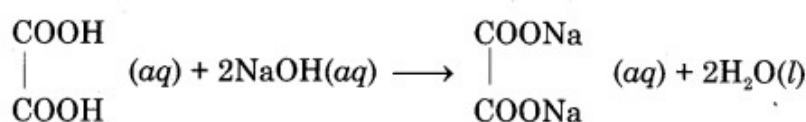


# Determine the strength of the given sodium hydroxide solution. You are provided with $\frac{M}{20}$ oxalic acid solution.

## Theory

Here, the sodium hydroxide solution is taken in burette and a known volume (20.0 ml) of the oxalic acid solution is taken in the titration flask. The titration is carried out using phenolphthalein as indicator.

### Chemical Equation :



**Indicator.** Phenolphthalein.

**End Point.** Colourless to pink (Alkali in burette)

1. Take a burette and wash it with water.
2. Rinse and then fill the burette with the given sodium hydroxide solution. Clamp it vertically in burette stand.
3. Rinse the pipette with the given oxalic acid solution.
4. Pipette out 20 ml of the oxalic acid solution in a washed titration flask.
5. Add 1-2 drops of phenolphthalein indicator into it and place it just below the nozzle of the burette over a white glazed tile.
6. Note down the lower meniscus of the solution in the burette and record it as the initial burette reading.
7. Now run the sodium hydroxide solution slowly and dropwise into the flask till a very faint permanent pink colour is just obtained. Read the lower meniscus of the solution again in the burette and record it as final burette reading.
8. Repeat the procedure until three concordant readings are obtained.

## Observations

Molarity of the given oxalic acid solution =  $\frac{M}{20}$

Volume of oxalic acid solution taken for each titration = 20 ml ( $V_1$ ).

S.No.	Initial reading of the burette	Final reading of the burette	Volume of the sodium hydroxide solution used
1.	—	—	— ml
2.	—	—	— ml
3.	—	—	— ml
4.	—	—	— ml

Concordant volume = x ml (say)

## Calculations

According to the equation, one mole of oxalic acid reacts with two moles of sodium hydroxide.

$$\therefore \frac{V_{\text{oxalic acid}} \times M_{\text{oxalic acid}}}{V_{\text{NaOH}} \times M_{\text{NaOH}}} = \frac{\text{No. of moles of oxalic acid in the balanced equation}}{\text{No. of moles of NaOH in the balanced equation}}$$

Molarity of the given oxalic acid solution =  $\frac{M}{20}$

$$\frac{20.0}{x} \times \frac{1}{20} = \frac{1}{2} M_{\text{NaOH}} = \frac{2}{x} \text{ mol L}^{-1}$$

**Strength of NaOH = Molarity x Molar mass**

$$= \frac{2}{x} \times 40 = \frac{80}{x} \text{ g L}^{-1}$$

## Result

The strength of the given sodium hydroxide solution is  $\frac{80}{x} \text{ g L}^{-1}$