

**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) 0.2moles = 1000cm³

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

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) 0.0025moles = average titre
= 1000cm³

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

= (Correct answer)M $\checkmark 1$

e) $RMM = \frac{g/l}{\text{molarity}}$
= 10.08 $\checkmark 1$
ans in (d)
= Correct ans $\checkmark 1$

f) $(COOH)_2 \cdot XH_2O = 90 + 18X \frac{1}{2}$
 $90 + 18X = \text{Ans in (e)}$
 $18X = \text{Ans in (e)} - 90 \frac{1}{2}$
 $X = \frac{\text{Ans in (e)} - 90}{18}$
X = 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 (°C)	34.5 $\checkmark \frac{1}{2}$
Initial temperature of CUSO ₄ Sln (°C)	24.5 $\checkmark \frac{1}{2}$
Change in temperature (°C)	10.0 $\checkmark \frac{1}{2}$

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

$$= 50 \text{ cm}^3$$

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

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

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

$$(2.1 \times 1)$$

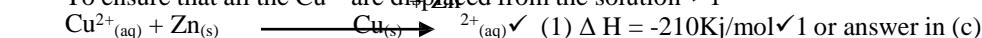
= 2.1kJ $\checkmark 1$ (correct answer)

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

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

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

d) To ensure that all the Cu²⁺ 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 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 $\checkmark \frac{1}{2}$	KO ₄ confirmed present $\checkmark 1$