

# Higher

## GCSE

### Combined Science B Twenty First Century Science

#### J260/06: Chemistry (Higher Tier)

General Certificate of Secondary Education

### Mark Scheme for June 2024

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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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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**MARKING INSTRUCTIONS****PREPARATION FOR MARKING****RM ASSESSOR**

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Online Training*; *OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are available in RM Assessor.
3. Log-in to RM Assessor and mark the **required number** of practice responses ("scripts") and the **required number** of standardisation responses.

**MARKING**

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the RM Assessor messaging system.

5. Work crossed out:
- where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
  - if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.
6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.
7. There is a NR (No Response) option. Award NR (No Response)
- if there is nothing written at all in the answer space
  - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
  - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question.
- Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).
8. The RM Assessor **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
- If you have any questions or comments for your Team Leader, use the phone, the RM Assessor messaging system, or email.
9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer.

Once the level is located, award the higher or lower mark:

**The higher mark** should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

**The lower mark** should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.















**In summary:**

**The skills and science content determines the level.**

**The communication statement determines the mark within a level.**

Level of response question on this paper **6a**

## 11. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
	Benefit of doubt given
	Contradiction
	Rounding error
	Error in number of significant figures
	Error carried forward
	Level 1
	Level 2
	Level 3
	Benefit of doubt not given
	Noted but no credit given
	Ignore

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

<b>Annotation</b>	<b>Meaning</b>
<b>/</b>	alternative and acceptable answers for the same marking point
<b>✓</b>	Separates marking points
<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
<b>( )</b>	Words which are not essential to gain credit
<b>—</b>	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

### 13. 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.



The breakdown of Assessment Objectives for GCSE (9-1) in Combined Science B:

	<b>Assessment Objective</b>
<b>AO1</b>	<b>Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.</b>
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
<b>AO2</b>	<b>Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.</b>
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
<b>AO3</b>	<b>Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.</b>
<b>AO3.1</b>	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
<b>AO3.2</b>	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
<b>AO3.3</b>	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.

Question			Answer	Marks	AO element	Guidance
1	(a)	(i)	Carbon (atom) / $1.54 \times 10^{-10}$ <b>AND</b> silver (atom) / $2.88 \times 10^{-10}$ ✓	1	2.2	
		(ii)	Carbon (atom) / $1.54 \times 10^{-10}$ Silver (atom) / $2.88 \times 10^{-10}$ Fullerene (molecule) / $1.10 \times 10^{-9}$ Platinum (nanoparticle) / $1.00 \times 10^{-8}$ ✓✓	2	2.2	<b>ALLOW</b> 1 mark if carbon is put as smallest <b>OR</b> 1 mark for platinum nanoparticle being biggest
	(b)		As size/particle gets bigger, (surface area to volume) ratio gets smaller. ORA ✓  <b>OR</b>  Size increase ten times, (surface area to volume) ratio decreases ten times/size and ratio are inversely proportional ORA ✓✓	2	3.1a	<b>ALLOW</b> size increases 10 times ratio decreases to/by a tenth/words to the effect of going up and down by factor of 10
	(c)		<b>First check the answer on answer line</b> <b>If answer = 600 (nm<sup>2</sup>) award 3 marks</b>  Length of one face = 10nm ✓  Substitution: surface area = $6 \times (10 \times 10)$ ✓  = 600 (nm <sup>2</sup> ) ✓	3	2.2	<b>ALLOW</b> mark if 10 is seen in marking  <b>ALLOW ECF</b> from incorrect length/breadth <b>DO NOT ALLOW</b> $6 \times 6 \times 6$ unless qualified/ <b>DO NOT ALLOW</b> h and w not the same  <b>ALLOW ECF</b> from incorrect substitution If candidate has measured the sides of the cube shown by labels on the diagram: MP1 does not score MP2 <b>ECF</b> for their values (need not be the same)

Question			Answer	Marks	AO element	Guidance
						MP3 <b>ECF</b> from substitution

Question			Answer	Marks	AO element	Guidance
2	(a)		<b>Any two from:</b> Volume of acid/50cm <sup>3</sup> of acid – measuring cylinder/burette/pipette/graduated beaker ✓ Temperatures measured at start – thermometer ✓ Temperatures measured after each addition/at end– thermometer ✓ Mass/1g of solid/calcium hydroxide portions – balance ✓	2	3.3a	<b>IGNORE</b> amount of acid/solid  <b>ALLOW</b> temperature (change).- using thermometer for 1 mark  <b>ALLOW</b> scales for balance <b>IGNORE</b> weight/weighing  <b>IGNORE</b> measurement of time <b>ALLOW</b> 1 mark for 2 measurements or 2 pieces of apparatus measuring different things.
	(b)		All points correctly plotted ✓✓	2	2.2	Any two points correctly plotted = 1 mark <b>ALLOW</b> +/- Half square tolerance
	(c)		Line of best fit ✓	1	2.2	Line must start at 0/22 and end at 5/59.5 and be straight line. <b>ALLOW ECF</b> from incorrectly plotted points <b>IGNORE</b> line outside grid
	(d)		$Y=mx+c$ ✓	1	3.1a	
	(e)		<b>First check the answer on answer line</b> <b>If answer = 28.5 (°C) award 2 marks</b> Selection of data from graph: 50.5°C ✓ (Change in temperature: 50.5 – 22.0) = 28.5 °C ✓	2	3.1a	<b>ALLOW</b> 50-51 °C <b>ALLOW</b> 28-29 °C
	(f)		<b>First check the answer on answer line</b> <b>If answer = 6104.7 (J) award 3 marks</b>  Mass of hydrochloric acid: 50 x 1.02 = 51(g) ✓ Substitution: change in thermal energy = 4.2 x 28.5 x 51 ✓	3	2.2	<b>ALLOW</b> minimum of 2 significant figures <b>ALLOW</b> 3 marks if answer is correct for answer to part e.  <b>ALLOW ECF</b> from answer to (e)/ incorrectly evaluated mass of acid

Question			Answer	Marks	AO element	Guidance
			= 6104.7(J) ✓			<b>ALLOW</b> correct evaluation from mp2 <b>IGNORE</b> incorrect rounding on answer line if correct evaluation given in working.

Question			Answer	Marks	AO element	Guidance																								
3	(a)		<table><tr><th>Particle</th><th>Relative mass</th><th>Relative charge</th></tr><tr><td>Proton</td><td>1</td><td>+1</td></tr><tr><td>Neutron</td><td>1</td><td>0</td></tr><tr><td>Electron</td><td>Negligible / 1/1800/ 1/2000</td><td>-1</td></tr></table> <p>✓✓✓</p>	Particle	Relative mass	Relative charge	Proton	1	+1	Neutron	1	0	Electron	Negligible / 1/1800/ 1/2000	-1	3	1.1	6 correct = 3 marks 5 or 4 correct = 2 marks 3 or 2 correct = 1 mark <b>ALLOW</b> <table><tr><th>Particle</th><th>Relative mass</th><th>Relative charge</th></tr><tr><td>Proton</td><td>+1</td><td>Plus one/one positive/1+</td></tr><tr><td>Neutron</td><td>+1</td><td>Neutral</td></tr><tr><td>Electron</td><td>0 / very small/tiny/ 0.0005/</td><td>Minus one/one negative/1-</td></tr></table>	Particle	Relative mass	Relative charge	Proton	+1	Plus one/one positive/1+	Neutron	+1	Neutral	Electron	0 / very small/tiny/ 0.0005/	Minus one/one negative/1-
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Electron	Negligible / 1/1800/ 1/2000	-1																												
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Electron	0 / very small/tiny/ 0.0005/	Minus one/one negative/1-																												
	(b)		<b>First check the answer on answer line</b> <b>If answer = 6700 (m) award 2 marks</b>  Conversion: $(6.7 \div 100 = ) 0.067$ ✓ $0.067 \times (1 \times 10^5) = 6.7 \times 10^3/ 6700$ (m) ✓	2	1.2 2.2	<b>ALLOW ECF</b> in MP2 for incorrect conversion/ <b>ALLOW</b> $6.7 \times 10^5/ 670000$ for 1 mark																								
	(c)		<table><tr><td></td><td><b>P</b></td><td><b>Na<sup>+</sup></b></td></tr><tr><td><b>Number of protons</b></td><td>15</td><td>11</td></tr><tr><td><b>Number of neutrons</b></td><td>16</td><td>12</td></tr><tr><td><b>Number of electrons</b></td><td>15</td><td>10</td></tr></table> <p>Electrons ✓ Neutrons ✓ Protons ✓</p>		<b>P</b>	<b>Na<sup>+</sup></b>	<b>Number of protons</b>	15	11	<b>Number of neutrons</b>	16	12	<b>Number of electrons</b>	15	10	3	2.2													
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<b>Number of electrons</b>	15	10																												
	(d)		Magnesium small number electrons in outer shell <b>AND</b> fluorine large number ✓ Metals/magnesium lose electrons( to give full outer shell) <b>AND</b> Non-metals/fluorine gains ✓	2	1.1	<b>IGNORE</b> magnesium has 2 electrons in outer shell <b>AND</b> fluorine has 7 electrons in outer shell unless reason why 2 electrons are lost/1 electron gained is given/linked to small/large elsewhere.																								

Question			Answer	Marks	AO element	Guidance
4	(a)		<p>Good electrical conductors – electrons can move (between the ions) ✓</p> <p>Malleable – Ions can slide over each other ✓</p> <p>High melting point – strong attraction/force between ions and electrons ✓</p>	3	1.1	<p><b>ALLOW</b> delocalised. <b>IGNORE</b> free/carry the charge.</p> <p><b>ALLOW</b> atoms/layers</p> <p><b>ALLOW</b> bonds between ions and electrons. <b>DO NOT ALLOW</b> atoms, molecules, ionic bonds etc</p>
	(b)		<p>Magnesium loses electrons/is oxidised. ✓</p> <p>More easily (than copper). ✓</p>	2	2.1	<p><b>ALLOW</b> Magnesium gives electrons to copper ions. <b>IGNORE</b> magnesium displaces copper</p>
	(c)	(i)	<p><math>\text{Cu} + 2\text{Ag}^+ \rightarrow \text{Cu}^{2+} + 2\text{Ag}</math></p> <p>Correct species ✓</p> <p>Balancing ✓</p>	2	2.2	<b>DO NOT ALLOW</b> balancing of incorrect species.
		(ii)	<p>Magnesium/Mg</p> <p>Iron /Fe</p> <p>Copper / Cu</p> <p>Silver /Ag</p> <p>✓✓</p>	2	3.2b	<p>Mg most reactive and silver least reactive = 1 mark</p> <p>Iron more reactive than copper = 1 mark</p>

Question			Answer	Marks	AO element	Guidance												
5	(a)		<b>Any two from:</b> Assume (inelastic) spheres/not actual shape ✓ Don't show true scale/actual size (of particles)/actual space between particles ✓ Don't show interactions/attractions/bonds between particles/atoms/molecules ✓ Don't show movement/collisions of particles ✓ Don't show electron etc ✓	2	1.1													
	(b)		<table><tr><td></td><td>Movement of particles</td><td>Arrangement of particles</td></tr><tr><td>Solid</td><td>Vibration (about a fixed point) ✓</td><td></td></tr><tr><td>Liquid</td><td>Moving/sliding past each other ✓</td><td>Close together ✓</td></tr><tr><td>Gas</td><td></td><td>Random ✓ Far apart ✓</td></tr></table>		Movement of particles	Arrangement of particles	Solid	Vibration (about a fixed point) ✓		Liquid	Moving/sliding past each other ✓	Close together ✓	Gas		Random ✓ Far apart ✓	4	1.1	5 correct = 4 marks 4 correct = 3 marks 2 or 3 correct = 2 marks 1 correct = 1 mark  <b>DO NOT ALLOW</b> Fairly/quite close together  <b>ALLOW</b> irregular
	Movement of particles	Arrangement of particles																
Solid	Vibration (about a fixed point) ✓																	
Liquid	Moving/sliding past each other ✓	Close together ✓																
Gas		Random ✓ Far apart ✓																
	(c)		Particles gain (kinetic) energy ✓ (and) move faster/move apart/move more ✓ <b>OR</b> Energy breaks/weakens force between particles ✓ Particles move further apart/move more ✓	2	1.1	<b>ALLOW</b> atoms/molecules/ions for particles <b>DO NOT ALLOW</b> idea of moving apart if clearly referring to solid to liquid change  1 mark if both points made but no reference to particles etc  <b>ALLOW</b> heat for energy. <b>IGNORE</b> temperature/heating/heated												
	(d)		Gas ✓	1	3.2a													

Question			Answer	Marks	AO element	Guidance
6	(a)*		<p>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> Detailed description of titration method <b>AND</b> explanation of how this gives quality data. <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> Detailed description of titration method. <b>OR</b> Some details of titration method <b>AND</b> some explanation of how this gives quality data. <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> Basic description of titration method. <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> <i>No response or no response worthy of credit.</i></p>	6	1.2	<p><b>AO1.2 Demonstrates knowledge and understanding of the procedure for a titration to give high quality data (accuracy, precision, repeatability, reproducibility)</b></p> <ul style="list-style-type: none"> <li>• measure the sodium hydroxide/acid</li> <li>• into container</li> <li>• add indicator</li> <li>• Add acid/sodium hydroxide bit by bit</li> <li>• Until colour change</li> <li>• Note volume of acid</li> <li>• Use of conical flask/pipette/burette</li> <li>• put on white tile</li> <li>• note initial/ volume on burette</li> <li>• swirl flask when adding the acid/sodium hydroxide</li> <li>• note volume on when colour changes</li> <li>• do a rough one first</li> <li>• repeat until results close together</li> <li>• add acid drop by drop near end point</li> <li>• rinse pipette/burette with solution</li> </ul> <p>Quality data explanation:</p> <ul style="list-style-type: none"> <li>• pipette gives exact volume each time</li> <li>• burette small graduations/controllable tap</li> <li>• white tile helps to see colour change</li> <li>• swirling so acid all mixed in</li> <li>• rough one helps to know roughly where end point is</li> <li>• drop by drop so don't go past end point</li> <li>• repeated results test consistency / precision</li> </ul>



Question			Answer	Marks	AO element	Guidance
	(b)	(i)	To get a rough idea of when colour change happens/to see when need to add slowly ✓	1	1.2	<b>ALLOW</b> Student has added too much acid/has gone past colour change/air bubble in burette
		(ii)	<b>First check the answer on answer line</b> <b>If answer = 25.3 (cm<sup>3</sup>) award 3 marks</b>  (25.4 + 25.3 + 25.2 + 25.2 =) 101.1 ✓ (101.1 ÷ 4 =) 25.275 ✓ = 25.3 (cm <sup>3</sup> ) (1dp) ✓	3	2.2 x 2  1.2	<b>ALLOW</b> 2 marks if answer on answer line is 25.7(cm <sup>3</sup> )  (25.4 + 25.3 + 25.2 + 25.2 + 27.2 =) 128.3 (128.3 ÷ 5 =) 25.66 = 25.7 (cm <sup>3</sup> ) (1dp)
		(iii)	Accuracy – not good/good because experimental result (25.3cm <sup>3</sup> ) is not/is close to true value (25.8cm <sup>3</sup> ) ✓  Precision – good because (all but rough/titration 1) close together ✓	2	3.1b	<b>ALLOW ECF</b> from bii <b>ALLOW</b> Accuracy –good because experimental result (25.7cm <sup>3</sup> ) is close to true value (25.8cm <sup>3</sup> ) / is not good because they are not the same✓ <b>ALLOW</b> Precision – if all 5 readings considered then not good because readings not all close together ✓

Question			Answer	Marks	AO element	Guidance
7	(a)	(i)	Reversible ✓	1	1.1	<b>ALLOW</b> reaction goes both ways <b>IGNORE</b> equilibrium
		(ii)	Ammonia reacts back to hydrogen and nitrogen / products react to form reactants ✓	1	1.1	<b>ALLOW</b> go back to/turn back into
	(b)	(i)	(Increase in temperature) decreases the yield. ✓ (Increase in pressure) increases the yield. ✓  Catalyst yield – no effect ✓ Catalyst rate – increase ✓	4	3.1a x 2  1.1 x 2	
		(ii)	<b>Temperature:</b> Particles have more KE/move faster. ✓ More (chance of) effective collisions/more (chance of) successful collisions/more particles have enough energy to react/more particles have activation energy. ✓  <b>Pressure</b>  Particle move closer together. ✓  More frequent collisions. ✓	4	1.1	<b>IGNORE</b> more/more chance of collisions unqualified by reference to successful/effective e.g. more frequent alone  <b>DO NOT ALLOW</b> either mark if refers to move more vigorously/faster/have more energy.  <b>ALLOW</b> correct references to numbers of particles in volume/area/less space  <b>ALLOW</b> increased chance of collisions/particles collide more often <b>IGNORE</b> more collisions unqualified by idea of time.
	(c)		$2 \text{ NH}_3(\text{g}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow (\text{NH}_4)_2\text{SO}_4(\text{aq})$ Balancing ✓ State symbols ✓	2	2.2 1.2	Balancing and state symbols dependent on correct formulae.

Question			Answer	Marks	AO element	Guidance
8	(a)	(i)	(sulfuric acid + copper oxide) Copper sulfate ✓ (calcium carbonate, calcium nitrate) Nitric acid ✓	2	2.1	
		(ii)	Water ✓	1	1.2	<b>ALLOW</b> hydrogen oxide <b>IGNORE</b> H <sub>2</sub> O
	(b)	(i)	Increase in H <sup>+</sup> concentration gives decrease in pH ORA ✓ (Increase in H <sup>+</sup> concentration) by 10 (gives decrease in pH) by 1 ✓	2	2.2	<b>IGNORE</b> references to more or less acidic.
		(ii)	4 ✓	1	2.2	
	(c)	(i)	Compare colour of Universal indicator with colour chart /pH chart ✓	1	1.2	<b>IGNORE</b> comparisons of colour with acid/alkaline /neutral <b>ALLOW</b> comparisons of colour with pH e.g red is pH 1/green is pH7
		(ii)	Use a pH meter ✓	1	1.2	<b>IGNORE</b> pH machine



	<b>(b)</b>	<b>(i)</b>	<p>Solution shown in a container in contact with electrodes/ label showing electrolyte/sodium sulfate solution in container ✓</p> <p>Test tubes over electrodes/label indicating where test tubes should be ✓</p> <p>Solution in test tubes shown by a surface in the tube /label ✓</p>	<b>3</b>	<b>1.2</b>	<p><b>MAX</b> 2 marks for drawing with no labels/labels with no drawing</p> <p><b>ALLOW</b> 'bung' labelled as electrolyte/sodium sulfate solution / ions drawn.</p> <p><b>ALLOW</b> a gas syringe/tube attached to whole container (i.e. has not collected gases separately)/suitable label indicating a gas syringe or tube</p> <p><b>DO NOT ALLOW</b> sealed top to container in the given diagram</p>
		<b>(ii)</b>	Water/H <sub>2</sub> O ✓	<b>1</b>	<b>1.2</b>	
		<b>(iii)</b>	Sodium more reactive (than hydrogen) / sodium higher in reactivity series (than hydrogen)/hydrogen ions gain electrons more readily (than sodium ions) ORA ✓	<b>1</b>	<b>2.2</b>	<b>ALLOW</b> 'it' with no names instead of hydrogen
		<b>(iv)</b>	<p>Anode – oxygen <b>AND</b> cathode – hydrogen ✓</p> <p><math>2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2</math> ✓</p> <p><math>4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-</math> ✓</p>	<b>3</b>	<b>2.2</b>	<b>ALLOW</b> marking points 2 and 3 if shown at incorrect electrode

## Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

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