

---

**CHEMISTRY**

**9701/35**

Paper 3 Advanced Practical Skills 1

**October/November 2016**

MARK SCHEME

Maximum Mark: 40

---

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2016 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.



<b>Page 3</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS/A Level – October/November 2016</b>	<b>9701</b>	<b>35</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(a)	<p><b>I</b> Initial and final burette readings and volume added recorded for rough titre <b>and</b> accurate titre details tabulated. [minimum 2 × 2 'boxes' with relevant information]</p> <p><b>II</b> Initial and final burette readings recorded and volume of <b>FA 3</b> added recorded for each accurate titration. Headings and units correct for accurate titrations Headings: initial / final (burette) reading / volume <b>or</b> reading / volume at start / finish <b>and</b> volume / <b>FA 3</b> added / used <b>or</b> titre [<b>not</b> difference / total] allow vol but not V <b>and</b> Units: (cm<sup>3</sup>) <b>or</b> / cm<sup>3</sup> <b>or</b> in cm<sup>3</sup> [or cm<sup>3</sup> by every entry]</p> <p><b>III</b> All accurate burette readings are recorded to the nearest 0.05 cm<sup>3</sup> Do <b>not</b> award this mark if: 50(.00) is used as an initial burette reading; more than one final burette reading is 50(.00); any burette reading is greater than 50(.0)</p> <p><b>IV</b> Final uncorrected titre is within 0.10 cm<sup>3</sup> of any previous uncorrected accurate titre. <i>Do not include a reading if it is labelled rough.</i> <i>Do not award the mark if any accurate burette readings (apart from the initial zero) are given as integers.</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>

<b>Page 4</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS/A Level – October/November 2016</b>	<b>9701</b>	<b>35</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
	<p><b>V, VI and VII</b>  Examiner rounds any accurate burette readings to the nearest <math>0.05 \text{ cm}^3</math>, checks subtractions and then selects the 'best' accurate titres using the hierarchy: identical titres; titres within <math>0.05 \text{ cm}^3</math>; titres within <math>0.1 \text{ cm}^3</math>; etc., to calculate mean correct to <math>0.01 \text{ cm}^3</math>.</p> <p>Examiner uses the best titre to calculate the ratio of acid remaining after reaction with calcium carbonate in Question 1 to this best titre from Question 2 for Supervisor and each candidate.</p> <p>The ratio of this value for the candidate is compared to the ratio of this value for the Supervisor and marks awarded as follows.</p> <p>Award <b>V, VI and VII</b> for 0.95 – 1.05  Award <b>V and VI</b> for 0.90 – 1.10  Award <b>V</b> for 0.80 – 1.20</p>	<p>3</p> <p><b>7</b></p>



<b>Page 6</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS/A Level – October/November 2016</b>	<b>9701</b>	<b>35</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(c)(vii)	Correctly uses $[(vi) \times 100]/(\text{mass in (a)})$ to a minimum of 2 sf	1 <b>5</b>
2(d)	Question 1: % purity lower as loss of gas means fewer moles /less mass <b>CaCO<sub>3</sub></b>  Question 2: no change /% same as same amount of <b>acid</b> reacts / (amount) <b>acid</b> left is same	1 1  1 1  <b>4 max 3</b>
	<b>Total</b>	<b>16</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>								
<b>FA 5</b> is NaNO <sub>3</sub> (s); <b>FA 6</b> is CuCO <sub>3</sub> (s); <b>FA 7</b> is NaBr(aq)										
3(a)(i)	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;"><b>FA 5</b></th> <th style="width: 50%;"><b>FA 6</b></th> </tr> </thead> <tbody> <tr> <td>(goes to) colourless or yellow liquid/ solution</td> <td>(green) powder / solid (turns) black / black residue</td> </tr> <tr> <td>gas relights glowing splint</td> <td><b>or gas</b> turns limewater milky / cloudy white / chalky / forms white ppt</td> </tr> <tr> <td>gas (turns) brown / brown gas <b>or</b> solution turns blue</td> <td>(pale) blue solution / liquid formed</td> </tr> </tbody> </table>	<b>FA 5</b>	<b>FA 6</b>	(goes to) colourless or yellow liquid/ solution	(green) powder / solid (turns) black / black residue	gas relights glowing splint	<b>or gas</b> turns limewater milky / cloudy white / chalky / forms white ppt	gas (turns) brown / brown gas <b>or</b> solution turns blue	(pale) blue solution / liquid formed	1+1  1  1+1
<b>FA 5</b>	<b>FA 6</b>									
(goes to) colourless or yellow liquid/ solution	(green) powder / solid (turns) black / black residue									
gas relights glowing splint	<b>or gas</b> turns limewater milky / cloudy white / chalky / forms white ppt									
gas (turns) brown / brown gas <b>or</b> solution turns blue	(pale) blue solution / liquid formed									

<b>Page 7</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS/A Level – October/November 2016</b>	<b>9701</b>	<b>35</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>								
3(a)(ii)–(iv)	<table border="1"> <thead> <tr> <th><b>FA 5</b></th> <th><b>FA 6</b></th> </tr> </thead> <tbody> <tr> <td>(iii) solid dissolves / colourless solution allow no reaction / no change / no effervescence</td> <td>effervescence / fizzing / bubbling <b>and</b> blue solution / liquid formed</td> </tr> <tr> <td>(iv) no reaction / no change / no ppt / remains colourless</td> <td>blue ppt <b>and</b> insoluble in excess</td> </tr> <tr> <td>(v) no reaction / no change / no ppt / remains colourless</td> <td>(pale) blue ppt <b>and</b> soluble in excess to give deep / dark blue (solution)</td> </tr> </tbody> </table>	<b>FA 5</b>	<b>FA 6</b>	(iii) solid dissolves / colourless solution allow no reaction / no change / no effervescence	effervescence / fizzing / bubbling <b>and</b> blue solution / liquid formed	(iv) no reaction / no change / no ppt / remains colourless	blue ppt <b>and</b> insoluble in excess	(v) no reaction / no change / no ppt / remains colourless	(pale) blue ppt <b>and</b> soluble in excess to give deep / dark blue (solution)	1  1  1
	<b>FA 5</b>	<b>FA 6</b>								
	(iii) solid dissolves / colourless solution allow no reaction / no change / no effervescence	effervescence / fizzing / bubbling <b>and</b> blue solution / liquid formed								
(iv) no reaction / no change / no ppt / remains colourless	blue ppt <b>and</b> insoluble in excess									
(v) no reaction / no change / no ppt / remains colourless	(pale) blue ppt <b>and</b> soluble in excess to give deep / dark blue (solution)									
3(a)(v)	<b>FA 5:</b> cation unknown; anion nitrate / $\text{NO}_3^-$ <b>FA 6:</b> cation $\text{Cu}^{2+}$ / copper(II); anion carbonate / $\text{CO}_3^{2-}$ 4 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark	1 1 1								
3(a)(vi)	$\text{CuCO}_3(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{CuSO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$	1								
3(b)(i)	Selects $\text{AgNO}_3$ <b>and</b> $\text{NH}_3$ Selects $\text{NaOH}$ <b>and</b> $\text{Al}$ <b>and</b> $\text{HCl}$ / $\text{HNO}_3$ / $\text{H}_2\text{SO}_4$	1 1								
3(b)(ii)	Clearly defined test   observation   conclusion sections  <b>FA 7</b> + $\text{AgNO}_3$ cream ppt partially soluble in $\text{NH}_3$  <b>FA 7</b> is bromide / $\text{Br}^-$ from cream ppt	1  1  1								
	<b>Total</b>	<b>17</b>								