



**GCE**

**Chemistry A**

**H032/02: Depth in chemistry**

Advanced Subsidiary GCE

**Mark Scheme for June 2019**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations available in RM Assessor

Annotation	Meaning
✓	Correct response
✗	Incorrect response
▲	Omission mark
BOD	Benefit of doubt given
CON	Contradiction
RE	Rounding error
SF	Error in number of significant figures
ECF	Error carried forward
L1	Level 1
L2	Level 2
L3	Level 3
NBOD	Benefit of doubt not given
SEEN	Noted but no credit given
I	Ignore

Abbreviations, annotations and conventions used in the detailed Mark Scheme (to include abbreviations and subject-specific conventions).

Annotation	Meaning
<b>DO NOT ALLOW</b>	Answers which are not worthy of credit
<b>IGNORE</b>	Statements which are irrelevant
<b>ALLOW</b>	Answers that can be accepted
( )	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
<b>ECF</b>	Error carried forward
<b>AW</b>	Alternative wording
<b>ORA</b>	Or reverse argument

## Subject-specific Marking Instructions

### INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

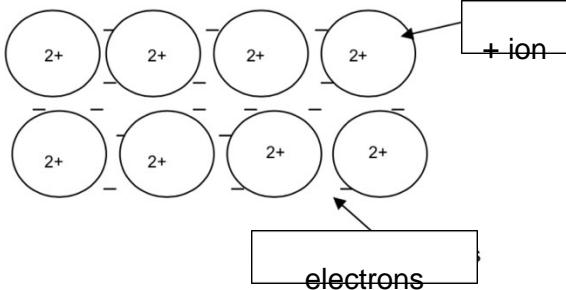
- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

Question		Answer	Marks	AO element	Guidance
1	(a) (i)	(Weighted) mean/average mass of an <b>atom</b> ✓ compared with 1/12th mass of carbon-12 <b>OR</b> compared with mass of carbon-12 which is 12 ✓	2	AO1.1 ×2	<b>DO NOT ALLOW</b> mean mass of an element <i>i.e. 'atom' essential</i>  <b>Both marks available based on mole:</b> <b>ALLOW</b> mass of <b>1 mole</b> of atoms ✓ compared to 1/12th <b>1 mole</b> /12 g of carbon-12 ✓  <b>ALLOW</b> <u>mass of one mole of atoms</u> ✓ 1/12th mass of one mole/12 g of carbon-12 ✓
	(ii)	<b>Use of isotope data</b> Use of $87 \times 6.9$ <b>AND</b> $88 \times 82.9$ <b>AND</b> 10.2 anywhere ✓  <b>Calculation of isotopic mass</b> $\frac{(100 \times 87.73) - (87 \times 6.9) - (88 \times 82.9)}{10.2} = 86$ <b>OR</b> 86.03 ✓	2	AO1.2 ×2	  <b>ALLOW</b> $877.5 = 10.2A$  <b>ALLOW</b> $87.73 = \frac{(A \times 10.2) + 600.3 + 7295.2}{100}$  <b>ALLOW</b> $\frac{8773 - 600.3 - 7295.2}{10.2} = 86.03$  <b>ALLOW</b> $\frac{87.73 - 78.955}{0.102}$ <b>OR</b> $\frac{8.775}{0.102} = 86$ <b>OR</b> 86.03  <b>DO NOT ALLOW</b> Sr-86 with no working/justification  <b>ALLOW</b> any unambiguous representation

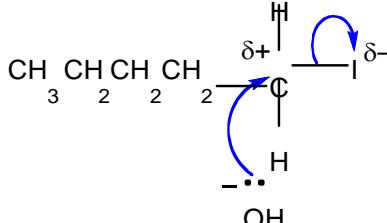
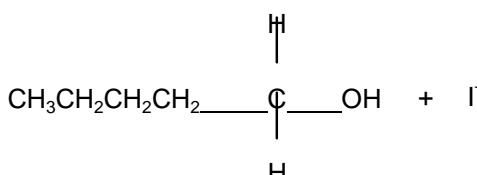
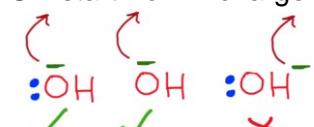
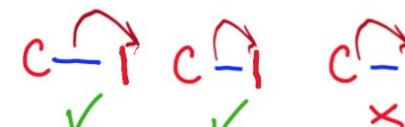
Question		Answer	Marks	AO element	Guidance
1	(b)	<p><b>Bonding and structure</b></p>  <p><b>Metallic bonding diagram</b>      Regular arrangement of <b>labelled</b> + ions ✓      scattering of <b>labelled</b> electrons <b>between</b> other species ✓</p> <p><b>Properties linked to explanation</b>      metallic bond or attraction between the electrons and the positive ions/cations ✓      bonds are strong/require a lot of energy to break  <b>AND</b> high melting point ✓      Delocalised electrons move  <b>AND</b> good conductivity ✓</p>	5	AO1.1 x3  AO2.1 x2	<p><b>Diagram must have at least two rows and a minimum of two ions per row (allow <math>\text{Sr}^+</math> or <math>\text{Sr}^{2+}</math>)</b></p> <p><b>ALLOW</b> for labels: + ions, positive ions, cations</p> <p><b>ALLOW</b> <math>e^-</math> <b>OR</b> e as label for electron</p>
	(c) (i)	$\text{Sr} + 2\text{H}_2\text{O} \rightarrow \text{Sr}(\text{OH})_2 + \text{H}_2$ ✓	1	AO2.6	<p><b>ALLOW</b> correct multiples including fractions  <b>IGNORE</b> state symbols</p>

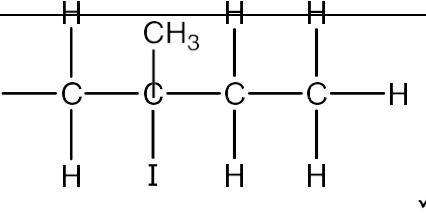
Question			Answer	Marks	AO element	Guidance
	(c)	(ii)	<p>Two points (✓✓) from With calcium:</p> <ol style="list-style-type: none"> <li>1. less vigorous fizzing/bubbling/effervescence</li> <li>2. dissolves more slowly/slower reaction</li> <li>3. solution has a lower pH/less alkaline</li> <li>4. precipitate forms/less soluble</li> </ol>	2	AO2.3 x2	<b>IGNORE</b> gives out less/more heat, less reactive, less gas
1	(d)	(i)	<p><b>FIRST CHECK THE ANSWER ON ANSWER LINE</b> If answer = 5.8 award 3 marks</p> <hr/> $n(\text{SrCl}_2) = \frac{1.02}{158.6} = 0.0102\dots\dots \text{ (mol)} \checkmark$ $n(\text{H}_2\text{O}) = \frac{1.07}{18} = 0.0594\dots\dots \text{ (mol)} \checkmark$ $x = \text{SrCl}_2 : \text{H}_2\text{O} = \frac{0.0594\dots\dots}{0.0102\dots\dots} = 5.8 \checkmark$	3	AO3.1 x2  AO3.2	<b>Calculator:</b> 0.01021437579  <b>Calculator:</b> 0.05944444444  <b>ALLOW ECF</b> from $n(\text{SrCl}_2)$ and/or $n(\text{H}_2\text{O})$ Answer must be to <b>TWO</b> significant figures <b>ALLOW</b> 2 marks for 5.83 (answer must be to 2 SF)

Question		Answer	Marks	AO element	Guidance
	(ii)	To make sure all the water had been removed ✓	1	AO3.4	<b>IGNORE</b> just 'to weigh to constant mass'
	(iii)	Use balance that weighs to 3/more decimal places ✓  Use a larger mass (of hydrated strontium chloride) ✓	2	AO3.4 ×2	<b>ALLOW</b> more precise/more accurate/ more sensitive/higher resolution/smaller division/weigh to 0.001  <b>IGNORE</b> 'less error/smaller interval balance'  <b>IGNORE</b> any reference to lid on crucible (water can't escape)  <b>IGNORE</b> 'weigh straight after heating'  <b>IGNORE</b> idea of repeating the experiment/ taking an average/ getting concordant results /larger sample size, etc.
		<b>Total</b>	<b>18</b>		

Question		Answer	Marks	AO element	Guidance
2	(a)	<p><i>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</i></p> <p><b>Level 3 (5–6 marks)</b> Calculates the correct mass of <math>\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}</math> or <math>\text{Mg}(\text{NO}_3)_2</math>.</p> <p><b>AND</b> Explains the preparation steps, with most fine detail.</p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p><b>Level 2 (3–4 marks)</b> Attempts a calculation which is partly correct.</p> <p><b>AND</b> Outlines the preparation steps, with some fine detail.</p> <p><i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i></p> <p><b>Level 1 (1–2 marks)</b> Attempts the calculation but makes little progress or makes errors.</p> <p><b>OR</b> Briefly outlines the preparation steps, which may be incomplete</p> <p><i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i></p> <p><b>0 marks</b> No response or no response worthy of credit.</p>	6	AO2.8 ×2	<p><b>Indicative scientific points may include:</b></p> <p><b>Calculation:</b>  <math display="block">n = \frac{250.0}{1000} \times 0.4000 = 0.1(000) \text{ (mol)}</math> <math display="block">M(\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}) = 256.3</math> <math display="block">\text{Mass} = 0.1000 \times 256.3 = 25.63 \text{ g}</math> </p> <p><b>OR</b> <math>M(\text{Mg}(\text{NO}_3)_2) = 148.3</math>  <math>\text{Mass} = 14.83 \text{ g}</math></p> <p><b>ALLOW</b> small slip/rounding errors such as errors on <math>M_r</math> (e.g. use of 24 instead of 24.3 for Mg A.)</p> <p><b>Preparation steps (apparatus and method):</b></p> <ul style="list-style-type: none"> <li>• Weigh mass of crystals</li> <li>• Dissolve in (distilled/deionised) water</li> <li>• Transfer to 250 cm<sup>3</sup> volumetric flask</li> <li>• Make up to the mark with more water so that bottom of meniscus is on the mark</li> </ul> <p><b>IGNORE</b> removing the water of crystallisation</p> <p><b>Fine detail:</b></p> <ul style="list-style-type: none"> <li>• 2 or more decimal place balance</li> <li>• Rinse beaker and transfer washings to flask</li> <li>• Use of dropping pipette when filling to mark</li> <li>• Stopper, invert several times to mix</li> </ul>

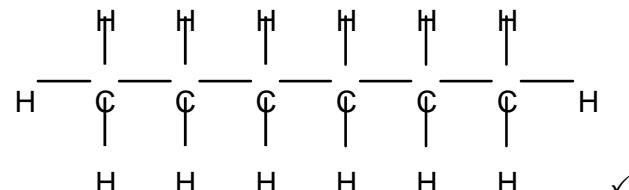
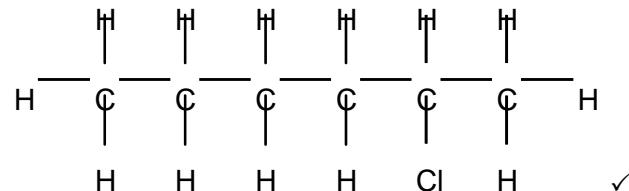
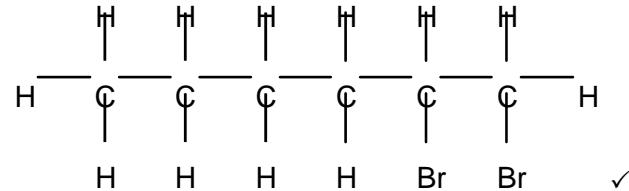
Question		Answer	Marks	AO element	Guidance
2	(b)	<p><b>FIRST CHECK THE ANSWER ON ANSWER LINE</b>  <b>If answer = 38.5 cm<sup>3</sup> award 3 marks</b></p> <hr/> $n(\text{Mg}(\text{NO}_3)_2) = \frac{0.00}{148.3} = 0.0337 \dots \text{(mol)} \checkmark$ $n(\text{HNO}_3) = 2 \times 0.0337 \dots = 0.0674 \dots \text{(mol)} \checkmark$ $\text{volume} = 0.0674 \dots \times \frac{1000}{1.75} = 38.5 \text{ (cm}^3\text{)} \checkmark$ <p><b>3 SF required</b></p>	3	AO2.8 x3	<p><b>Calculator:</b> 0.03371544167</p> <p><b>ALLOW ECF</b> from <math>n(\text{Mg}(\text{NO}_3)_2)</math>  <b>Calculator:</b> 0.06743088334</p> <p><b>ALLOW ECF</b> from <math>n(\text{HNO}_3)</math></p>
	(c)	<p><b>Element oxidised:</b> Oxygen/O Change from: -2 to 0 ✓</p> <p><b>Element reduced:</b> Nitrogen/N: Change from +5 to +4 ✓</p>	2	AO2.2 x2	<p><b>MAX 1 mark</b> if no '+' sign for oxidation number</p> <p><b>ALLOW</b> 2-</p> <p><b>ALLOW</b> 5+ <b>AND</b> 4+</p> <p><b>ALLOW</b> O<sub>2</sub> for oxygen</p> <p><b>ALLOW</b> 1 mark for all oxidation numbers correct, but oxidised and reduced the wrong way around</p> <p><b>IGNORE</b> numbers around equation <i>i.e. treat as rough working</i></p>
		<b>Total</b>	11		

Question		Answer	Marks	AO element	Guidance
3	(a) (i)	<p>Curly arrow from <math>\text{HO}^-</math> to carbon atom of C–I bond ✓</p> <p>Dipole shown on C–I bond, <math>\text{C}^{\delta+}</math> and <math>\text{I}^{\delta-}</math> <b>AND</b></p> <p>curly arrow from C–I bond to I atom ✓</p> <p></p> <p><b>IGNORE</b> presence of <math>\text{Na}^+</math> but <math>\text{OH}^-</math> needed i.e. <math>\text{Na}^+\text{OH}^-</math> can be allowed if the criteria are met</p> <p>-----</p> <p>Correct organic product <b>AND</b> <math>\text{I}^-</math> ✓</p> <p></p> <p><b>IGNORE</b> presence of <math>\text{Na}^+</math> but <math>\text{I}^-</math> needed i.e. <math>\text{Na}^+\text{I}^-</math> can be allowed BUT <math>\text{NaI}</math> does not show <math>\text{I}^-</math></p>	3	AO2.5 x3	<p><b>ANNOTATE ANSWER WITH TICKS AND CROSSES</b></p> <p><b>NOTE:</b> curly arrows can be straight, snake-like, etc. but <b>NOT</b> double headed or half headed arrows</p> <p><b>1st curly arrow</b> must</p> <ul style="list-style-type: none"> <li>• go to the C of C–I</li> <li><b>AND</b></li> <li>• start from, <b>OR</b> be traced back to <b>any point across width</b> of lone pair on O of <math>\text{OH}^-</math></li> </ul> <p></p> <ul style="list-style-type: none"> <li>• <b>OR</b> start from – charge on O of <math>\text{OH}^-</math> ion</li> </ul> <p></p> <p><i>(Lone pair <b>NOT</b> needed if curly arrow shown from <math>\text{O}^-</math>)</i></p> <p><b>2nd curly arrow</b> must start from, <b>OR</b> be traced back to, <b>any part of</b> C–I bond and go to I</p> <p></p>
	(ii)	Time for <b>precipitate</b> to appear ✓	1	AO3.3	Time <b>AND</b> precipitate required Question asks for measurement

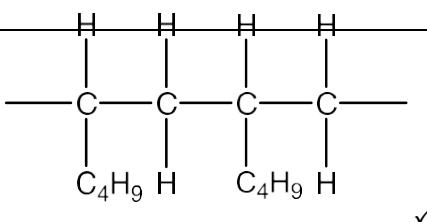
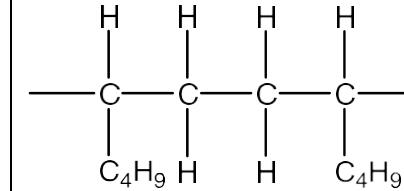
3	(a)	(iii)	C–I bond is weaker (than C–Br bond) OR C–I bond has a lower bond enthalpy (than C–Br bond) ✓  Carbon – halogen <b>bond breaks</b> ✓	2	AO3.2	<b>For 2 marks,</b> <b>ALLOW</b> C–I is broken more easily (than C–Br) as the bond is weaker  There must be a <b>comparison</b> between C–Br and C–I bonds
	(b)	(i)	Molecular mass ✓	1	AO1.1	<b>IGNORE</b> 'relative' <b>IGNORE</b> 'molecular ion' alone, answer must relate to <b>mass</b>  <b>ALLOW</b> $M_r$ / molar mass
		(ii)	Y: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2^+$ ✓  Z: $\text{CH}_3\text{CH}_2\text{CH}_2^+$ ✓  <b>If positive charge is missing but the structures of Y AND Z are correct, award one mark</b>	2	AO3.2 x2	<b>FOR ONE MARK</b> <b>ALLOW</b> $\text{C}_5\text{H}_{11}^+$ AND $\text{C}_3\text{H}_7^+$  <b>ALLOW</b> any combination of skeletal OR structural <b>OR</b> displayed formula as long as unambiguous
	(c)	(i)		1	AO1.1	<b>ALLOW</b> any combination of skeletal OR structural <b>OR</b> displayed formula as long as unambiguous
		(ii)	<b>Similarity</b> Both have a peak at ( $m/z =$ ) 198 (X) <b>OR</b> 71 (Y) <b>OR</b> 29 ✓  <b>Difference</b> 2-iodo-2-methylbutane has <b>no</b> peak at ( $m/z =$ ) 43 (Z) ✓	2	AO3.2 x2	<b>ALLOW</b> same molecular ion peak / $M_r$  <b>IGNORE</b> statements where no specific ion peak is suggested e.g. "different ion peaks"
				<b>Total</b>	12	

Question		Answer	Marks	AO element	Guidance
4	(a)	<p><b>FIRST CHECK THE ANSWER ON ANSWER LINE</b>  <b>If answer = 60 cm<sup>3</sup> award 3 marks</b></p> <hr/> $n(\text{HCl}) = \frac{50.0}{1000} \times 0.100 = 5.00 \times 10^{-3} \text{ (mol)} \checkmark$ $n(\text{H}_2) = \frac{5.00 \times 10^{-3}}{2} = 2.50 \times 10^{-3} \text{ (mol)} \checkmark$ $\text{Volume} = 2.5(0) \times 10^{-3} \times 24.0 \times 1000 = 60(0) \text{ cm}^3 \checkmark$	3	AO2.6 x3	<p><b>ALLOW</b> 120 cm<sup>3</sup> for 2 marks (no ÷ 2)  <b>ALLOW</b> 240 cm<sup>3</sup> for 2 marks (× 2 not ÷ 2)</p> <p><b>IGNORE</b> absence of trailing zeroes, e.g. for 0.100, <b>ALLOW</b> 0.1</p> <p><b>ALLOW ECF</b> from <math>n(\text{HCl})</math></p> <p><b>ALLOW ECF</b> from <math>n(\text{HCl})</math> and/or <math>n(\text{H}_2)</math></p>
	(b)	<p><b>(i)</b> <b>Use of graph paper</b>  linear numerical scale chosen for x axis  <b>AND</b>  Time / s added as label  <b>AND</b>  ALL points plotted correctly ✓</p>	1	AO2.4 x1	<p><b>ALLOW</b> Time (s) <b>OR</b> Time in s  <b>ALLOW</b> seconds <b>OR</b> sec <b>OR</b> secs</p> <p>Tolerance ± 1 small square</p> <p>Point at 0,0 <b>NOT</b> required  <b>ALLOW</b> up to 3 plotting errors</p>
	(ii)	<p><b>Anomaly</b>  point at 80 s circled ✓</p>	1	AO2.4 x1	<p><b>ALLOW</b> one more anomalous point <b>NOT</b> on the curve drawn in (iii)</p>
	(iii)	<p><b>Line</b>  smooth curve using all points  <b>EXCEPT</b> point at 80 s ✓</p>	1	AO3.1	
	(c)	<p>Initial slope is steeper  <b>AND</b> curve levels off at an earlier time ✓</p> <p><b>Same</b> volume of gas produced (58 cm<sup>3</sup>) ✓</p>	2	AO2.8 x2	<p>Tolerance ± 1 small square</p>

Question		Answer	Marks	AO element	Guidance
4	(d)	<p><b>Rate</b>            (Acid) <b>concentration</b> decreases. ✓</p> <p><b>Collisions</b>            Fewer collisions per second  <b>OR</b> less frequent collisions ✓</p>	2	AO1.1 ×2	<b>IGNORE</b> amount of acid decreases, response must imply a volume and <b>NOT</b> area, e.g. fewer particles/molecules/ions in same space /volume  'fewer collisions' alone is not sufficient (no rate)
	(e)	<p>Catalyst lowers the activation energy (by providing an alternative route) ✓</p> <p>A greater proportion of molecules have more energy greater than/equal to activation energy ✓</p>	2	AO1.2 ×2	<b>ALLOW</b> 'more' for 'greater proportion'  <b>ALLOW</b> more molecules have sufficient energy to react  <b>IGNORE</b> (more) successful collisions
	(ii)	Reactants have different physical states ✓	1	AO2.1	<b>ALLOW</b> idea that copper(II) sulfate solution is homogeneous in relation to the acid, but heterogeneous in relation to the zinc
		<b>Total</b>	<b>13</b>		

Question		Answer	Marks	AO element	Guidance
5	(a) (i)	<p><b>Product with <math>\text{H}_2</math></b></p>  <p><b>Product with <math>\text{HCl}</math></b></p>  <p><b>Product with <math>\text{Br}_2</math></b></p> 	3	AO1.2 x3	<b>ALLOW</b> any combination of skeletal <b>OR</b> structural <b>OR</b> displayed formula as long as unambiguous  <b>ALLOW</b> part molecular formulae but not full
	(ii)	Nickel/Ni ✓	1	AO1.2	<b>ALLOW</b> Pt <b>OR</b> Pd <b>OR</b> Rh
	(iii)	(orange to) colourless <b>OR</b> bromine is decolourised ✓	1	AO1.2	<b>ALLOW</b> 'it decolourises / turns colourless' <b>IGNORE</b> colour change

Question		Answer	Marks	AO element	Guidance
5	(b)	<p><b>(i)</b> Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p><b>Level 3 (5–6 marks)</b> Calculates the correct mass of hexan-1-ol. <b>AND</b> Explains the purification steps, with most fine detail. <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p><b>Level 2 (3–4 marks)</b> Attempts a calculation of the mass of hexan-1-ol which is partly correct. <b>OR</b> Outlines the purification steps, with some fine detail. <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i></p> <p><b>Level 1 (1–2 marks)</b> Attempts the calculation but makes little progress. <b>OR</b> Briefly outlines the purification steps, which may be incomplete. <i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i></p> <p><b>0 marks</b> No response or no response worthy of credit.</p>	6	AO2.8 x2   AO3.3 x4	<p><b>Indicative scientific points may include:</b></p> <p><b>Calculation from moles</b></p> <p><input type="checkbox"/> <math>n(\text{hex-1-ene}) = \frac{4.20}{84.0} = 0.0500 \text{ (mol)}</math></p> <p><input type="checkbox"/> <math>n(\text{hexan-1-ol}) \text{ needed} = 0.0500 \times \frac{100}{62.5} = 0.0800 \text{ (mol)}</math></p> <p><input type="checkbox"/> <math>\text{mass needed} = 0.0800 \times 102 = 8.16 \text{ g}</math></p> <p><input type="checkbox"/> <b>OR</b> volume <math>\frac{8.16}{0.82} = 9.95 \text{ cm}^3</math></p> <p><b>CHECK</b> for extent of errors by <b>ECF</b>.</p> <p><b>Calculation from mass</b></p> <p><input type="checkbox"/> Theoretical mass hex-1-ene = <math>4.20 \times \frac{100}{62.5} = 6.72 \text{ g}</math></p> <p><input type="checkbox"/> Theoretical <math>n(\text{hex-1-ene}) = \frac{6.72}{84} = 0.0800 \text{ (mol)}</math></p> <p><input type="checkbox"/> Mass of hexan-1-ol = <math>102 \times 0.0800 = 8.16 \text{ g}</math></p> <p><b>ALLOW</b> small slip/rounding errors such as errors on <math>M_r</math> (e.g. use of 83 instead of 84 for hex-1-ene <math>M_r</math>)</p> <hr/> <p><b>Purification</b></p> <p><input type="checkbox"/> Use of a <b>separating funnel</b> to separate organic and aqueous layers</p> <p><input type="checkbox"/> <b>Drying</b> with an anhydrous salt</p> <p><input type="checkbox"/> <b>Distillation</b></p> <p><b>Fine detail</b></p> <p><input type="checkbox"/> Collection of upper layer (less dense from separating funnel)</p> <p><input type="checkbox"/> Example of drying agent, e.g. <math>\text{MgSO}_4</math>, <math>\text{CaCl}_2</math></p> <p><input type="checkbox"/> Collection of fraction distilling at <math>63^\circ\text{C}</math> (boiling point of hex-1-ene)</p> <p>Incorrect purification method <b>NOT</b> creditworthy</p> <hr/> <p><b>Examples of partly correct calculations</b></p> <p>Mass = 5.1 g from <math>0.0500 \times 102</math> % yield omitted</p> <p>Mass = 3.1875 g from <math>0.0500 \times \frac{62.5}{100} \times 102</math> % yield inverted</p>

Question		Answer	Marks	AO element	Guidance
5	(b) (ii)	<p>Yield of hex-1-ene is less ✓</p> <p>A mixture of hex-1-ene and hex-2-ene forms ✓</p>	2	AO3.2 x2	<p><b>ALLOW</b> hex-2-ene also forms</p>
	(c) (i)	 <p><b>NOTE:</b> C<sub>4</sub>H<sub>9</sub>– is allowed for CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>–</p>	1	AO2.5	<p><b>ALLOW</b> correct structural <b>OR</b> displayed <b>OR</b> skeletal formula</p> <p>Must show two repeat units</p> <p>Polymer must have side links</p> <p><b>IGNORE</b> brackets and use of 'n'</p> <p><b>ALLOW</b> alternating side chains, i.e.</p> 
	(ii)	<p>Combustion for energy production ✓</p> <p>for production of plastics</p> <p><b>OR</b> other useful <b>organic</b> compounds ✓</p>	2	AO1.1 x2	<p>For energy production,</p> <p><b>ALLOW</b> generate electricity/heating</p> <p><b>ALLOW</b> as an (organic) feedstock</p>
		<b>Total</b>	<b>16</b>		

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