LANY JOINT MOCK 2018
233/3 – CHEMISTRY PAPER 3 - MARKING SCHEME

Table I (6 marks)

Volume of water in the boiling tube (cm^3)	4	6	8	10
Temperature at which crystals of solid A first appear (^{o}C)	73	62	55	49
Solubility of solid A	125.0	83.3	62.5	50.0

Row II

(a) Complete table. (2 marks)

- Complete table with four readings (2 marks)
- Incomplete table with 3 readings (1 ½ marks)
- Incomplete table with 2 readings (1 mark)
- Incomplete table with one reading (0 mark)

Conditions

- Penalize ½ mark @ for temperature reading above 76.5^{o}C or below 10°C to a maximum of
(1 mark)

(b) Use of decimals. (1 mark)

- Accept only if ALL readings are recorded consistently to either as whole numbers to 1 d.p of 'O' or 5 otherwise penalize fully.

(c) Accuracy (½ mark)

* Compare the candidates 1st temperature reading (at 4cm^3) to the S.V if within $\pm$ 2°C award ½ mark otherwise penalize fully

(d) Trend (½ mark)

* Award ½ mark for continuous drop in temperature readings otherwise penalize fully.

ROW III

- Award ½ mark for @ value of solubility correctly calculated, otherwise penalize fully.
- Indicate each entry by ticking ($\sqrt{}$) or crossing (X).
- Ignore units (g) if attached to correct answer otherwise penalize if wrong units are used to a maximum of ½ mark.

1.

Experiment No.	(i)	(ii)	(iii)
Final burette reading (cm³)	19.5	38.9	19.4
Initial burette reading (cm³)	0.0	19.5	0.0
Volume of R used	19.5	19.4	19.4

Average $=$ $\dfrac{19.50 + 19.40 + 19.40}{3}$

$=$ $19.43 cm^3$

Table
- Complete – 1mk
- Use decimal point – 1mk

Accuracy
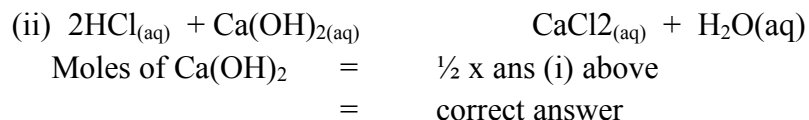- ± 0.1 (1mk)
- ± 0.2 (½)
- Beyond ± 0.2 (0mk)

Principles of average (1mk)
(average consistent value only)
Final accuracy (1mk)

- ± 0.1 of average litre (1mk)
- ± 0.2 of average litre (½ mk)
- Beyond ± 0.1 of average litre (0mk)

Calculations
(b) (i) Moles of R $=$ $\dfrac{0.07 \times \text{average litre}}{1000}$

$=$ Correct answer

(ii) $2HCl_{(aq)} + Ca(OH)_{2(aq)}$ → $CaCl2_{(aq)} + H_2O(aq)$
Moles of $Ca(OH)_2$ $=$ ½ x ans (i) above
$=$ correct answer

(iii) 25cm3 ………….. ans(ii) above.
Therefore 90cm³ $=$ $\dfrac{90 \times \text{ans above (ii)}}{25cm}$
$=$ correct ans

(iv) Mass of $Ca(OH)_2$ = ans (iii) x 74
Correct ans.

(c) Ans (iv) …………… 90cm³

Therefore 100 ………. $\dfrac{100 \times \text{ans (iv)}}{90\text{cm}}$

=   correct answer

3. I

	Observations	Inferences
(a)	Yellow/brown filtrate ✓ ½ OR Black residue	Fe^{3+} present ✓ ½ OR Cu^{2+} present
(i)	Brown precipitate ✓ ½ Insoluble in excess ✓ ½	Fe^{3+} Present ✓ ½
(ii)	Brown precipitate ✓ ½ Insoluble in excess ✓ ½	Fe^{2+} Present ✓ ½
(iii)	White precipitate formed ✓ ½	Cl^-, SO_4^{2-}, SO_3^{2-} , CO_3^{2-} Present NB: (i) 3 or 4 mentioned ✓1 (ii) 2 mentioned present ✓ ½ (i) 1 mentioned present ✓ 0
iv)	No white precipitate formed ✓ ½	CI - Present✓ ½
(b)	- Blue solution formed ✓ ½ OR - No effervescence bubbles	Cu^{2+} present ✓ ½ OR SO_3^{2-}/CO_3^{2-} absent
(i)	Blue precipitate ✓ ½ insoluble in excess ✓ ½	Cu^{2+} present✓ ½
(ii)	Blue precipitate ✓ ½ soluble in excess to form a deep blue solution ✓ ½	Cu^{2+} confirmed present ✓ ½

	Observations	Inferences
(a)	- Yellow/sooty flame ✓ ½/ Smoky flame	Either $C = C$ ✓ ½ OR $- C \equiv C -$ Present
(b) (i)	Orange $K_2Cr_2O_7$ changes to green ✓1	Either R-OH present
(ii)	Yellow Bromine water is decolourised	R-OH present ✓ ½
(iii)	PH = 5 – 6.5 ✓ ½	- Weakly acidic
(iv)	Effervescence/bubbling/fizzling ✓ 1	RCOOH present✓ ½