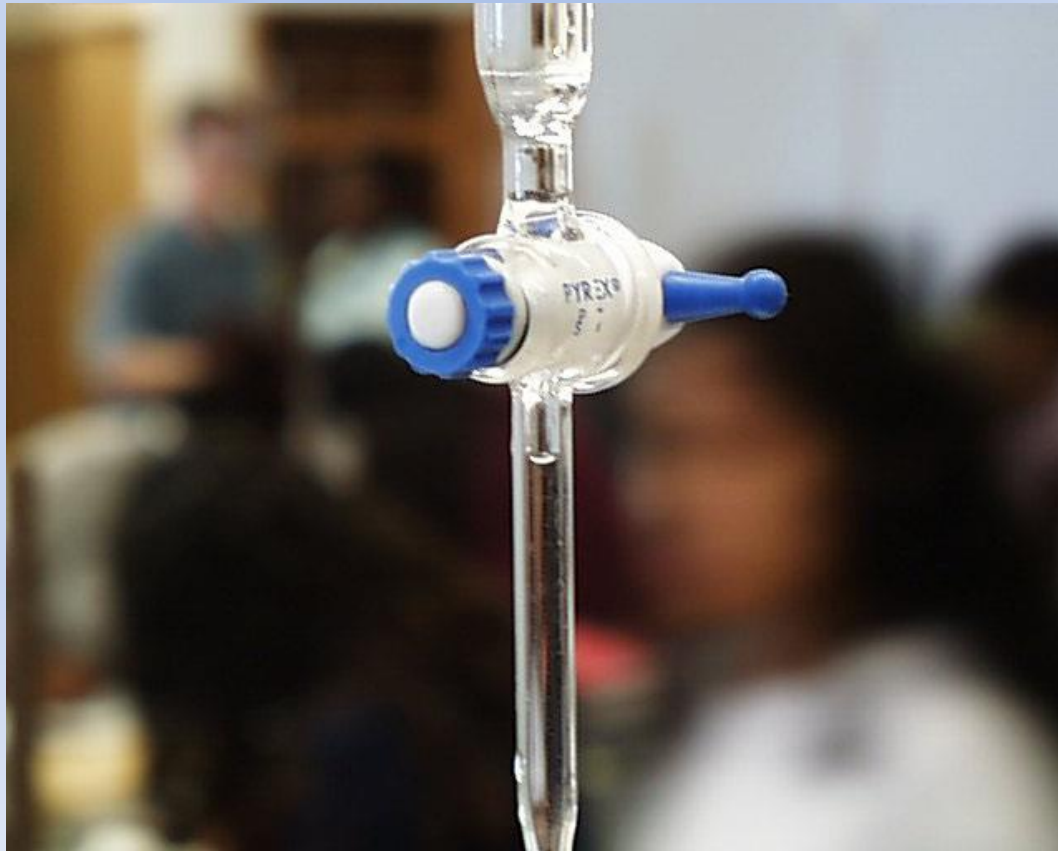
Preparation and Standardization of 1 N HCl Solution

□ titration apparatus



Preparation and Standardization of 1 N HCl Solution

□ burette adjustment



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☐ burette adjustment



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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 (Na_2CO_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



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□ procedure



end point
(faint pink)



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□ calculations

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

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



