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**CHEMISTRY**

**9791/04**

Paper 4 Practical

**May/June 2017**

MARK SCHEME

Maximum Mark: 40

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**Published**

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This document consists of **5** printed pages.

Question	Answer	Marks
1(a)	<p><b>I</b> Records clearly the mass of weighing bottle + <b>FA 1</b>, mass of weighing bottle + residue, and mass of <b>FA 1</b></p> <p><b>II</b> Tabulates initial burette readings, final burette readings and volume of <b>FA 2</b> added</p> <p><b>III</b> Appropriate headings and units for titration results</p> <p><b>IV</b> All accurate burette readings and the volumes of <b>FA 2</b> added are given to the nearest 0.05 cm<sup>3</sup></p> <p><b>V</b> Two or more uncorrected titres within 0.20 cm<sup>3</sup></p> <p><b>VI, VII, VIII</b> Examiner calculates  <math>\delta =  \text{supervisor value} - \text{corrected scaled mean titre} </math>  Award <b>VI, VII</b> and <b>VIII</b> if <math>\delta \leq 0.15</math>  Award <b>VI</b> and <b>VII</b> only if <math>0.15 &lt; \delta \leq 0.30</math>  Award <b>VI</b> only if <math>0.30 &lt; \delta \leq 0.45</math></p>	<b>8</b>
1(b)	Selects titres within 0.20 cm <sup>3</sup> , calculates the correct mean and gives answer to the same number of dp as the most precise burette reading	<b>1</b>
1(c)	<p>(i) Calculates correctly <math>\text{ans(b)} / 1000 \times 0.0100</math></p> <p>(ii) Calculates correctly <math>5 \times \text{ans(i)}</math> AND (iii) Calculates correctly <math>10 \times \text{ans(ii)}</math></p> <p>(iv) Calculates relative formula mass of <b>FA 1</b> OR mass of water in sample OR correct expression in working.</p> <p>(iv) Determines <math>x</math> to nearest integer.</p>	<b>4</b>

Question	Answer	Marks
2(a)	<p><b>I</b> All 5 masses recorded have appropriate headings and units: / g or (g)</p> <p><b>II</b> All 3 measured masses to the same number of dp (at least 1 dp)</p> <p><b>III</b> Calculates correctly mass of <b>FA 5</b> added and mass lost.</p> <p><b>IV</b> and <b>V</b> Compare corrected mass of <b>FA 5</b> / corrected mass lost with supervisor value. Award <b>IV</b> and <b>V</b> if <math>\delta \leq 0.20</math> Award <b>IV</b> only if <math>0.20 &lt; \delta \leq 0.40</math></p>	<b>5</b>
2(b)	<p>(i) Use of 123.5 and 97.5</p> <p>(i) <math>123.5 + 97.5y</math></p> <p>(ii) Initial mass of <b>FA 5</b> / <math>(123.5 + 97.5y)</math> AND (iii) (initial mass of <b>FA 5</b> <math>\times y</math>) / <math>(123.5 + 97.5y)</math></p> <p>(iv) Shows that <math>(ii) \times 44 + (iii) \times 18 = \text{mass lost}</math></p> <p>(v) Correctly calculates a value for <math>y</math> to 1 dp</p>	<b>5</b>
2(c)	Heat to constant mass	<b>1</b>

Question	Answer	Marks
	<b>FA 6 is <math>\text{MnCl}_2</math> FA 7 is <math>\text{FeSO}_4</math></b>	
3(a)	(i) Clear layout of results. No repeating headings. (i) Selects NaOH and / or $\text{NH}_3$ (i) <b>FA 6</b> : off-white / buff / beige / light-brown ppt (i) Ppt darkens (in air) <b>Allow</b> turns brown (i) <b>FA 7</b> (dirty) green ppt (i) Ppt turns brown in air (ii) <b>FA 6</b> is $\text{Mn}^{2+}$ (ii) <b>FA 7</b> is $\text{Fe}^{2+}$	<b>8</b>

Question	Answer	Marks
	<b>FA 8 is NaNO<sub>2</sub> FA 9 is BaCl<sub>2</sub></b>	
3(b)	(i) Decolourises with <b>FA 8</b> AND white ppt with <b>FA 9</b> (ii) White ppt soluble in ammonia for <b>FA 8</b> and <b>FA 9</b> (iii) Fizzing / effervescence / bubbles for <b>FA 8</b> AND brown gas for <b>FA 8</b> AND no reaction for <b>FA 9</b> (iv) No reaction for <b>FA 8</b> on adding AgNO <sub>3</sub> AND White ppt for <b>FA 9</b> on adding AgNO <sub>3</sub> (v) <b>FA 8</b> is NO <sub>2</sub> <sup>-</sup> (v) <b>FA 9</b> is Cl <sup>-</sup> (vi) AgNO <sub>2</sub> is insoluble (vi) Adding acid removed the nitrite ion	<b>8</b>