

SERIES 9 EXAMS

233/3

CHEMISTRY

PAPER 3

PRACTICAAL

MARKING SCHEME

TABLE 1

Experiment number	I	II	III
Final burette reading (cm ³)	13.0	25.9	38.7
Initial burette reading (cm ³)	0.0	13.0	25.9
Volume of solution B used (cm ³)	13.0	12.9	12.8

Complete table	1
Decimal place	1
Accuracy (tied to school value	1
Arithmetic (correct)	1

(a) Average volume of solution B used

$$\frac{13.0 + 12.9 + 12.8}{3} \sqrt{\frac{1}{2}} = 12.9\text{cm}^3 \sqrt{\frac{1}{2}}$$

(b) Molarity of solution A

$$\text{Molarity} = \frac{\text{mass}}{\text{RMM}} \div \text{litre} = \frac{4.0}{40} = 0.1\text{M} \sqrt{\frac{1}{2}}$$

(c) Molarity of solution B



Mole ratio 1 : 1

$$\begin{aligned} \text{Moles of NaOH} &= 0.1 \times \frac{25}{1000} \sqrt{\frac{1}{2}} \\ &= 0.0025 \text{ moles} \sqrt{\frac{1}{2}} \end{aligned}$$

Moles of HCl = moles of NaOH = 0.0025 moles

$$\begin{aligned} \text{Molarity of HCl} &= \frac{0.0025 \times 1,000}{12.9} \sqrt{\frac{1}{2}} \\ &= 0.19379\text{M} \sqrt{\frac{1}{2}} \end{aligned}$$

TABLE 2

Experiment number	I	II	III
Final burette reading (cm ³)	5.0	10.0	15.0
Initial burette reading (cm ³)	0.0	5.0	10.0
Volume of solution B used (cm ³)	5.0	5.0	5.0

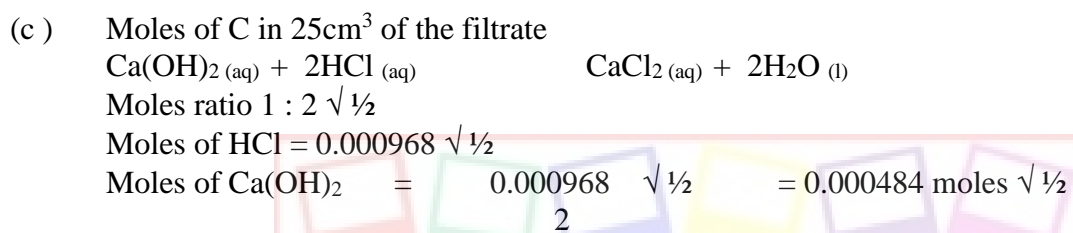
Complete table	1
Accuracy (tied to school value)	1
Decimal place	1
Arithmetic	1

(a) Average volume of solution B used

$$\frac{5.0 + 5.0 + 5.0}{3} \sqrt{\frac{1}{2}} = 5.0 \text{cm}^3 \sqrt{\frac{1}{2}}$$

(b) Moles of solution B used
 Moles = $M \times \frac{V}{1000}$

$$= 0.19379 \times \frac{5.0 \sqrt{\frac{1}{2}}}{1000} = 0.0096895 \sqrt{\frac{1}{2}} \text{ moles}$$



(d) Moles in 100cm³

$$\frac{0.000484 \text{ moles}}{25 \text{cm}^3} = \frac{?}{100 \text{cm}^3}$$

$$\frac{0.00484 \times 100 \sqrt{\frac{1}{2}}}{5} = 0.00968 \text{ moles } \sqrt{\frac{1}{2}}$$

(e) R.F.M $\text{Ca(OH)}_2 = 40 + 32 + 2 = 74$
 Moles in 100cm³ = 0.00968
 1 mole 74g
 0.00968 moles ?

$$\frac{0.00968 \times 74 \sqrt{\frac{1}{2}}}{1} = 0.71632 \text{g } \sqrt{\frac{1}{2}}$$

$$0.71632 \times 1 \text{ g/cm}^3 \sqrt{\frac{1}{2}} \quad 0.71632 \text{ cm}^3 \sqrt{\frac{1}{2}}$$

 Solubility = 0.71632g / 100g of water

	Observation	Inference
2 (a)	- Colourless liquid formed on cooler part of the test-tube $\checkmark \frac{1}{2}$ - White residue or solid is left $\checkmark \frac{1}{2}$ (1 mark)	Hydrated salt $\checkmark 1$ (1 mark) NB: Reject Tiny droplets or moisture or vapour or water condensed or colourless liquid condensed.
(b)	Colourless filtrate $\checkmark \frac{1}{2}$ White residue $\checkmark \frac{1}{2}$ (1 mark)	Compound is sparingly soluble $\checkmark 1$ NB: Accept absence of coloured ions (1 mark)
(c)	Solution turns pink from colourless $\checkmark \frac{1}{2}$ (1 mark)	OH^- , HCO_3^- or CO_3^{2-} present All 3- 1 mark Only 2 – $\frac{1}{2}$ mark Only 1 – 0 mark NB: Accept basic for $\frac{1}{2}$ mark
(d)	No effervescence $\checkmark \frac{1}{2}$ (1 mark)	OH^- present or CO_3^{2-} or HCO_3^- absent (1 mark)
(e)	White precipitate $\checkmark 1$ (1 mark)	Ca^{2+} or Ba^{2+} ions present Accept Ca^{2+} only $\frac{1}{2}$ Ba^{2+} only $\frac{1}{2}$ (1 mark)
(f)	No white precipitate $\checkmark 1$ (1 mark)	Ba^{2+} or Ca^{2+} ions present (1 mark)
3(a)	Colourless gas $\checkmark \frac{1}{2}$; turns red litmus paper to blue $\checkmark \frac{1}{2}$ (1 mark)	Basic gas or ammonium ions present $\checkmark 1$ (1 mark)
(b)	Pale green precipitate $\checkmark \frac{1}{2}$; Insoluble in excess $\checkmark \frac{1}{2}$ (1 mark)	Fe^{2+} present $\checkmark 1$ (1 mark)
(c)	Pale green precipitate $\checkmark \frac{1}{2}$ Insoluble in excess $\checkmark \frac{1}{2}$ (1 mark)	Fe^{2+} present $\checkmark 1$ (1 mark)
(d)	Pale green solution. Turns to brown orange \checkmark	Fe^{2+} confirmed \checkmark
(e)	White precipitate $\checkmark 1$ (1 mark)	SO_4^{2-} present $\checkmark 1$ (1 mark)

