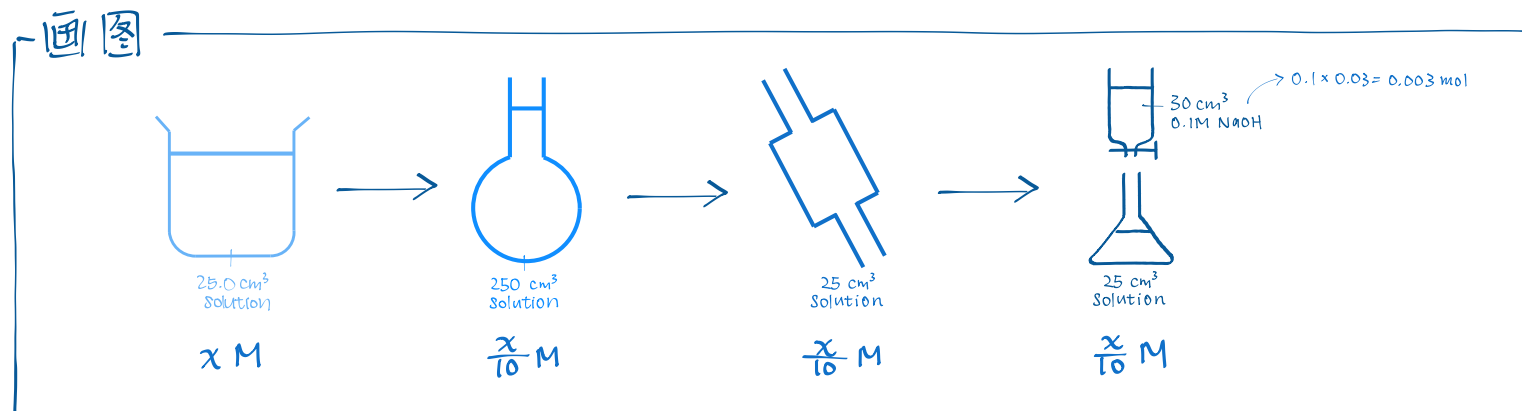


# Titration (calculations)

## I Questions

### LEVEL I

25.0 cm<sup>3</sup> CH<sub>3</sub>COOH is withdrawn to 250.0 cm<sup>3</sup> v-flask.  
Sol. in v-flask is withdrawn by 25.0 cm<sup>3</sup> pipette to conical flask, and titrated against 0.1M NaOH. 30 cm<sup>3</sup> NaOH is needed for complete reaction.  
Find stock CH<sub>3</sub>COOH concentration.



算数

$$\text{CH}_3\text{COOH } n : \text{NaOH } n = 1 : 1 = n : 0.003$$

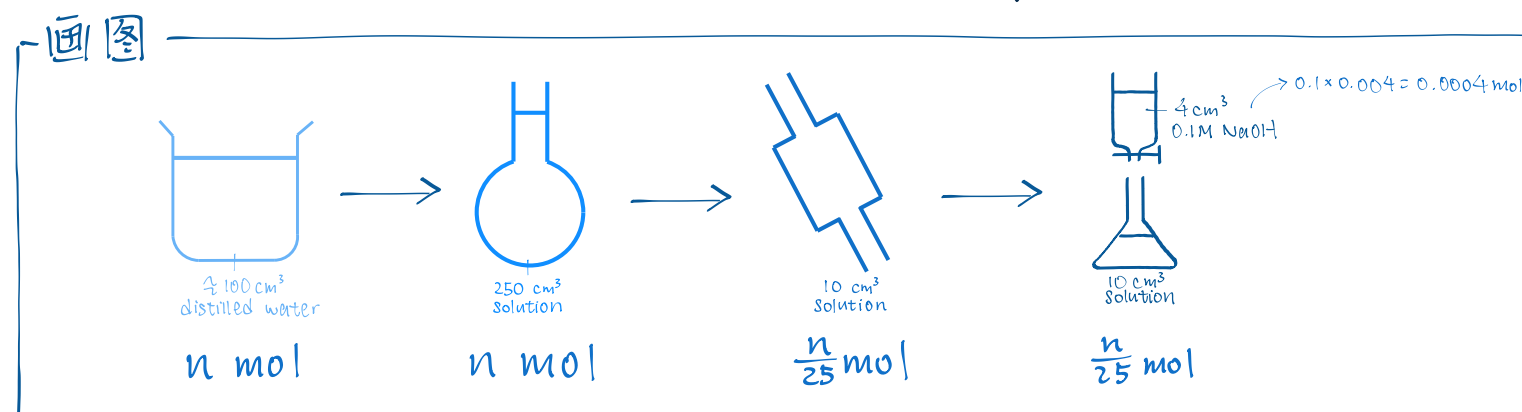
$$n = 0.003 \quad \text{CH}_3\text{COOH used in titration}$$

$$\frac{x}{10} = \frac{0.003}{0.025}$$

$$x = 1.2 \text{ mol dm}^{-3}$$

### LEVEL II

0.6g monobasic acid is dissolved completely in a beaker w/ 100 cm<sup>3</sup> distilled water.  
The sol. in beaker is then poured into 250.0 cm<sup>3</sup> v-flask. Distilled water is added until the graduation mark is reached. 10.0 cm<sup>3</sup> of solution in v-flask is pipetted into conical flask. 4 cm<sup>3</sup> 0.1M NaOH is required for complete reaction. Find acid Mr.



算数

$$\text{acid } n : \text{NaOH } n = 1 : 1 = \frac{n}{25} : 0.0004$$

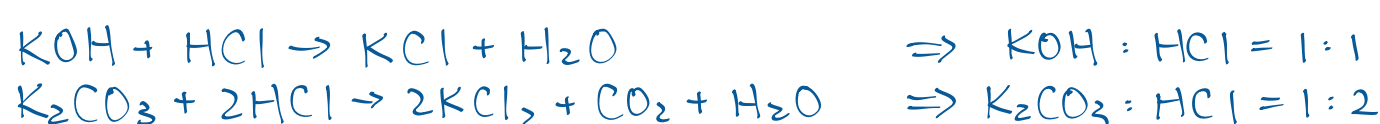
$$n = 0.01$$

$$\frac{0.6g}{Mr} = 0.01$$

$$Mr = 60.0 \text{ g mol}^{-1}$$

### LEVEL III

0.75g of solid mixture (KOH & K<sub>2</sub>CO<sub>3</sub>) is dissolved in distilled water completely. It is titrated against 0.1M HCl aq. An average of 120 cm<sup>3</sup> HCl is used. Find KOH % by mass.



Let x g be KOH mass, (0.75-x)g be K<sub>2</sub>CO<sub>3</sub> mass.

$$\text{HCl in KOH rx} + \text{HCl in K}_2\text{CO}_3 \text{ rx} = 0.1 \times 0.12$$

$$\frac{x}{39.1 + 16 + 1} + \frac{0.75 - x}{39.1 \times 2 + 12 + 16 \times 3} \cdot 2 = 0.012$$

$$\frac{x}{56.1} + \frac{0.75 - x}{69.1} = 0.012$$

$$\frac{69.1x}{3876.51} + \frac{42.075 - 56.1x}{3876.51} = 0.012$$

$$13x = 46.51812 - 42.075$$

$$x = 0.342$$

$$\text{KOH \% by mass} = \frac{0.342}{0.75} \cdot 100\% = 45.6\%$$