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 = $1000cm^3$

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

c) Mole ratio A : B
1 : 2✓ ½
Moles of base = 0.005moles
Moles of acid = $\frac{0.005}{2}$ ✓ (½) = 0.0025moles✓ (1)

d) 0.0025moles = average titre
= $1000cm^3$
= $\left(\frac{0.0025 \times 1000}{average titre}\right)$ ✓1
= (Correct answer)M✓1

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

f) $(COOH)_2.XH_2O = 90 + 18X$ ½
90 + 18 X = Ans in (e)
18X = Ans in (e) – 90 ½
X = $\frac{\text{Ans in (e)} - 90}{18}$
X = Correct ans✓1

2. **TABLE II**

Volume of $CUSO_4$ solution used (cm^3)	50.0✓ ½
Highest temperature of the mixture (^0C)	34.5✓ ½
Initial temperature of $CUSO_4$Sln (^0C)	24.5✓ ½
Change in temperature (^0C)	10.0✓ ½

a) 0.2MOLES = $1000cm^3$

= $50cm^3$

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

= 0.01moles✓1

b) $\Delta H = MC\theta$ ✓ ½

$= \left(\frac{50}{1000} \times 4.2 \times 10 / use\ students\ value\right)$ ✓ ½

= 2.1kJ✓1 (correct answer)

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

$1\text{mole} = \left(\frac{2.1 \times 1}{0.01}\right)$ ✓1 $\qquad 1\text{ mole} = \frac{answer(b)x1}{answer\ \ in\ \ a}$

= -210kJ/mol✓1 (penalize ½ mk for the sign)

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

e) $Cu^{2+}_{(aq)} + Zn_{(s)} \longrightarrow Cu_{(s)} + Zn^{2+}_{(aq)}$ ✓ (1) ΔH = -210Kj/mol✓1 or answer in (c)

3. i)

Observation	Inference
dissolves✓ ½ to form a colourless solution ✓ ½ (reject clear solution)	Presence of Zn^{2+}, Pb^{2+}, Al^{3+}, Mg^{2+}, Ca^{2+} (ignore absence of coloured ions) 5 ions – 1mk 3ions – ½ mk 2 ions 0mk

ii)

Observation	Inference
White ppt✓ ½ formed dissolves in excess of NaOH✓ ½	Zn^{2+}. Pb^{2+}, or Al^{3+}present 3 ions – 1mk 2 ions – ½ mk 1 ions 0mk (penalize ½ mk for contradictory ions to mxm 1mk)

iii)

Observation	Inference
White ppt✓ ½ formed insoluble in excess addition of ammonia✓ ½ solution	Pb^{2+}, Al^{3+} present 1 ions – 1mk 1 ion – ½ mk (penalize foreign ions)

iv)

Observation	Inference
No white ppt.	Al^{3+} present ✓1

v)

Observation	Inference
White ppt formed✓1	SO_3^{2-}, SO_4^{2-} or CO_3^{2-} present 3 ions – 1mk 2 ions – ½ mk 1 ion - omk

vi)

Observation	Inference
White ppt✓ ½ does not dissolve in nitric✓ ½ (V) acid	SO^{2-}_4 present ✓1

vii)

Observation	Inference
White ppt✓ ½	SO^{2-}_4 confirmed present ✓1