

SERIES 45 EXAMS

233/3

CHEMISTRY

Paper 3

(PRACTICAL)

MARKING SCHEME

	1	2	3
Final Burette reading cm ³			
Initial Burette reading cm ³			
Final Burette reading cm ³			

$$\text{Mean titre} = \frac{15.0 + 15.0 + 15.0}{3}$$

$$\text{Mean} = 15.033 \text{ cm}^3$$

$$\text{Mean} = 15.0 \text{ cm}^3$$

1. (i) Moles of MnO_4^- is $\left(\frac{0.02 \times 15}{1000}\right) = 3.0 \times 10^{-4} \text{ mole}$
 From equation: 2 moles of MnO_4^- react with 5 moles of $\text{C}_2\text{O}_4^{2-}$
 3.0×10^{-4} Moles reacts with:

$$\frac{3.0 \times 10^{-4}}{2} \times 5 = 7.5 \times 10^{-4} \text{ moles}$$

- (ii) Number of Moles of $\text{C}_2\text{O}_4^{2-}$ that are 25 cm^3 is 7.5×10^{-4}
 (iii) 25 cm^3 contain 7.5×10^{-4} moles

$$250 \text{ cm}^3 \text{ will contain } \frac{7.5 \times 10^{-4}}{25} \times 250$$

$$= 7.5 \times 10^{-3} \text{ Moles}$$

$$\text{Moles in } 25 \text{ cm}^3 \text{ of solution } S_1 = 7.5 \times 10^{-3}$$

$$\text{Moles in } 50 \text{ cm}^3 \text{ of Solution } S_1 = \frac{7.5 \times 10^{-3} \times 50}{25}$$

$$= 1.5 \times 10^{-2} \text{ Moles}$$

$$\text{Mass dissolved in } 50 \text{ ml H}_2\text{O} = 1.5 \times 10^{-3} \times 134 = 2.01 \text{ g}$$

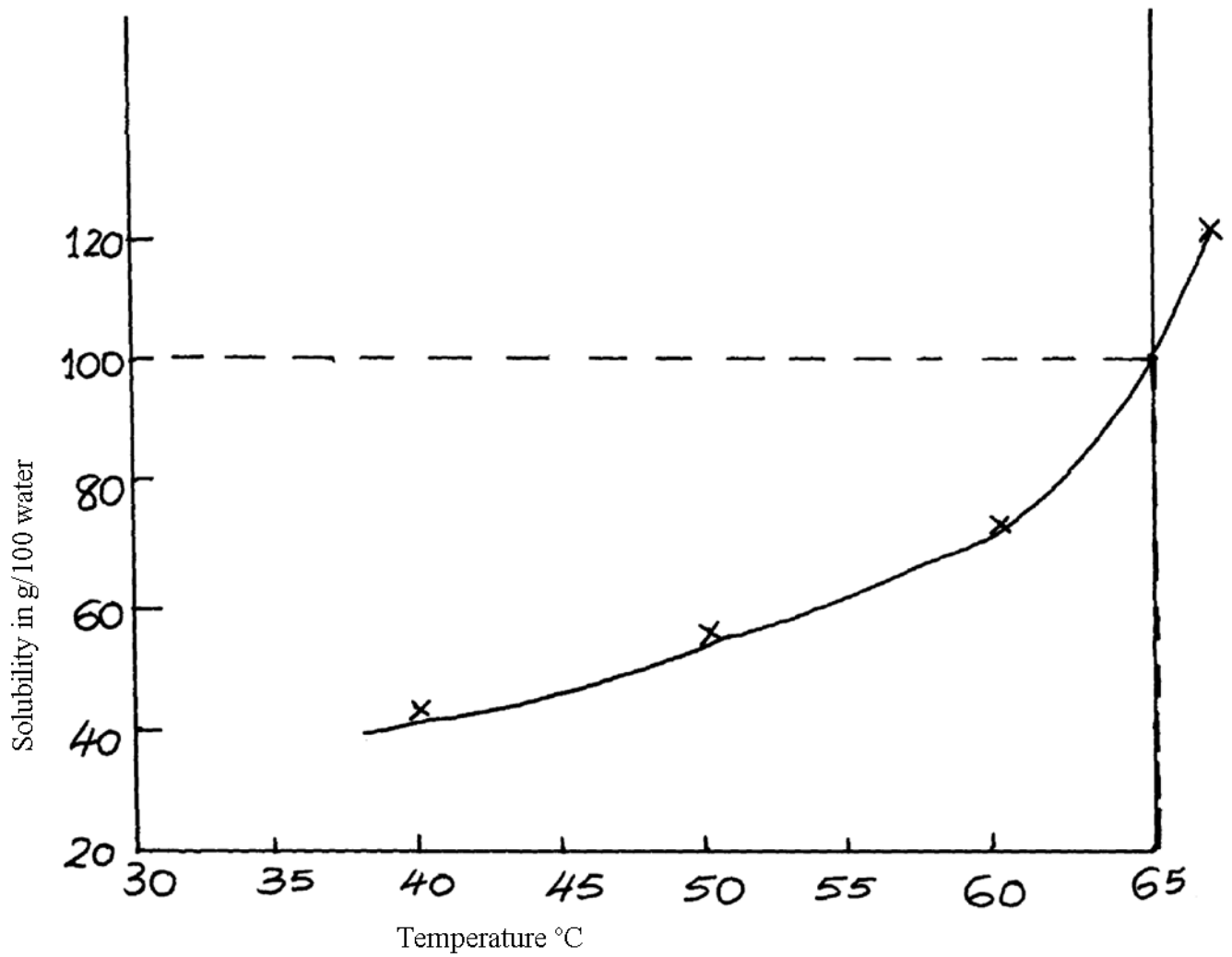
$$\text{Mass dissolved in } 100 \text{ ml H}_2\text{O} = 2.01 \times 2 = 4.02 \text{ g}$$

$$\text{Solubility of } S_1 = 4.02 \text{ g}/100 \text{ g H}_2\text{O}$$

2.

Volume of water in boiling tube (cm³)	Temperature at which crystals of solid M first appear (°C)	Solubility of solid M in g/100g of water
4	67	112.50
6	58	75.00
8	48	56.25
10	38	45.00

(a)



(b) 65°C

(c) Solubility of Solid M increases with increase in temperature.

3.

(i)	OBSERVATIONS Part of solid dissolves and on filtering a pale blue solution is obtained. ✓ ½. White residue remains ✓ ½	INFERENCES Z could be a mixture of an insoluble salt ✓ ½ and a soluble Cu ²⁺ salt ✓ ½
(ii)	White residue remains ✓ ½	

O

BSERVATIONS

INFERENCE

A white precipitate is formed ✓ 1	SO ₄ ²⁻ (aq) ions are present ✓ 1
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(iii)	OBSERVATIONS A pale blue precipitate is formed ✓ ½ The precipitate is insoluble in excess alkali ✓ ½	INFERENCE Possibly Cu ²⁺ (aq) ions present ✓ 1
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(iv)	OBSERVATIONS A pale blue precipitate is formed ✓ ½ Precipitate dissolves to form a deep blue solution ✓ ½	INFERENCE Presence of Cu ²⁺ (aq) ions ✓ 1
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(v)	OBSERVATIONS The residue dissolves in Nitric (v) acid with evolution of a gas. ✓ ½. The resultant solution is colourless. ✓ ½	INFERENCES Possibly CO ₃ ²⁻ (aq) ✓ ½ or SO ₄ ²⁻ (aq) one present ✓ ½
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(vi)	OBSERVATIONS A white precipitate is formed ✓ ½ Soluble in Excess alkali ✓ ½	INFERENCES Possibly Pb ²⁺ (aq) ✓ ½, Zn ²⁺ (aq) or Al ³⁺ (aq) ions present ✓ ½
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(vii)	OBSERVATIONS A white precipitate is formed ✓ ½ Insoluble in Excess ammonia solution ✓ ½	INFERENCES Possibly Pb ²⁺ (aq) ✓ ½ or Al ³⁺ (aq) ions present ✓ ½
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(viii)	OBSERVATIONS A white precipitate is formed ✓ ½	INFERENCES Pb ²⁺ (aq) ions present ✓ ½
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4. (i)

OBSERVATIONS	INFERENCES
U is a colourless liquid ✓ ½	Coloured ions absent ✓½

(ii)

OBSERVATIONS	INFERENCES
U burns with a blue flame ✓ 1	U possible alkane ✓ ½ or an alkanol of low molecular mass ✓ ½

(iii)

OBSERVATIONS	INFERENCES
U mixes freely with water ✓½ Universal indicator paper turns pale blue ✓½	U possibly contains an OH ✓1

(iv)

OBSERVATIONS	INFERENCES
No reaction with sodium hydrogen carbonate ✓ 1	R-COOH absent ✓ 1

(v)

OBSERVATIONS	INFERENCES
Potassium Dichromate (VI) changes colour from orange to green on warming ✓ 1	U is a reducing agent , Possibly an alkanol ✓ 1

(vi)

OBSERVATIONS	INFERENCES
Potassium Manganate (VII) is decolourized on warming ✓ 1	U is a reducing agent ✓ 1

(vii)

OBSERVATIONS	INFERENCES
A pleasant fruit smell is produced ✓ 1	U is an alkanol. R – OH present ✓ 1