K.C.S.E 2024 CHEMISTRY PP3 233/3

MARKING GUIDE.

PROCEDURE I.

(a) Table 1

	I	II	III
Final burette reading	14.2	14.2	14.2
Initial burette reading	0.0	0.0	0.0
Volume of solution A used, cm^3	14.2	14.2	14.2

(b) (i) $\frac{14.2+14.2+14.2}{3} = 14.2$

(ii) moles $= \frac{M \times V}{1000} = \frac{0.10 \times 25}{1000} = 0.0025$

(iii) moles of A = moles of B = 0.0025

$M = \frac{\text{moles}}{V} \times 1000 = \frac{0.0025}{14.2} \times 1000$

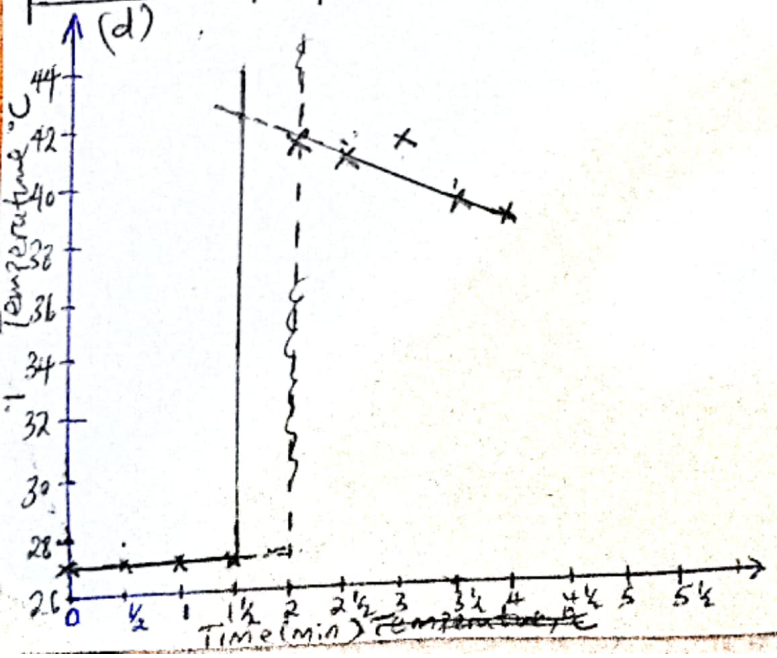
$= 0.1761$

(OR $\frac{\text{Ans in b (ii)}}{\text{Ans in b(i)}} \times 1000$).

(c) Table 2.

Time, minutes	0	½	1	1½	2	2½	3	3½	4
Temperature, °C	27.0	27.0	27.0	–	41.0	41.5	41.0	39.0	36.0

(d)



(e) (i) ΔT

$42 - 27 = 15°C$

Highest – Lowest from Graph.

(ii) $\Delta H = MC\Delta T$

$= 50 \times 4.2 \times 15$ / $\frac{50 \times 4.2 \times 15}{1000}$

$= 3150J$ / $0.315kJ$

(OR $50 \times 4.2 \times$ Ans in e(i))

Procedure III

(f) Table 3

	I	II	III
Final burette reading	23.0	23.0	23.0
Initial burette reading	0.0	0.0	0.0
Volume of solution E used, cm^3	23.0	23.0	23.0

(g) (i) $\frac{23.0+23.0+23.0}{3} = 23.0$

(ii) moles $= \frac{M \times V}{1000} = \frac{0.1761 \times 25}{1000}$

$= 0.0044025$

(OR $\frac{\text{Ans in 6(iii)} \times 25}{1000}$)

(iii) $\frac{0.0044025 \times 250}{23.} = 0.04785$

(OR $\frac{\text{Ans in g(ii)} \times 250}{\text{Ans in g(i)}}$).

(iv) moles $= \frac{M \times V}{1000} = \frac{2 \times 50}{1000} = 0.1$.

(v) $0.1 - 0.04785 = 0.05215$

(OR Ans in g(iv) – Ans in g(iii))

(h) (i) $\frac{0.5215 \times 1}{2} = 0.02608$ (OR $\frac{\text{Ans in g(v)}}{2}$.

(ii) $\frac{3150}{0.02608 \times 1000} = -120.78 kJ/mole$ (OR $\frac{\text{Ans in e(ii)}}{\text{Ans in h(i)} \times 1000}$ SIGN A MUST

2

(a) Heat and test gas using blue litmus paper.

Observation	Inference
Colourless liquid condenses on the cooler parts of the test tube.	Hydrated salt.
Moist blue litmus paper turns red.	Acidic gas.

(b) (i) $NaOH_{(aq)}$

Observation	Inference
White ppt. soluble in excess.	Zn^{2+}, Al^{3+}, Pb^{2+}

(ii) $NH_4OH_{(aq)}$

Observation	Inference
White ppt. Insoluble in excess.	Al^{3+}, Pb^{2+}

(iii) $NaCl_{(aq)}$

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

(iv) $Ba(NO_3)_2$, HNO_3 (aq).

Observation	Inference.
White ppt. Insoluble on addition of the acid.	SO_4^{2-}

3.

(a). $NaHCO_{3(s)}$

Observation	Inference
No effervescence produced.	R-COOH absent.

(b) $K_2Cr_2O_7$ / H_2SO_4 / Heat.

Observation	Inference
Orange colour of $K_2Cr_2O_7$ changes to green.	R-OH

(c) Bromine water.

Observation	Inference
Yellow colour of Bromine water persists.	R-OH.