TERM 2 2025
MARKING SCHEME
CHEMISTRY PAPER 3

1. (a)

Time (min)	0	½	1	1 ½	2	2 ½	3	3 ½	4
Temperature (ºC)	19.0	19.0	19.0	19.0	X	16.0	15.0	15.0	15.0

Complete   – 1mk
- 8 readings – 1mk- penalize – ½ of space not filled
- ½ for unrealistic values T 100 or 40
- ½ all constant t = 0 to t = 4
- ½ if T(T(2 ½)

Decimal place – 1mk
- Accept whole number or to 1d.p of 0.5 or 0.0

Accuracy – 1mk S.V ± 2units
Trend – 1mk
Award ½ - where t = 0 – t – 1 ½ min = all constant
t = ½ - t ½ min – constant
Award ½ - t – 2 ½ to 4min – show a drop

C.T = 1
D.C = 1
A.C = 1
Tr = 1
4mks

(b) Graph
Ans – ½ - both axis correctly labelled
Scale = ½ - use more than ¾ big squares in both axis
Plotting -1
Labeling -1
     3 mks
Penalize ½ inverted and scale to accommodate all plots
Plotting – all 8 points award 1mk
- 6pts & 7 award
- ≤ 5 award 0mk
Labelling – Award ½ for two straight lines.
- ½ for extrapolation

(b) (i) T = correct reading
(ii) Heat of solution = MCΔT
= 50g x 4.2Jg-1K-1 x 4.5K
= -50 x 4.2 x 45J
= -$\frac{50 \times 4.2 \times 4.5}{1000}$ KJ

ΔHsoln = ?
0.0238moles = $\frac{-50 \times 4.2 \times 4JKJ}{1000}$

1mole= ?
= $\frac{-50 \times 4.2 \times 4.5}{1000 \times 0.0238}$ KJ/mol-
= -Ans
Penalized if ΔH – sign is + and not – ve (total 3mks)

TABLE 2

Titre	I	II	III

Final burette reading	24.4	24.5	24.3
Initial burette reading	0.0	0.0	0.0
Volume of solution H used (cm^3)	24.4	24.5	24.3

Conditions:- A complete table ...

3 consistent titrations 1ms

2 titrations done and are consistent...1mk

3 inconsistent titrations done and averaged   0mk

only 1 titration done................0mk

C.T = 1
D.C = 1
AC = 1
PA = 1
GFA= 1
5mks

Penalty:

(i) Penalize ½mk for inverted table.

(ii) Penalize ½mk to unrealistic titre values e.g. volume cm3 unless explained.

(iii) Penalize ½mk for wrong arithmetic.

B- Use of decimals 1mk

(Tied to 1st and 2nd rows)

Conditions

(i) Accept 1 decimal place / point if used consistently.

(ii) Accept 2 decimal points , however the 2nd decimal point must be either 0.0 or 0.5

Penalty

(i) Penalize fully if decimals are not used consistently

(C) Accuracy 1mk

(i) Conditions (i) If any of the volume used is within ±0.1cm^3 of the school value (S.V)...

(ii) If there is one value within ±0.2cm^3 of the school value (S.V)... (½mk)

(D) Principles of averaging.....1mk

Conditions

(i) If 3 titrations done are consistent and averaged....

(ii) If 3 titrations done and 2 are consistent and averaged 1mk

(iii) If 2 titrations done and are consistent and averaged....1mk

(iv) If titration done ...1mk

(v) If 3 titrations done and are inconsistent and averaged 0mk

(vi) If 2 consistent titrations averaged...0mk

(vii) If 3titrations are done and are consistent but are averaged 0mk

(E) Final answer 1mk

Conditions

(i) If the answer of the titre value is within ±0.1cm^3 of the school value (S.V) award....1mk

(ii) If the answer of the titre value is within ±0.2cm^3 of the school value .... ½mk

(iii) If the answer is not within ±0.2cm^{3}of the school value (S.V) award....0mk

(e) Average volume of solution H used

$\dfrac{24.5 + 24.4 + 24.3}{3} = 24.4$ ✓½   ✓1½

✓½

II. $\dfrac{24.4 \times 0.04}{1000} = 0.000976$ ✓½

III. $^5/_2$ x 0.000976 = 0.00244 (penalize ½ for wrong units) ✓½   ✓½

IV. $\dfrac{3}{250 \times 0.00244}$ ✓½
          25

     $= \dfrac{3}{0.0244}$ = 122.95

     = 123(no units) penalize for units

(f)   123-90 = 33 ✓½
          16 + (2x1) = 18x = 33
          x = $^{33}/_{18}$ = 1.833
          x = 2 ✓½

2.   (a) (i)

Observation	Inference
- Solid dissolves, yellowish solution. - Colourless fumes/vapour are produced. - boiling tube becomes warm.(1 mk)	- Soluble compound. - Mix with water is exothermal heat is produced. (1 mk)

(ii)

Observation	Inference
- Blue litmus turns red. - No effect on litmus paper. (1mk)	- Presence of H^+/H_3O in the solution. - Solution is acid (1 mk)

(iii)

Observation	Inference
- White ppt. soluble in excess. (1 mk)	- Pb^{2+}, Zn^{2+}, Pb^{3+} present. (1 mk)

(iv)

Observation	Inference
- White ppt. persisted insoluble in excess	- Al^{3+} or Pb^{2+} probably present

(v)

Observation	Inference
- Mixture remains colourless/ No yellow ppt. seen. (1 mk)	- Pb^{2+} absent (1glim). - Al^{3+} present

(vi)

Observation	Inference
- White ppt. seen. (1 mk)	- SO_4^{2-}, CO_3^{2-}, SO_3^{2-} absent - Cl- is present (probably present)

3. a)   b) i)

Observation	Inference
- Solid dissolves forming a colourless and ignites /burns with Effervescence/ fizzling/bubbles of a Smoky/sooty flame. (1 mk) - No effect on litmus paper.	- Unsaturated organic compound/presence Presence of – COOH/ H_3O^+ ions. Solution is acid . (1 mk)
Observation	Inference
- The solution remained orange.	- Absence of R-OH. (Accept absence of saturated organic)(1 mk)

(ii)