

KCSE 2008 Chemistry Paper 3 Answer 3

Procedure A

Table 1

Time (min)	0	½	1.0	1.5	1.0	2.5	3.0	3.5	4.0	4.5	5.0
Temperature °C)	19	18.5	18.0	18.0	18.0	X	13.0	13.0	13.5	13.5	14.0

(5 marks)

(3 marks)

(ii) $\Delta T = 6^{\circ}\text{C}$

(1 mark)

(iii) $\Delta H = 20 \times 4.2 \times 6$
 $= 504 \text{ joules}$

(2 marks)

Procedure B

Table 2

	I	II	III
Final burette reading	16.5	32.20	32.20
Initial burette reading	0.0	16.0	16.0
Titre (cm ³)	16.5	16.20	16.20

(3 marks)

(i) $\frac{16.2 + 16.2}{2} = 16.2 \text{ cm}^3$ (1 mark)

mark)

(ii) I $\frac{16.2 \times 0.1}{1000} = 0.00162\text{m}$

(1 mark)

II Moles of HCl = Moles of NaOH (1 mark)

= 0.00162

III $0.00162 \times 10 = 0.0162\text{m}$ (1 mark)

IV $\frac{20 \times 2}{1000} = 0.04$

(1 mark)

V $0.04 - 0.00162 = 0.00238$ (1 mark)

mark)

(c) $0.0238 \text{ moles} = 504$

1 mole = $\frac{504}{0.0238} \times \frac{1}{1000}$

$$= +21.176 \text{ kJmol}^{-1}$$

(2

marks)

2.

<i>Observations</i>	<i>Inferences</i>
(a) <ul style="list-style-type: none"> ▪ Green solid turned black. ▪ Colourless liquid condenses on cool part water of crystallization. ▪ Blue litmus paper turned pink. ▪ Red litmus paper remains the same. 	<ul style="list-style-type: none"> ▪ Solid d is hydrated or contains water of crystallization. ▪ Acidic gas is produced <p style="text-align: right;">(3 marks)</p>
(b) <ul style="list-style-type: none"> ▪ No effervescence. ▪ Black solid reacts to form a green solution. 	<ul style="list-style-type: none"> ▪ Black solid is basic. ▪ Coloured ion present i.e Fe^{2+} or Cu^{2+}. <p style="text-align: right;">(2 marks)</p>
(c) (i) <ul style="list-style-type: none"> ▪ Blue precipitate formed. ▪ Re-dissolves in excess to form a deep blue/Royal blue solution. 	<ul style="list-style-type: none"> ▪ Cu^{2+} present. <p style="text-align: right;">(2 marks)</p>
(ii) <ul style="list-style-type: none"> ▪ Effervescence occurs. ▪ Brown solid deposited. ▪ Colourless formed. ▪ Green solution turns. ▪ Test-tube gets warm. 	<ul style="list-style-type: none"> ▪ E is a metal more reactive than copper or E displaces Copper or E reduces Cu^{2+} to Cu. <p style="text-align: right;">(2 marks)</p>
3. (a) Yellow smoky flames/sooty flame.	F is along chain hydrocarbon or an unsaturated organic compound. (1 mark)
(b) Dissolves to form a colourless.	It is probably a soluble salt or Polar organic compound. (2 marks)
(c) (i) <ul style="list-style-type: none"> ▪ Effervescence occurs. ▪ Colourless gas given out. 	Compound is acidic – COOH or H^+ or H_3O^+ (2 marks)
(ii) Orange/Yellow colour persists.	Absence of Hydroxyl group. (2 marks)
(iii) $\text{KMnO}_4(\text{aq})$ is decoloursied.	$\text{C}=\text{C}$ or $\text{C}\equiv\text{C}$ present. (2 marks)

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