

MARKING SCHEME

233/3 CHEMISTRY PPS

Table 1

Time(sec)	0	30	60	90	120	150	180	210	240	270	300
Temp.(⁰ C)	27.0	28.0	29.0	30.0	30.5	31.0	31.5	32.0	31.5	31.0	30.5

CT – 1 AC – 1
Trend – 1 DC – 1

Table 2

	(I)	(II)	(III)
Final burette reading(cm ³)	24.5	24.4	24.6
Initial burette reading(cm ³)	0.0	0.0	0.0
Volume of solution used(cm ³)	24.5	24.5	24.6

AT – 1 DC – 1
AC – 1 PA – 1

$$(i) \quad \left(\frac{24.5 + 24.4 + 24.6}{3} \right) \text{ cm}^3 \quad \text{FA – 1}$$

$$= \underline{24.5 \text{ cm}^3}$$

Alternatively

Any two or three close values averaged of ± 0.1 range.

$$ii)(I) \text{ No. of moles} = \frac{\text{Molarity} \times \text{volume used}}{1000} \quad \text{or} \quad \frac{\text{ans}(i) \times 0.3}{1000} \quad \checkmark \frac{1}{2}$$

$$= \left(\frac{0.3 \times 24.5}{1000} \right) \text{ moles} \checkmark \frac{1}{2} \quad \text{Ans} \checkmark \frac{1}{2}$$

$$= \underline{0.00735 \text{ moles}} \checkmark \frac{1}{2}$$

(II) Mole ratio = 1 : 1

Hence no. of moles = 0.00735 moles or ans ii (I) \checkmark

(III) If in 25cm³ = 0.00735moles

Therefore 100cm³

$$= \frac{100 \text{ cm}^3 \times 0.00735 \text{ moles}}{25} \quad \checkmark \frac{1}{2} \quad \text{or} \quad \frac{ii(i) \times 100}{25}$$

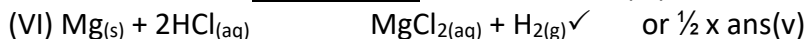
$$= \underline{0.0294 \text{ moles}} \checkmark \frac{1}{2}$$

$$(IV) \text{ No. of moles} = \frac{\text{Molarity} \times \text{volume used}}{1000}$$

$$= \frac{0.7 \times 50}{1000} \quad \checkmark \frac{1}{2}$$

$$= \underline{0.035 \text{ moles}} \checkmark \frac{1}{2}$$

(V) Moles of HCl = (0.035 – 0.0294) moles
 = 0.0056 moles or 0.035 – ans (III)



Mole ratio = 1 : 2

No. of moles of Mg = ($\frac{1}{2} \times 0.0056$) moles $\checkmark \frac{1}{2}$
 = 0.0028 moles $\checkmark \frac{1}{2}$

C. $\Delta T_{\text{emp.}} = (33 - 27) \text{K} \checkmark$
 = 6K. Accept the student value.

-Heat change - $MC\Delta T$.
 = (50 x 4.2 x 6)j \checkmark or 50 x 4.2 x student value
 = 1260j \checkmark

-No. of moles of HCl used 0.0056 moles
 If 0.0056 moles = 1260j

Therefore 1mole

$$\underline{1 \text{ mole} \times 1260 \text{ j}}$$

$$= \underline{0.0056 \text{ moles}} \checkmark$$

$$= 225,000 \text{ j}$$

$$= \underline{225 \text{ KJ mol}^{-1}} \checkmark \quad (\text{Penalize } \frac{1}{2} \text{ mrk for wrong sign and } \frac{1}{2} \text{ mrk for wrong units used})$$

2(a)	Observation	Inferences
	Colourless liquid/ liquid condenses on the cooler parts of test tube $\checkmark \frac{1}{2}$ Gas produced forms white fumes with HCl $\checkmark \frac{1}{2}$	Hydrated salt or compound contains water of crystallization. Ammonia gas $\checkmark \frac{1}{2}$ (NH_4^+) present
b(i)	White ppt insoluble in excess aqueous ammonia $\checkmark \frac{1}{2}$	Pb^{2+} or Al^{3+} present \checkmark (combined) one of them $\frac{1}{2}$. Penalize for contradictory ion $\frac{1}{2}$
(ii)	No white ppt / no white solid $\checkmark \frac{1}{2}$	Pb^{2+} absent. \checkmark Al^{3+} present but it is tied to earlier mentioned
(iii)	White ppt / solid \checkmark	SO_4^{2-} present. Penalize completely any other ion mentioned.
3a)	White solid dissolves to $\checkmark \frac{1}{2}$ form a colourless solutions. i) pH > $\checkmark \frac{1}{2}$ Reject Ph range. ii) No effervescence/No bubbles $\checkmark \frac{1}{2}$	E is a non –polar compound. $\checkmark \frac{1}{2}$ Neutral solution $\checkmark \frac{1}{2}$ H^+ absent $\checkmark \frac{1}{2}$
b)	i) Effervescence/Bubbles of a gas. $\checkmark \frac{1}{2}$ ii) Does not turn to green or Orange colour remains/ persists. iii) Bromine water not decolourised or colour of bromine water persists $\checkmark 1$	R-COOH present or H^+ or H_3O^+ or present alkanolic acid any $\checkmark \frac{1}{2}$ Alcohol Absent/ R-OH absent $\checkmark \frac{1}{2}$ C=C or $\text{C}\equiv\text{C}$ - $\checkmark 1$ absent. Should mention both.