

5.5.3 Chemistry Practical Paper 3 (233/3)

Procedure I

1. Table 1

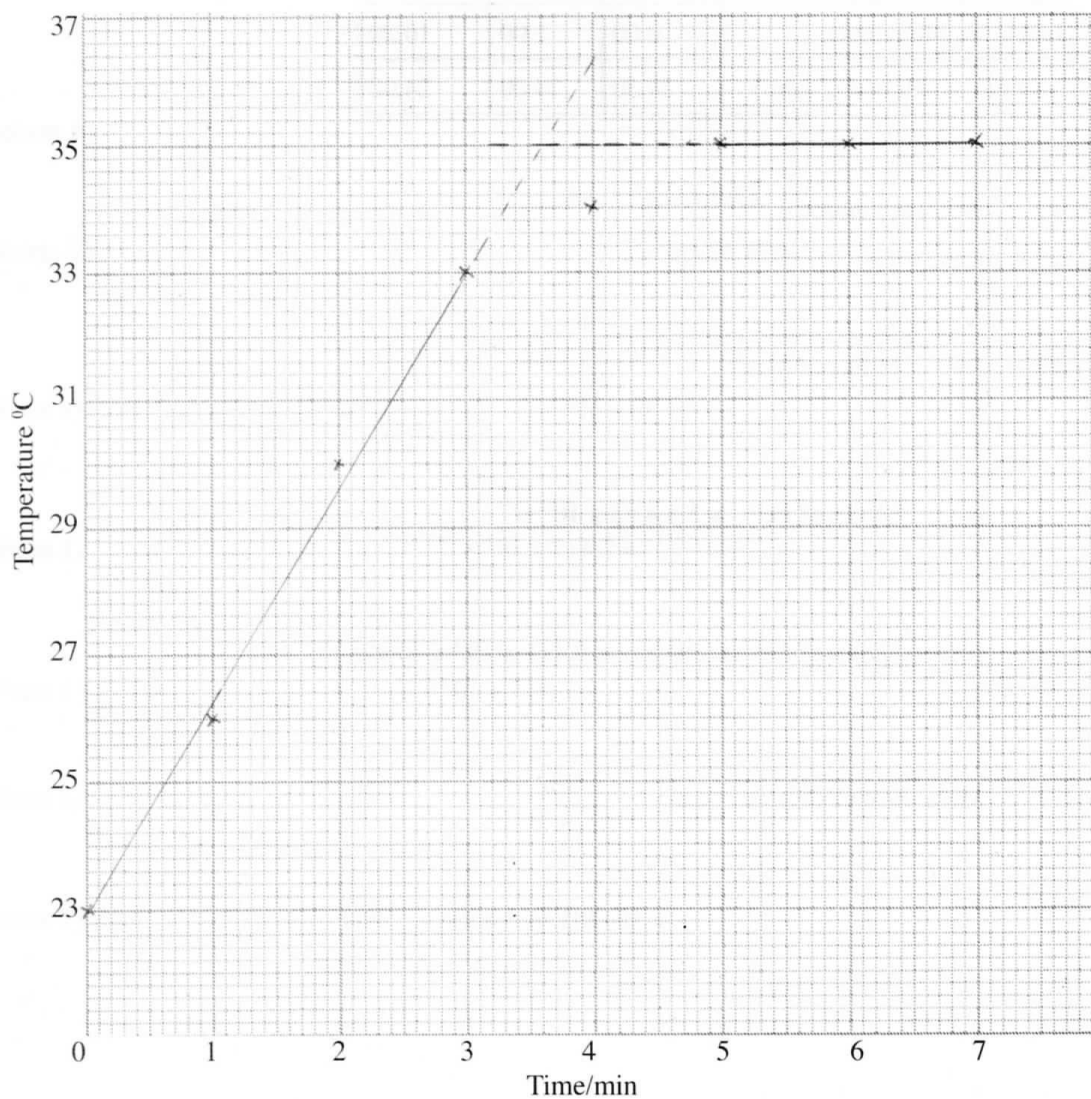
Time (Min.)	0	1	2	3	4	5	6	7
Temperature ($^{\circ}\text{C}$)	23.0	26.0	30.0	33.0	34.0	35.0	35.0	35.0

$\frac{1}{2}$ mark for each correct entry,

Maximum (3 marks)

(a) (i)

(3 marks)



(ii) (I) $\Delta T = 35 - 23 = 12^{\circ}\text{C}$. (1 mark)

(II) 3 minutes 36 seconds. ($\frac{1}{2}$ mark)

(iii) $\Delta H = 50 \times 4.2 \times 12$
 $= 2520 \text{ joules}$. (2 marks)

Procedure II

Table 2

	I	II	III
Final burette reading	24.50	25.00	34.20
Initial burette reading	0.00	1.00	10.20
Volume of solution C (cm^3)	24.50	24.00	24.00

(4 marks)

(a) Average volume = $\frac{24.5 + 24.0 + 24.0}{3} \sqrt{\frac{1}{2}}$
 $= 24.17 \text{ cm}^3 \sqrt{\frac{1}{2}}$ ($\frac{1}{2}$ mark)

(b) (i) Moles of $\text{MnO}_4^- = \frac{0.02 \times 24.17}{1000} \sqrt{\frac{1}{2}}$
 $= 4.83 \times 10^{-4} \sqrt{\frac{1}{2}}$ (1 mark)

(ii) Moles of $\text{Fe}^{2+} = 5 \times 4.83 \times 10^{-4} \sqrt{\frac{1}{2}}$
 $= 2.417 \times 10^{-3} \sqrt{\frac{1}{2}}$ (1 mark)

(iii) Moles of Fe^{2+} in $250 \text{ cm}^3 = 2.417 \times 10^{-3} \times 10 \sqrt{\frac{1}{2}}$
 $= 2.417 \times 10^{-2} \sqrt{\frac{1}{2}}$ (1 mark)

(c) Molar heat of displacement = $\frac{2520}{2.417 \times 10^{-2}} \sqrt{1}$ (1 mark)

$= 104261.48 \text{ Joules} \sqrt{1}$ (1 mark)

2 (a)

(i)		
Observations	Inferences	
- White solid turns yellow - Splint extinguished - On cooling solid is white - Colourless, odourless gas.	Probably CO_2 gas given off. $\therefore \text{CO}_3^{2-}$ or HCO_3^- , ZnO formed	
(max. 1 mark)	(max. 1 mark)	(2 marks)

(ii)		
Observations	Inferences	
- effervescence/bubbles - colourless, odourless gas	CO_3^{2-} present	
(1 mark)	(1 mark)	(2 marks)

(iii)		
Observations	Inferences	
- White ppt soluble in excess	Zn^{2+} present	
(1 mark)	(1 mark)	(2 marks)

(b) (i)		
Observations	Inferences	
White ppt insoluble in excess	Pb^{2+} or Al^{3+} Mg^{2+}	
(1 mark)	(1 mark)	(2 marks)

(ii)		
Observations	Inferences	
- No effervescence - No white ppt	CO_3^{2-} SO_3^{2-} absent Pb^{2+} absent or Al^{3+} and Mg^{2+} present	
(1 mark)	(1 mark)	(2 marks)

(iii)		
Observations	Inferences	
White ppt	SO_4^{2-} present	
(1 mark)	(1 mark)	(2 marks)

3. (a)

Observations	Inferences
Melts and then burns with a sooty/ smoky/Luminous flame/yellow flame. (1 mark)	Long chain organic compound or $C = C$ or $H - C \equiv C - H$ (1 mark)

(b) (i)

Observations	Inferences
Not decolourised (1 mark)	ROH $C = C$ or $C \equiv C$ absent (1 mark)

Observations	Inferences
Effervescence/bubbling Colourless gas (1 mark)	Carboxylic acid present. H^+ or H_3O^+ or $RCOOH$ (1 mark)

Method used	Inferences
- Add 2 drops of universal indicator to solution. - Match the colour of solution to the pH chart paper - Read off pH. (2 marks)	- pH is 1 or 2 - Solution is strongly acidic (1 mark)