

233/3 CHEMISTRY (2017)
PAPER 3 (PRACTICAL)

MARKING SCHEME

1.

Time(min)	0	½	1	1½	2	2½	3	3½	4	4½	5
Temperature (°C)	21.0	21.0	21.0	21.0	21.0	X	16.0	16.0	16.0	16.5	17.0

CT 2

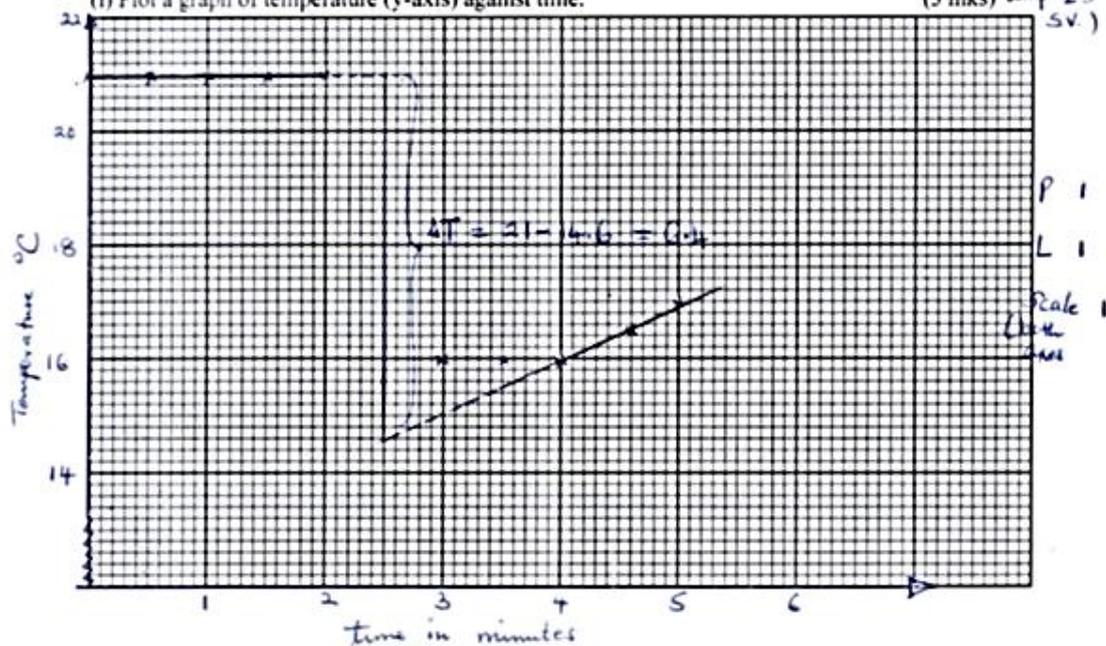
D 1

Tr 1

Ac 1

(5 mks) (The lowest
(3 mks) temp 2.3
SV.)

(i) Plot a graph of temperature (y-axis) against time.



ii) $\Delta T = 21.0 - 14.6 = 6.4\text{K}$ (the value 14.6 is obtained from the graph)

iii) $\Delta H = 20\text{g} \times 4.2\text{Jg}^{-1}\text{K}^{-1} \times$ (ans in (ii) above) = correct ans.

Table 2

	I	II	III
Final burette reading(cm ³)			
Initial burette reading(cm ³)			
Volume of solution R used (cm ³)			

(5 mks)

Table 2.....5marks

Award a total of 5 marks distributed as follows:-

- a) **Complete table** 1 mark
- Complete table with 3 titration done 1 mark
 - Incomplete table with 2 titration done ½ mark
 - Incomplete table with only 1 titration done 0 marks
- b) **Use of decimals (tied to 1st and 2nd rows only)** 1 mark
- Accept either one or two decimal places used consistently, otherwise penalize fully.
 - If 2 decimal places are used, the second decimal place must be a “0” or “5”, otherwise penalize fully.
 - Accept inconsistency in the use of zeros as initial burette reading. i.e 0, 0.0, 0.00.
- c) **Accuracy** 1 mark
- Compare the candidate’s titre value with the school value (v.s), tick the chosen value where it earns accredit.
- Conditions**
- If at least one value is within ± 0.1 cm³ of school value1 mark
 - If no value is within ± 0.1 of s.v but at least one within ± 0.2 cm³ of v.s ½ mark
 - If no value is within ± 0.2 cm³ of s.v0 mark
- d) **PRINCIPLES OF AVERAGING.** 1mark
- Values averaged must be shown and must be within ± 0.2 cm³ of each other.
- Conditions**
- If 3 consistent values averaged1mark
 - If 3 titrations are done but only 2 are consistent and averaged 1mark
 - If only 2 titrations are done, are consistent and averaged1 mark
 - If only 3 values are possible but only 2 are averaged0 mark.
 - If only 2 titrations are done ,are inconsistent and averaged0 mark
 - If 3 titrations are done, are inconsistent and yet averaged0 mark
- e) **FINAL ANSWER**1 mark
- Compare the candidates correct AVERAGE TITRE with s.v.
- If it is within ± 0.2 cm³ of v.s0mark
 - If it is not within \pm cm³ of v.s but it is within ± 0.2 cm³ of v.s ½ marks.
 - If it is beyond \pm cm³ of v.s 0marks.

(ii) I $\frac{0.1M \times \text{ans (i)}}{1000} = \text{correct answer}$

II $\text{moles HCl} = \text{ans (II)}$ (mole ratio 1: 1) quoted

III $\frac{\text{ans(II)} \times 250}{25} = \text{correct ans}$

IV $\frac{2M \times 20}{1000} = 0.04 \text{ mol}$ (correct answer only)

V $\text{ans(IV)} - \text{ans (III)} = \text{correct ans.}$

(c) $\frac{\text{ans(iii) procedure I}}{\text{ans(V) procedure II}} = \text{correct ans \& must have plus sign}$
(penalize if units kJ mol^{-1} or J mol^{-1} not included)

2.

Observations	Inferences
- Dissolve to form colourless solution	- Soluble salt - Absence of Fe^{2+} , Fe^{3+} , Cu^{2+}
a) No white precipitate	Na^+ , K^+ , NH_4^+ present Pb^{2+} , Al^{3+} , Zn^{2+} , Mg^{2+} absent
b) Yellow flame	Na^+ present
c) White ppt that dissolve on adding HCl	- CO_3^{2-} , SO_3^{2-} present
Decolourises KMnO_4 / turns acidified purple KMnO_4 colourless	SO_3^{2-} present

3.

Observations	Inferences
- Burns with a blue flame	Saturated organic compound
b) No effervescence	- Absence of H^+ or R-COOH
c) - decolourises	R-OH , Present
d) Yellow brom	R-OH present