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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

$$\frac{13.0 + 12.9 + 12.8}{3} \surd ½ = 12.9cm^3 \surd ½$$

(b) Molarity of solution A

$$\text{Molarity} = \frac{\text{mass / litre}}{\text{RMM}} = \frac{4.0}{40} = 0.1M \surd 1$$

(c) Molarity of solution B

$HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$

Mole ratio 1 : 1

Moles of NaOH $= 0.1 \times {}^{25}/_{1000} \surd ½$

$= 0.0025$ moles $\surd ½$

Moles of HCl = moles of NaOH = 0.0025 moles

Molarity of HCl $= \frac{0.0025 \times 1,000}{12.9} \surd ½$

$= 0.19379M \surd ½$

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

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

(a) Average volume of ssolution B used

$\frac{5.0 + 5.0 + 5.0}{3}$ √ ½ = $5.0cm^3$ √ ½

(b) Moles of solution B used

Moles = $M \times \frac{V}{1000}$

= $0.19379 \times \frac{5.0}{1000}$ √ ½ = 0.0096895 √ ½ moles

(c) Moles of C in $25cm^3$ of the filtrate

$Ca(OH)_{2\,(aq)} + 2HCl_{\,(aq)} \rightarrow CaCl_{2\,(aq)} + 2H_2O_{\,(l)}$

Moles ratio 1 : 2 √ ½

Moles of HCl = 0.000968 √ ½

Moles of $Ca(OH)_2$ = $\frac{0.000968}{2}$ √ ½ = 0.000484 moles √ ½

(d) Moles in $100cm^3$

0.000484 moles	$5.0cm^3$
?	$100cm^3$

$\frac{0.00484 \times 100}{5}$ √ ½ = 0.00968 moles √ ½

(e) R.F.M $Ca(OH)_2$ = 40 + 32 + 2 = 74

Moles in $100cm^3$ = 0.00968

1 mole	74g
0.00968 moles	?

$\frac{0.00968 \times 74}{1}$ √ ½ = 0.71632g √ ½

0.71632 x 1 g/cm^3 √ ½ 0.71632 cm^3 √ ½

Solubility = 0.71632g / 100g of water

2

	Observation	Inference
2 (a)	- Colourless liquid formed on cooler part of the test-tube √ ½ - White residue or solid is left √ ½ (1 mark)	Hydrated salt √1 (1 mark) NB: Reject Tiny droplets or moisture or vapour or water condensed or colourless liquid condensed.
(b)	Colourless filtrate √ ½ White residue √ ½ (1 mark)	Compound is sparingly soluble √1 NB: Accept absence of coloured ions (1 mark)
(c)	Solution turns pink from colourless √ ½ (1 mark)	OH^-, HCO_3^- or co_3^{2-} present All 3- 1 mark Only 2 – ½ mark Only 1 – 0 mark NB: Accept basic for ½ mark
(d)	No effervescence √ ½ (1 mark)	OH^- present or CO_3^{2-} or HCO_3^- absent (1 mark)
(e)	White precipitate √1 (1 mark)	Ca^{2+} or Ba^{2+} ions present Accept Ca^{2+} only ½ Ba^{2+} only ½ (1 mark)
(f)	No white precipitate √1 (1 mark)	Ba^{2+} or Ca^{2+} ions present (1 mark)
3(a)	Colourless gas √ ½; turns red litmus paper to blue √ ½ (1 mark)	Basic gas or ammonium ions present √1 (1 mark)
(b)	Pale green precipitate √ ½ ; Insoluble in excess √ ½ (1 mark)	Fe^{2+} present √1 (1 mark)
(c)	Pale green precipitate √ ½ Insoluble in excess √ ½ (1 mark)	Fe^{2+} present √1 (1 mark)
(d)	Pale green solution. Turns to brown orange √	Fe^{2+} confirmed √
(e)	White precipitate √1 (1 mark)	SO_4^{2-} present √1 (1 mark)

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