

## 5.5.3 Chemistry Practical Paper 3 (233/3)

## Procedure I

## 1. Table 1

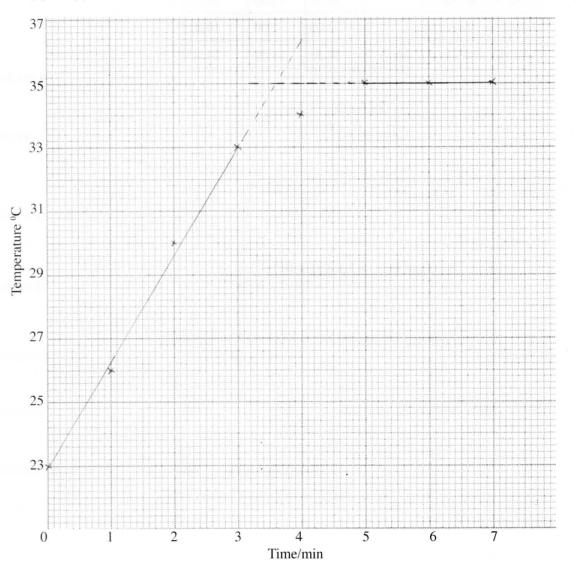
Time (Min.)	0	1	2	3	4	5	6	7
Temperature (°C)	23.0	26.0	30.0	33.0	34.0	35.0	35.0	35.0

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

Maximum (3 marks)



(3 marks)





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

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

(iii) 
$$\Delta H = 50 \times 4.2 \times 12$$
  
= 2520 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 <sup>3</sup> )	24.50	24.00	24.00

(4 marks)

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

(b) (i) Moles of MnO<sub>4</sub><sup>-</sup> = 
$$\frac{0.02 \times 24.17}{1000} \sqrt{\frac{1}{2}}$$
  
=  $4.83 \times 10^{-4} \sqrt{\frac{1}{2}}$  (1 mark)

(ii) Moles of Fe<sup>2+</sup> = 5 x 4.83 x 
$$10^{-4} \sqrt{\frac{1}{2}}$$
  
= 2.417 x  $10^{-3} \sqrt{\frac{1}{2}}$  (1 mark)

(iii) Moles of Fe<sup>2+</sup> in 250 cm<sup>3</sup> = 2.417 x 10<sup>-3</sup> x 10 
$$\sqrt{\frac{1}{2}}$$
  
= 2.417 x 10<sup>-2</sup>  $\sqrt{\frac{1}{2}}$  (1 mark)

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

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

(ii)  Observations - effervescence/bubbles - colourless, odourless gas  (1 mark)  (iii)  Observations - White ppt soluble in excess  (1 mark)  Inferences  Zn²+ present  (1 mark)  (2 mark)  (b)  (i)  Observations - Whoservations - White ppt insoluble in excess  (1 mark)  Inferences - Inferences - Pb²+ or Al³+ Mg²+	2	(a)					
- White solid turns yellow - Splint extinguished - On cooling solid is white - Colourless, odourless gas.  (max. 1 mark)  Observations - effervescence/bubbles - colourless, odourless gas  (1 mark)  (iii)  Observations - effervescence/bubbles - colourless, odourless gas  (1 mark)  (iii)  Observations - White ppt soluble in excess  (1 mark)  (1 mark)  (2 mark)  (2 mark)  (iii)  Observations - White ppt soluble in excess  (1 mark)  (1 mark)  (2 mark)  (2 mark)  (b) (i)  Observations - White ppt insoluble in excess  (1 mark)  (1 mark)  (2 mark)			(i)				
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- On cooling solid is white - Colourless, odourless gas.  (max. 1 mark)  (ii)  Observations - effervescence/bubbles - colourless, odourless gas  (1 mark)  (iii)  Observations - White ppt soluble in excess  (1 mark)  (2 mark)  (2 mark)  (1 mark)  (2 mark)  (1 mark)  (2 mark)  (1 mark)  (2 mark)  (3 mark)  (4 mark)  (5 mark)  (6 mark)  (7 mark)  (9 mark)  (1 mark)  (1 mark)  (1 mark)  (2 mark)  (3 mark)  (4 mark)  (5 mark)  (6 mark)  (7 mark)  (8 mark)  (9 mark)  (1 mark)  (1 mark)  (1 mark)							
(ii)  Observations - effervescence/bubbles - colourless, odourless gas  (1 mark)  Inferences  CO <sub>3</sub> <sup>2-</sup> present  (1 mark)  (2 mark)  (iii)  Observations - White ppt soluble in excess  (1 mark)  Inferences  Zn <sup>2+</sup> present  (1 mark)  (2 mark)  (2 mark)  (3 mark)  (4 mark)  (5 mark)  (6 mark)  (7 mark)  (9 mark)  (1 mark)  (1 mark)  (1 mark)  (2 mark)  (3 mark)  (4 mark)  (5 mark)  (6 mark)  (7 mark)  (9 mark)  (1 mark)  (1 mark)  (1 mark)  (2 mark)				3			
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- colourless, odourless gas  (1 mark)  (1 mark)  (2 mark)  (iii)  Observations - White ppt soluble in excess  (1 mark)  (1 mark)  (2 mark)  (2 mark)  (b)  (i)  Observations (1 mark)  (1 mark)  (2 mark)  (2 mark)  (3 mark)  (4 mark)  (5 mark)  (6 mark)  (7 mark)  (9 mark)  (1 mark)  (1 mark)  (1 mark)  (2 mark)  (3 mark)  (4 mark)  (5 mark)  (6 mark)			Observations		Inferences		
(iii)  Observations - White ppt soluble in excess  (1 mark)  Inferences  Zn²+ present  (1 mark)  (2 mark)  (b) (i)  Observations White ppt insoluble in excess  Inferences Pb²+ or Al³+ Mg²+			- effervescence/bubbles		CO <sub>3</sub> <sup>2</sup> present		
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Observations - White ppt soluble in excess  (1 mark)  Inferences  Zn²+ present  (1 mark)  (2 mark)  Observations White ppt insoluble in excess  Pb²+ or Al³+ Mg²+			(1	mark)		(1 mark)	(2 marks)
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- White ppt soluble in excess			(iii)				
(b) (i) Observations White ppt insoluble in excess  (1 mark) (1 mark) (2 mark) (1 mark) (2 mark)			Observations		Inferences		
(b) (i) Observations White ppt insoluble in excess  (1 mark) (1 mark) (2 mark) (1 mark) (2 mark)			- White ppt soluble in excess		Zn <sup>2+</sup> present		
Observations White ppt insoluble in excess  Inferences Pb <sup>2+</sup> or Al <sup>3+</sup> Mg <sup>2+</sup>			(1	mark)		(1 mark)	(2 marks)
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White ppt insoluble in excess Pb <sup>2+</sup> or Al <sup>3+</sup> Mg <sup>2+</sup>		(b)	(i)				
			Observations		Inferences		
			White ppt insoluble in excess		Pb <sup>2+</sup> or Al <sup>3+</sup> Mg <sup>2+</sup>		
				mark)		(1 mark)	(2 marks)
(ii)			(ii)				
<b>Observations</b> Inferences			Observations		Inferences		
- No effervescence $CO_3^{2-}SO_3^{-2}$ absent			- No effervescence		CO,2- SO,-2 absent		
- No white ppt Pb <sup>2+</sup> absent			- No white ppt		Pb <sup>2+</sup> absent		
			(1	mark)			(2 marks)
AI <sup>3+</sup> and Mg <sup>2+</sup> present				-	AI <sup>3+</sup> and Mg <sup>2+</sup> present		
(1 mark)						(1 mark)	
(iii)			(iii)				
Observations Inferences (2 mark			Observations		Inferences		(2 marks)
White ppt SO <sub>4</sub> <sup>2</sup> present			White ppt				(=)
(1 mark) (1 mark)				mark)	4	(1 mark)	

3. (a)

**Observations** 

Melts and then burns with a sooty/ smoky/Luminous flame/yellow flame.

(1 mark)

**Inferences** 

Long chain organic compound

C = C or  $H - C \equiv C - H$ 

(2 marks)

(2 marks)

(2 marks)

(1 mark)

(b)

(i)

**Inferences** 

ROH C = C or  $C \equiv C$  absent

(1 mark)

(1 mark)

**Observations** 

**Observations** 

Not decolourised

Effervescence/bubbling

Colourless gas

(1 mark)

**Inferences** 

Carboxylic acid present.

H+ or H<sub>3</sub>O+ or RCOOH

(1 mark)

Method used

- Add 2 drops of universal indicator to solution.
- Match the colour of solution to the pH chart paper
- Read off pH.

(2 marks)

**Inferences** 

- pH is 1 or 2

- Solution is strongly acidic

(3 marks)

(1 mark)