

### CHEMISTRY A LEVEL PAPER 3 MARK SCHEME

Question Number	Answer	Additional guidance	Mark
<b>1(a)</b>	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• step 2: insoluble impurities are removed by filtration of the hot solution (1)</li> <li>• step 4: soluble impurities remain in the solvent left after filtering the cooled mixture (1)</li> <li>• step 5: the solid product is washed so that no soluble impurities form on the product as it dries (1)</li> </ul>		<b>3</b>
<b>1(b)</b>	<p>A description that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• the melting temperature is over a larger range / is not sharp (1)</li> <li>• the measured melting temperature is less than for the pure solid (1)</li> </ul>		<b>2</b>

**(Total Question 1 = 5 marks)**

Question Number	Answer	Additional guidance	Mark
<b>2(a)</b>	<ul style="list-style-type: none"> <li>• <math>\text{Fe}^{2+} / \text{Fe}(\text{H}_2\text{O})_6^{2+}</math></li> <li>• <math>\text{Cr}^{3+} / \text{Cr}(\text{H}_2\text{O})_6^{3+}</math></li> </ul>	Allow $\text{Ni}^{2+} / \text{Ni}(\text{H}_2\text{O})_6^{2+}$ $\text{V}^{3+} / \text{V}(\text{H}_2\text{O})_6^{3+}$ Ignore names	<b>2</b>
<b>2(b)(i)</b>	$\text{Cr}^{3+} / \text{Cr}(\text{H}_2\text{O})_6^{3+}$	Ignore names	<b>1</b>
<b>2(b)(ii)</b>	$\text{Cr}(\text{OH})_3 / \text{Cr}(\text{H}_2\text{O})_3(\text{OH})_3$	Ignore names	<b>1</b>
<b>2(b)(iii)</b>	$\text{Cr}(\text{OH})_6^{3-}$	Accept other correct species Ignore names (no ecf from (b)(i))	<b>1</b>
<b>2(c)</b>	Any <b>one</b> from: <ul style="list-style-type: none"> <li>• purple to colourless</li> <li>• <u>purple</u> (solution) <u>decolourised</u></li> </ul>	Allow final colour of solution to be orange Allow pink for purple	<b>1</b>
<b>2(d)(i)</b>	$\text{Cl}^-$	Reject Cl Ignore names	<b>1</b>

Question Number	Answer	Additional guidance	Mark
2(d)(ii)	<p>An explanation that makes reference to the following points:</p> <p>ammonia solution cannot be used because:</p> <ul style="list-style-type: none"> <li>• ammonia reacts with the iron ions to form a precipitate (1)</li> </ul> <p><b>or</b></p> <ul style="list-style-type: none"> <li>• a precipitate of (Iron(II) hydroxide/ <math>\text{Fe}(\text{OH})_2</math>/ <math>\text{Fe}(\text{H}_2\text{O})_4(\text{OH})_2</math> forms (1)</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>• and so obscures the dissolving of the white precipitate (1)</li> </ul>		2

(Total Question 2 = 9 marks)

Question number	Answer	Additional guidance	Mark
<b>3(a)(i)</b>	<ul style="list-style-type: none"> <li>evaluation of number of moles of propanone = <math>0.025 \times 2.0 = 0.050</math> mol (1)</li> <li>which is greater than the amount of iodine, which is <math>0.050 \times 0.020 = 0.0010</math> mol (1)</li> </ul>		<b>2</b>
<b>3(a)(ii)</b>	<ul style="list-style-type: none"> <li>measuring cylinder/burette (1)</li> </ul>		<b>1</b>
<b>3(a)(iii)</b>	<ul style="list-style-type: none"> <li>pipette (1)</li> </ul>		<b>1</b>
<b>3(b)</b>	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>the order with respect to iodine is zero (1)</li> <li>because the graph is a straight line, showing that the change in iodine concentration is constant (1)</li> </ul>		<b>2</b>
<b>3(c)</b>	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>1<sup>st</sup> order with respect to H<sup>+</sup> and propanone (1)</li> <li>H<sup>+</sup> and propanone involved in reaction before rate determining step (therefore 1st order) (1)</li> <li>iodine involved after rate determining step / slow step (therefore zero order) (1)</li> </ul>		<b>3</b>

**(Total Question 3 = 9 marks)**

Question number	Answer	Additional guidance	Mark												
4(a)	<ul style="list-style-type: none"> <li>axes: correct way round, labelled, suitable scale (1)</li> <li>all points plotted correctly, with best fit straight line (1)</li> <li>calculation of gradient of straight line (1)</li> <li>use of gradient = <math>-E_a / R</math> to calculate <math>E_a</math> (in <math>\text{kJ mol}^{-1}</math>) (1)</li> </ul>	<p>Plotted points must cover at least half the graph paper on each axis Allow <math>\pm 1/2</math> a square</p> <p>Gradient = (-) 5970 Allow <math>\pm 200</math></p> <p>Activation energy = <math>5970 \times 8.31 / 1000</math> = <math>+49.6</math> (<math>\text{kJ mol}^{-1}</math>)</p> <p>Final answer must be positive.</p>	4												
*4(b)	<p>This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.</p> <p>Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.</p> <p>The following table shows how the marks should be awarded for indicative content.</p> <table border="1"> <thead> <tr> <th>Number of indicative marking points seen in answer</th> <th>Number of marks awarded for indicative marking points</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>4</td> </tr> <tr> <td>5-4</td> <td>3</td> </tr> <tr> <td>3-2</td> <td>2</td> </tr> <tr> <td>1</td> <td>1</td> </tr> <tr> <td>0</td> <td>0</td> </tr> </tbody> </table>	Number of indicative marking points seen in answer	Number of marks awarded for indicative marking points	6	4	5-4	3	3-2	2	1	1	0	0	<p>Guidance on how the mark scheme should be applied:</p> <p>The mark for indicative content should be added to the mark for lines of reasoning.</p> <p>For example, an answer with five indicative marking points, which is partially structured with some linkages and lines of reasoning, scores 4 marks (3 marks for indicative content and 1 mark for partial structure and some linkages and lines of reasoning).</p> <p>If there are no linkages between points, the same five indicative marking points would yield an overall score of 3 marks (3 marks for indicative content and no marks for linkages).</p>	6
Number of indicative marking points seen in answer	Number of marks awarded for indicative marking points														
6	4														
5-4	3														
3-2	2														
1	1														
0	0														

Question number	Answer	Additional guidance	Mark								
*4(b) Cont.	<p>The following table shows how the marks should be awarded for structure and lines of reasoning.</p> <table border="1" data-bbox="347 922 895 1794"> <thead> <tr> <th data-bbox="347 922 533 1279"></th> <th data-bbox="347 1279 533 1794">Number of marks awarded for structure of answer and sustained line of reasoning</th> </tr> </thead> <tbody> <tr> <td data-bbox="533 922 713 1279">Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning demonstrated throughout.</td> <td data-bbox="533 1279 713 1794">2</td> </tr> <tr> <td data-bbox="713 922 820 1279">Answer is partially structured with some linkages and lines of reasoning.</td> <td data-bbox="713 1279 820 1794">1</td> </tr> <tr> <td data-bbox="820 922 895 1279">Answer has no linkages between points and is unstructured.</td> <td data-bbox="820 1279 895 1794">0</td> </tr> </tbody> </table> <p><b>Indicative content:</b></p> <ul data-bbox="986 904 1332 1749" style="list-style-type: none"> <li>• activation energy (<math>E_A</math>) for the formation of <b>A</b> is lower than that for <b>B</b> (<math>E_B</math>)</li> <li>• hence at 40 °C more collisions exceed <math>E_A</math> than exceed <math>E_B</math></li> <li>• so <b>A</b> is formed more quickly than <b>B</b> at 40 °C</li> <li>• at 160 °C more collisions exceed <math>E_B</math> (and <math>E_A</math>) than at 40 °C</li> <li>• therefore both isomers are formed</li> <li>• but the reactions are reversible and <b>B</b> is the more stable isomer, therefore <b>A</b> will convert to <b>B</b></li> </ul>		Number of marks awarded for structure of answer and sustained line of reasoning	Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning demonstrated throughout.	2	Answer is partially structured with some linkages and lines of reasoning.	1	Answer has no linkages between points and is unstructured.	0		
	Number of marks awarded for structure of answer and sustained line of reasoning										
Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning demonstrated throughout.	2										
Answer is partially structured with some linkages and lines of reasoning.	1										
Answer has no linkages between points and is unstructured.	0										

(Total Question 4 = 10 marks)

Question Number	Answer	Additional guidance	Mark
5(a)	<ul style="list-style-type: none"> <li>substitution into <math>\Delta S^\ominus</math> equation (1)</li> <li>evaluation of <math>\Delta S^\ominus</math> (1)</li> <li>substitution into <math>\Delta G^\ominus = \Delta H^\ominus - T\Delta S^\ominus</math>, using <math>\Delta S^\ominus</math> in <math>\text{kJ K}^{-1} \text{mol}^{-1}</math> (1)</li> <li>correct answer to 3 sf (1)</li> <li>since <math>\Delta G^\ominus</math> is negative, the reaction is feasible (1)</li> </ul>	<p>Example of calculation</p> $\Delta S^\ominus = (2 \times 193) - 192 - (3 \times 131)$ $= -199 \text{ J K}^{-1} \text{ mol}^{-1} / - 0.199 \text{ kJ K}^{-1} \text{ mol}^{-1}$ $\Delta G^\ominus = - 92.0 - (298 \times - 0.199)$ $= - 32.7 \text{ kJ mol}^{-1} / - 32\,700 \text{ J mol}^{-1}$ <p>The first four marking points can be awarded for a correct answer to 3 sf with no working</p>	5
5(b)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>(as temperature increases) <math>T\Delta S</math> becomes more negative (1)</li> <li>(eventually) <math>\Delta H - T\Delta S</math> becomes positive (1)</li> </ul>		2

Question Number	Answer	Additional guidance	Mark
5(c)	<ul style="list-style-type: none"> <li>• Correct expression for <math>K_p</math> (1)</li> <li>• Calculation of mole fractions for <math>N_2</math>, <math>H_2</math> and <math>NH_3</math> (1)</li> <li>• Calculation of partial pressures for <math>N_2</math>, <math>H_2</math> and <math>NH_3</math> (1)</li> <li>• Substitution and evaluation of <math>K_p</math> (1)</li> <li>• Units: <math>\text{atm}^{-2}</math> (1)</li> </ul>	<p>Example of calculation (total number of moles = 18)  <math>\text{mf } N_2 = 2.88 \div 18 = 0.16</math>  <math>\text{mf } H_2 = 8.64 \div 18 = 0.48</math>  <math>\text{mf } NH_3 = 6.48 \div 18 = 0.36</math></p> <p><math>p_{N_2} = 0.16 \times 200 = 32 \text{ atm}</math>  <math>p_{H_2} = 0.48 \times 200 = 96 \text{ atm}</math>  <math>p_{NH_3} = 0.36 \times 200 = 72 \text{ atm}</math></p> <p><math>K_p = \frac{p^2 NH_3(g)}{p_{N_2}(g) \cdot p^3 H_2(g)}</math></p> <p><math>K_p = \frac{72^2}{32 \times 96^3} = 1.83 \times 10^{-4} \text{ atm}^{-2}</math></p> <p>Alternative method for calculation:  <math>\frac{0.36^2}{0.16 \times 0.48^3} (= 7.32421875)</math></p> <p><math>K_p = \frac{0.36^2}{0.16 \times 0.48^3} \times \frac{1}{200^2} = 1.83 \times 10^{-4} \text{ atm}^{-2}</math></p> <p>Correct answer with no working with units scores 5 marks</p>	5

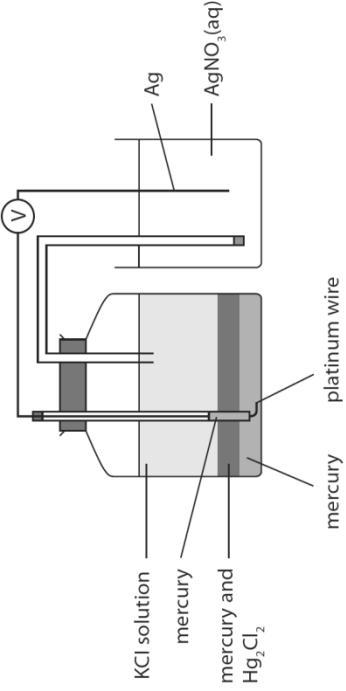
(Total Question 5 = 12 marks)



Question Number	Answer	Additional guidance	Mark
<b>6(a)</b>	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>• suitable volumes of ethanol and water (1)</li> <li>• evidence of calculation to show one component of mixture in excess (1)</li> <li>• mixed together in simple calorimeter / polystyrene cup with lid (1)</li> <li>• stir and measure maximum temperature change (1)</li> <li>• calculate energy change using <math>Q = mc\Delta T</math> (1)</li> <li>• calculate strength of hydrogen bond per mole by scaling up from the amount of limiting component of mixture (i.e. component not in excess) (1)</li> </ul>		<b>6</b>
<b>6(b)(i)</b>	<ul style="list-style-type: none"> <li>• evaluation of number of moles of 2-hydroxybenzoic acid used (1)</li> <li>• calculation of mass of aspirin at 100% yield (1)</li> <li>• calculation of mass of aspirin at 65% yield (1)</li> </ul>	<p><u>Example of calculation</u>  <math>2 / 138 = 0.0145 \text{ mol}</math>  <math>0.0145 \times 180 = 2.61 \text{ g}</math>  <math>2.61 / 100 \times 65 = 1.70 \text{ g}</math></p> <p>Correct answer with no working scores 3 marks</p>	<b>3</b>

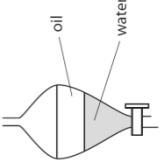
Question Number	Answer	Additional guidance	Mark
<b>6(b)(ii)</b>	<p>The mark for each reason must be linked with the correct improvement.</p> <ul style="list-style-type: none"> <li>• Improvement: swap the water inflow and outflow in the condenser (1)</li> <li>• Reason: to improve efficiency of condensing process (1)</li> <li>• Improvement: add anti-bumping granules to flask (1)</li> <li>• Reason: to promote smooth boiling/to prevent material escaping from top of condenser (1)</li> <li>• Improvement: insert condenser into neck of flask (1)</li> <li>• Reason: to prevent escape of reagents (1)</li> </ul>		<b>6</b>

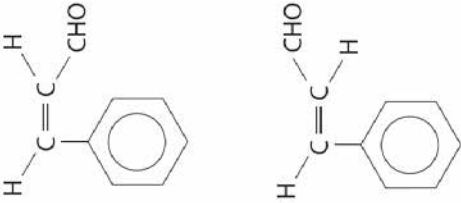
**(Total for question 6 = 15 marks)**

Question Number	Answer	Additional guidance	Mark
7(a)(i)	<ul style="list-style-type: none"> <li>• (saturated) potassium nitrate (1)</li> </ul>	Allow potassium chloride	1
7(a)(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• to complete the circuit (1)</li> <li>• by allowing movement of (positive and negative) ions (1)</li> </ul>		2
7(b)(i)	<ul style="list-style-type: none"> <li>• container/beaker containing the side arm and silver, both dipping into silver nitrate solution (1)</li> <li>• connecting wire from silver and calomel electrode to complete the circuit (1)</li> <li>• (high resistance/digital) voltmeter (1)</li> </ul>		3
7(b)(ii)	<ul style="list-style-type: none"> <li>• solution concentration 1.0 mol dm<sup>-3</sup> (1)</li> <li>• temperature 298 K (1)</li> </ul>	Ignore mention of pressure	2

Question Number	Answer	Additional guidance	Mark
<b>7(c)(i)</b>	<ul style="list-style-type: none"> <li>• correct equation</li> <li>• <math>\text{emf} = 0.80 - (+)0.27 = (+)0.53 \text{ (V)}</math></li> </ul>	<p>No sign in answer scores 1 mark, a minus sign given scores 0 marks</p> <p>Correct answer with no working scores 2 marks</p>	<b>2</b>
<b>7(c)(ii)</b>	<ul style="list-style-type: none"> <li>• <math>(+)0.03 \text{ (V)}</math></li> </ul>		<b>1</b>
<b>7(c)(iii)</b>	<ul style="list-style-type: none"> <li>• <math>\text{Fe}^{2+}(\text{aq}) + \text{Ag}^{+}(\text{aq}) \rightarrow \text{Fe}^{3+}(\text{aq}) + \text{Ag}(\text{s})</math></li> </ul>	Allow reversible arrows	<b>1</b>
<b>7(c)(iv)</b>	<ul style="list-style-type: none"> <li>• rearrangement and substitution into equation</li> <li>• evaluation of <math>\ln K</math> and conversion to <math>K</math></li> </ul>	<p><u>Example of calculation</u></p> $\ln K = \frac{-2892}{8.31 \times 298} = (+)1.1678$ $K = 3.21502 = 3.22$ <p>Ignore sf except 1</p> <p>Note if <math>\ln K = 1.1678</math> is used answer is 3.21</p> <p>Correct answer with no working scores 2 marks</p>	<b>2</b>

**(Total for question 7 = 14 marks)**

Question Number	Answer	Additional guidance	Mark
8(a)(i)	 <ul style="list-style-type: none"> <li>• cinnamon oil upper layer (1)</li> <li>• separating funnel (1)</li> </ul>	Funnel must be suitable for a stopper	2
8(a)(ii)	<ul style="list-style-type: none"> <li>• addition of (anhydrous) sodium sulfate / calcium chloride / magnesium sulfate (1)</li> </ul>		1
8(a)(iii)	<ul style="list-style-type: none"> <li>• from cloudy to clear (1)</li> </ul>	Do not accept colourless in place of clear	1
8(b)(i)	<ul style="list-style-type: none"> <li>• contains C=C/alkene (1)</li> </ul>		1
8(b)(ii)	<ul style="list-style-type: none"> <li>• contains carbonyl group/ aldehyde or ketone (1)</li> </ul>	C=O alone	1
8(b)(iii)	<ul style="list-style-type: none"> <li>• aldehyde/ -CHO (1)</li> </ul>		1

Question Number	Answer	Additional guidance	Mark
<b>8(c)(i)</b>	<ul style="list-style-type: none"> <li>• 77 C<sub>6</sub>H<sub>5</sub><sup>+</sup></li> <li>• 103 C<sub>8</sub>H<sub>7</sub><sup>+</sup></li> </ul>	Must show a charge but only penalise omission once Allow structural, displayed or skeletal formulae	<b>2</b>
<b>8(c)(ii)</b>		Allow non-displayed benzene C-Hs	<b>2</b>
<b>8(c)(iii)</b>	<ul style="list-style-type: none"> <li>• The peak is due to the presence of an atom of a <sup>13</sup>C isotope (1)</li> </ul>	Allow reference to other named isotope of H or O	<b>1</b>

Question Number	Answer	Additional guidance	Mark
8(d)	<ul style="list-style-type: none"> <li>• initial moles of NaOH in 250 cm<sup>3</sup> (1)</li> <li>• excess moles of NaOH in 25.0 cm<sup>3</sup> (1)</li> <li>• expression for moles of total NaOH reacted (1)</li> <li>• evaluation of moles of cinnamic acid (1)</li> <li>• evaluation of <math>M_r</math> of cinnamic acid to 1 dp (1)</li> </ul>	<p>Example calculation  Initial moles of NaOH = <math>(250 \div 1000) \times 0.500</math>  = 0.125</p> <p>Moles of excess NaOH in 25.0 cm<sup>3</sup>  = <math>(28.25 \div 1000) \times 0.400 = 0.0113</math></p> <p>Moles of NaOH reacted = <math>0.125 - (10 \times 0.0113)</math></p> <p>Moles of cinnamic acid = moles of NaOH reacted  = 0.012</p> <p><math>M_r</math> of cinnamic acid = <math>1.78 \div 0.012 = 148.3</math></p> <p>Allow ecf from 2<sup>nd</sup> mark  Correct answer to 1 dp with no working scores 5 marks</p>	5

**(Total for Question 8 = 17 marks)**

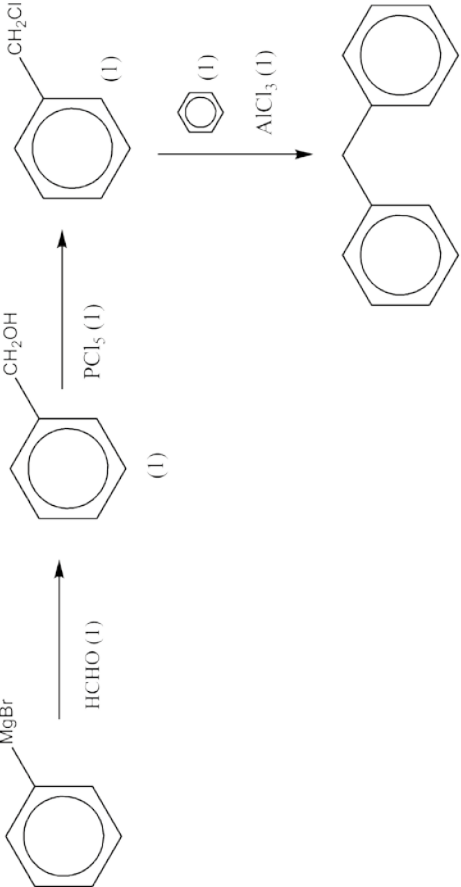
Question Number	Answer	Additional guidance	Mark
<b>9(a)(i)</b>	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• copper forms an ion with an incomplete d-sub-shell / with a configuration of <math>3d^9</math> (1)</li> <li>• but the <u>only</u> ion formed by zinc has a completely filled d-sub-shell (1)</li> </ul>		<b>2</b>
<b>9(a)(ii)</b>	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• (in brass) the layers of positive ions can slide over one another (1)</li> <li>• and there are (always) electrons between the layers preventing repulsion between the ions in one layer and those in another layer (1)</li> <li>• (in sodium chloride) when a layer of ions is displaced, ions with the same charge become close to one another and repel (1)</li> </ul>		<b>3</b>
<b>9(b)(i)</b>	<ul style="list-style-type: none"> <li>• brown fumes (1)</li> <li>• a green/blue solution forming (1)</li> </ul>		<b>2</b>



Question Number	Answer	Additional guidance	Mark
9(b)(ii)	<ul style="list-style-type: none"> <li><math>I_2(aq) + 2S_2O_3^{2-}(aq) \rightarrow 2I^-(aq) + S_4O_6^{2-}(aq)</math> (1)</li> </ul>	State symbols must be present	1
9(b)(iii)	<ul style="list-style-type: none"> <li>amount of thiosulfate (1)</li> <li>uses amount of thiosulfate = amount of iodine to determine amount of thiosulfate = amount of copper(II) ions in 25 cm<sup>3</sup> portion (1)</li> <li>evaluation of number of moles of Cu in sample (1)</li> <li>calculates mass of Cu (1)</li> <li>percentage copper to 3 sf (1)</li> </ul>	<p><u>Example of calculation</u>  amount of thiosulfate = <math>\frac{22.7 \times 0.25}{1000}</math>  = <math>5.675 \times 10^{-3}</math> (mol)</p> <p><math>5.675 \times 10^{-3}</math> (mol) = amount of copper(II) ions in 25 cm<sup>3</sup> portion</p> <p>amount of Cu in sample = <math>5.675 \times 10^{-3} \times 10</math>  = <math>5.675 \times 10^{-2}</math> (mol)</p> <p>mass of Cu = <math>5.675 \times 10^{-2} \times 63.5</math>  = 3.603625</p> <p>percentage copper = <math>\frac{3.603625 \times 100}{5.00}</math>  = 72.0725 = 72.1%</p> <p>Allow ecf from 2<sup>nd</sup> mark</p> <p>Correct answer to 3 sf with no working scores 5 marks</p>	5
9(b)(iv)	<ul style="list-style-type: none"> <li>calculation of percentage uncertainty from balance = <math>\pm 0.005 \times 2 \times 100 / 5.00 = 0.2\%</math></li> </ul> <p><b>and</b></p> <ul style="list-style-type: none"> <li>percentage uncertainty in mean titre from burette = <math>2 \times \pm 0.05 \times 100 / 22.7 = 0.44\%</math> (1)</li> <li>so burette reading is most significant (1)</li> </ul>		2

**(Total for Question 9 = 15 marks)**

Question Number	Answer	Additional guidance	Mark
<b>10(a)</b>	<ul style="list-style-type: none"> <li><math>C_6H_5COOH + CaO \rightarrow C_6H_6 + CaCO_3</math></li> </ul>	Accept $C_6H_5COOH + CaO \rightarrow C_6H_6 + CaO + CO_2$	<b>1</b>
<b>10(b)</b>	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>-2 in cyclohexane and -1 in benzene</li> <li>so (carbon is) oxidised</li> </ul>	2nd mark stands alone	<b>2</b>
<b>10(c)</b>	<p>spectrum 1 is methylbenzene, because</p> <ul style="list-style-type: none"> <li>it contains an absorption at <math>2962 - 2853 \text{ cm}^{-1}</math></li> <li>owing to alkyl C—H stretching</li> </ul>	Identification unqualified gains no marks	<b>2</b>
<b>10(d)</b>	$nC_6H_5CH=CH_2 \rightarrow \left( \begin{array}{c}   \\ CH-CH_2 \end{array} \right)_n$ $C_6H_5$ <ul style="list-style-type: none"> <li>correct product formula</li> <li>balanced equation</li> </ul>		<b>2</b>
<b>10(e)(i)</b>	Iron / iron(III) bromide	Allow aluminium / aluminium bromide Allow correct formulae	<b>1</b>

Question Number	Answer	Additional guidance	Mark
10(e)(ii)	<ul style="list-style-type: none"> <li>• reagent for step 1 (1)</li> <li>• product of step 1 (1)</li> <li>• reagent for step 2 (1)</li> <li>• product of step 2 (1)</li> <li>• reagent for step 3 (1)</li> <li>• catalyst for step 3 (1)</li> </ul>		6
	<p>Example of synthesis:</p> 		

(Total for Question 10 = 14 marks)