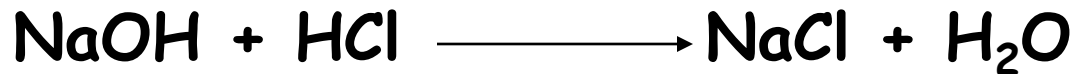# Determination
of
HCl sample

1- Principle

HCl

Directly determined, by titration with 0.1 N NaOH using any indicator ?

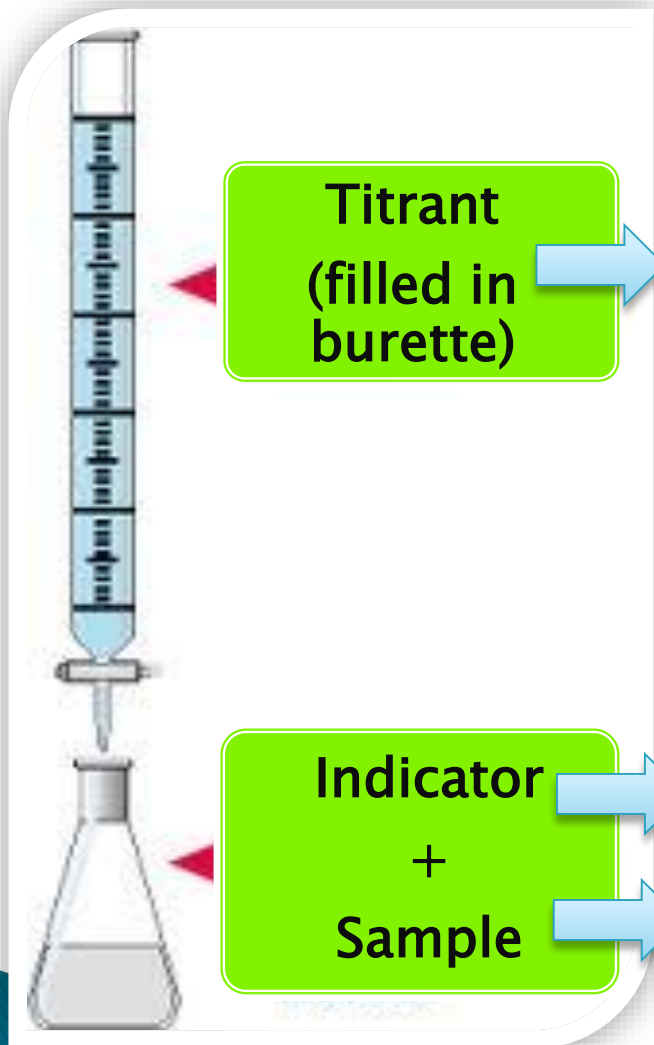End point: Ph.Ph. colorless → Pink (PH range 8–10)

M.O Red → Orange (PH range 3.3.–4.2)

NaOH + HCl ⟶ NaCl + H$_2$O

↳ pH= 7
Neutral

2- Procedure

In a conical flask

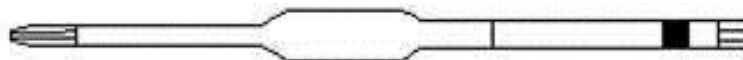**Titrant (filled in burette)** → **0.1 N NaOH**

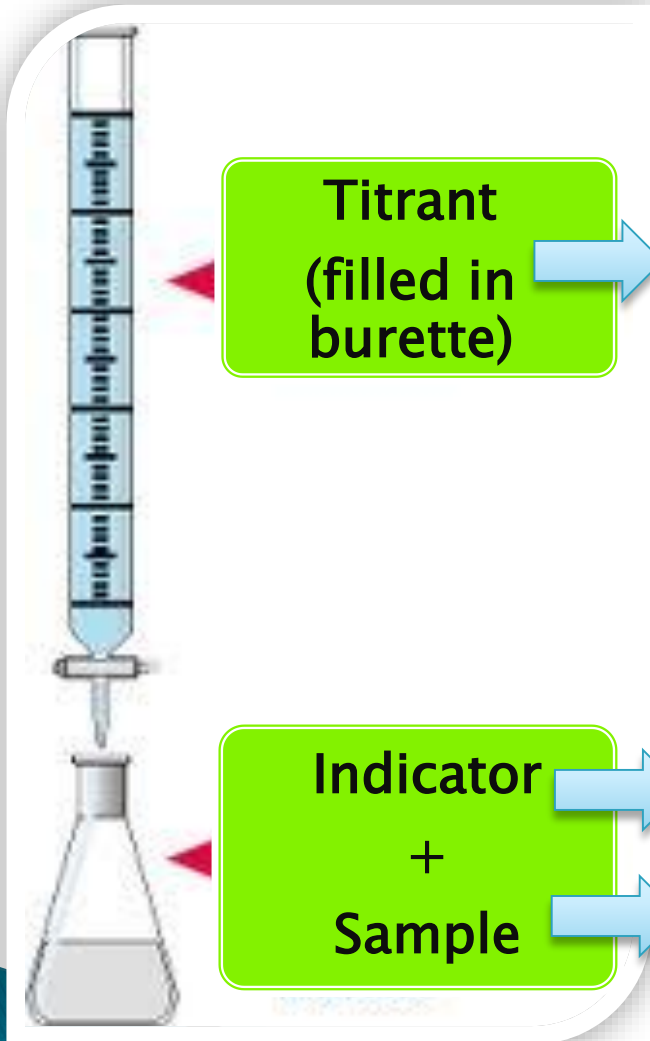**End Point: First persistent pink**

Record reading of the burette

Indicator + Sample → **Add 10 drops Ph.Ph.**

→ **Add 10 ml HCl sample (by bulb pipette)**

In a conical flask

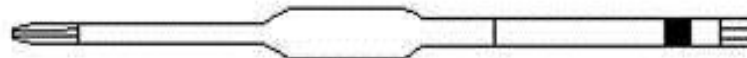**Titrant (filled in burette)** → **0.1 N NaOH**

End Point: Orange

Record reading of the burette

Indicator + Sample → **Add 2 drops M.O.**

Add 10 ml HCl sample (by bulb pipette)

3. Calculation

$1ml\ standard \equiv ??\ g\ sample$

$$1mL \quad 0.1 \quad N \quad NaOH \equiv F \quad g\ HCl$$

Equivalent Factor

Balanced equation $1\ NaOH + 1\ HCl \rightarrow NaCl + H_2O$

Std (left) ≡ Sample(right)

$1\ mole\ NaOH \equiv 1\ mole\ HCl$

$1L\ 1M\ NaOH \equiv Mwt.HCl$

$1L\ \dfrac{1M}{1}\ NaOH \equiv \dfrac{Mwt.}{1}HCl$

$1L\ 1N\ NaOH \equiv \dfrac{Mwt.}{1}\ HCl$

$1L\ \ 0.1N\ NaOH \equiv \dfrac{Mwt.}{1\times10}\ HCl$

$1ml\ 0.1N\ NaOH \equiv \dfrac{Mwt.}{1\times10\times1000}\ HCl$

$1M = \dfrac{1\ mole}{1L} \quad\Rightarrow\quad 1\ mole = 1L\ 1M$

$N = \dfrac{Equivalent\ weight}{L}$

$N = \dfrac{M}{no.of\ OH^-}$

Divide both sides by 10

Divide both sides by 1000

$$\mathbf{F} = \dfrac{36.5}{1\times10\times1000} = 0.00365\ g$$

$$\text{Conc. of HCl} = \frac{\text{mls} \times \text{f} \times \text{F} \times 1000}{10} = \qquad \text{g/L}$$
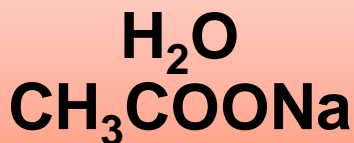
Determination
of
Acetic acid sample

1 –Principle

- CH$_3$COOH is Weak acid which is directly titrated against NaOH

weak acid ≠ strong base

- <u>At the end point, the following are present</u>
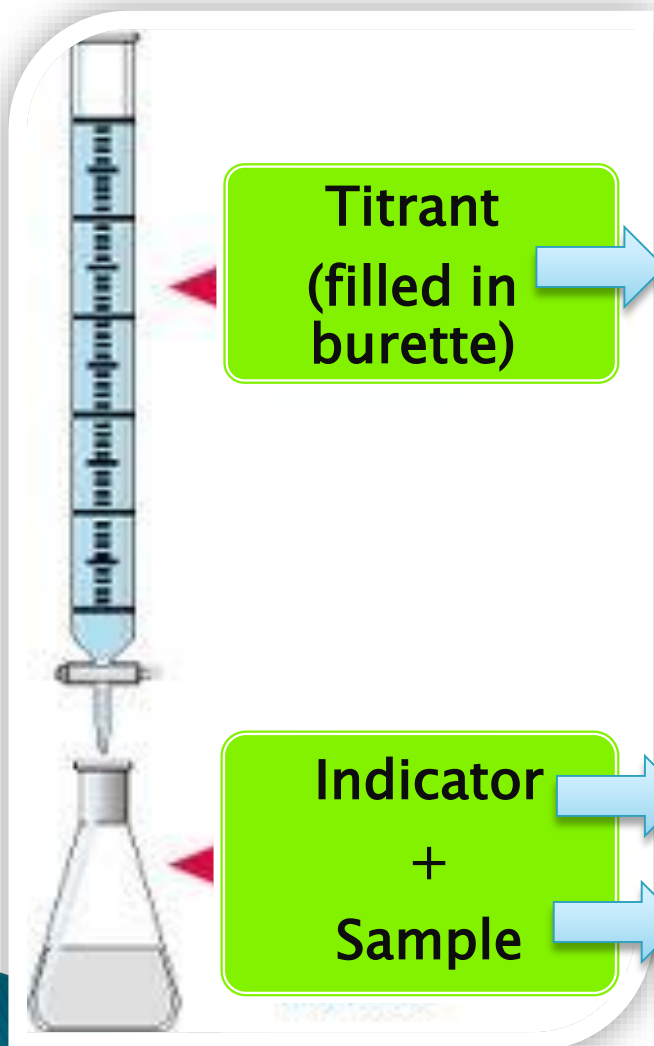
H$_2$O
CH$_3$COONa

PH is Slightly Alkaline

ph.ph. indicator

2- Procedure

In a conical flask

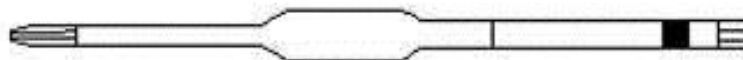**Titrant (filled in burette)** → **0.1 N NaOH**

End Point: First persistent pink

Record reading of the burette

Indicator + Sample → **Add 10 drops Ph.Ph.**

→ **Add 10 ml Acetic acid sample (by bulb pipette)**

3- Calculation

$$1ml\ standard \equiv ??\ g\ sample$$

Balanced equation $1\ NaOH + 1\ CH_3COOH \rightarrow CH_3COONa + H_2O$

$$Std\ (left) \equiv Sample\ (right)$$

$$1\ mole\ NaOH \equiv 1\ mole\ CH_3COOH$$

$$1L\ \ 1M\ NaOH \equiv Mwt.\ CH_3COOH$$

$$1L\ \ \frac{1M}{1}\ NaOH \equiv Mwt.\ CH_3COOH$$

$$1L\ \ 1N\ NaOH \equiv \frac{Mwt.\ CH_3COOH}{1}$$

$$1L\ \ 0.1N\ NaOH \equiv \frac{Mwt.\ CH_3COOH}{1 \times 10}$$

$$1ml\ \ 0.1N\ NaOH \equiv \frac{Mwt.\ CH_3COOH}{1 \times 10 \times 1000}$$

$$1M = 1\ mole/1L$$

$$N = Equivalent\ weight/L$$

Divide both sides by 10

Divide both sides by 1000

$$F = \frac{60}{1 \times 10 \times 1000} = 0.006\ g$$

$$\text{Conc. of acetic acid} = \frac{\text{mls} \times \text{f} \times \text{F} \times 1000}{10} = \quad \text{g/L}$$

Thank You