

233/3 CHEMISTRY PRACTICALS
FORM 3 TERM TWO- 2017
MARKING SCHEME

1. TABLE I

	I	II	III
Final burette reading (cm ³)	25.0	25.1	24.9
Initial burette reading (cm ³)	0.0	0.0	0.0
Volume of acid used (cm ³)	25.0	25.1	24.9

CT – 1mark
 DP – 1mark
 ACC – 1mark
 PA – 1mark
 FA – 1mark

CT – Complete table with three titrations done and realistic figures filled in

DP – Consistency in decimal places either 1d.p or 2 d.p used consistently.

AC – Compare with the school value (SV) if within ± 0.2 award 1mk, other wise award zero

PA – Values to be averages should be within the range of ± 0.2

FA – Compare with the school value and check the arithmetic's.

a) Average volume = (school value (S.V)

b) $0.2\text{moles} = 1000\text{cm}^3$

$$\left(\frac{0.2 \times 25}{1000} \right) \checkmark 1 = 0.005\text{moles} \checkmark 1$$

c) Mole ratio A : B

$$1 : 2 \checkmark \frac{1}{2}$$

Moles of base = 0.005moles

$$\text{Moles of acid} = \frac{0.005}{2} \checkmark (\frac{1}{2}) = 0.0025\text{moles} \checkmark (1)$$

d) $0.0025\text{moles} = \text{average titre}$
 $= 1000\text{cm}^3$

$$= \left(\frac{0.0025 \times 1000}{\text{averagetitre}} \right) \checkmark 1$$

$$= (\text{Correct answer})M \checkmark 1$$

e) $\text{RMM} = \frac{g/l}{\text{molarity}}$

$$= \frac{10.08}{\text{ans in (d)}} \checkmark 1$$

ans in (d)

= Correct ans $\checkmark 1$

f) $(\text{COOH})_2 \cdot \text{XH}_2\text{O} = 90 + 18X \frac{1}{2}$

$$90 + 18X = \text{Ans in (e)}$$

$$18X = \text{Ans in (e)} - 90 \frac{1}{2}$$

$$X = \frac{\text{Ans in (e)} - 90}{18}$$

$$X = \text{Correct ans} \checkmark 1$$

2. TABLE II

Volume of CUSO ₄ solution used (cm ³)	50.0 $\checkmark \frac{1}{2}$
Highest temperature of the mixture (⁰ C)	34.5 $\checkmark \frac{1}{2}$
Initial temperature of CUSO ₄ Sln (⁰ C)	24.5 $\checkmark \frac{1}{2}$
Change in temperature (⁰ C)	10.0 $\checkmark \frac{1}{2}$

a) $0.2\text{MOLES} = 1000\text{cm}^3$
 $= 50\text{cm}^3$

$$\left(\frac{0.2 \times 50}{1000} \right) \checkmark 1$$

$$= 0.01\text{moles} \checkmark 1$$

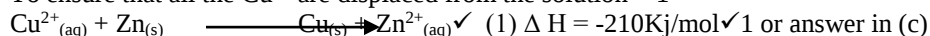
b) $\Delta H = MC\theta \checkmark \frac{1}{2}$
 $= \left(\frac{50}{1000} \times 4.2 \times 10 / \text{use students value} \right) \checkmark \frac{1}{2}$
 $= 2.1 \text{ kJ} \checkmark 1 \text{ (correct answer)}$

c) if 0.01 moles = 2.1 kJ or if answer in (a) = answer (b)

$$1 \text{ mole} = \left(\frac{2.1 \times 1}{0.01} \right) \checkmark 1 \quad 1 \text{ mole} = \frac{\text{answer(b)} \times 1}{\text{answer in a}}$$

$$= -210 \text{ kJ/mol} \checkmark 1 \text{ (penalize } \frac{1}{2} \text{ mk for the sign)}$$

d) To ensure that all the Cu^{2+} are displaced from the solution $\checkmark 1$



3.

i)

Observation	Inference
dissolves $\checkmark \frac{1}{2}$ to form a colourless solution $\checkmark \frac{1}{2}$ (reject clear solution)	Presence of Zn^{2+} , Pb^{2+} , Al^{3+} , Mg^{2+} , Ca^{2+} (ignore absence of coloured ions) 5 ions – 1mk 3 ions – $\frac{1}{2}$ mk 2 ions 0mk

ii)

Observation	Inference
White ppt $\checkmark \frac{1}{2}$ formed dissolves in excess of $\text{NaOH} \checkmark \frac{1}{2}$	Zn^{2+} , Pb^{2+} , or Al^{3+} present 3 ions – 1mk 2 ions – $\frac{1}{2}$ mk 1 ions 0mk (penalize $\frac{1}{2}$ mk for contradictory ions to mxm 1mk)

iii)

Observation	Inference
White ppt $\checkmark \frac{1}{2}$ formed insoluble in excess addition of ammonia $\checkmark \frac{1}{2}$ solution	Pb^{2+} , Al^{3+} present 1 ions – 1mk 1 ion – $\frac{1}{2}$ mk (penalize foreign ions)

iv)

Observation	Inference
No white ppt.	Al^{3+} present $\checkmark 1$

v)

Observation	Inference
White ppt formed $\checkmark 1$	SO_3^{2-} , SO_4^{2-} or CO_3^{2-} present 3 ions – 1mk 2 ions – $\frac{1}{2}$ mk 1 ion - omk

vi)

Observation	Inference
White ppt $\checkmark \frac{1}{2}$ does not dissolve in nitric $\checkmark \frac{1}{2}$ (V) acid	SO_4^{2-} present $\checkmark 1$

vii)

Observation	Inference
White ppt $\checkmark \frac{1}{2}$	SO_4^{2-} confirmed present $\checkmark 1$