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OCR
RECOGNISING ACHIEVEMENT

GCSE

# Chemistry A
# Twenty First Century Science

General Certificate of Secondary Education **J634**

## Mark Scheme for the Units

## January 2009

**J634/MS/R/09J**

Oxford Cambridge and RSA Examinations

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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## MARK SCHEMES FOR THE UNITS


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# Guidance for Examiners

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Each separate marking point is indicated by a (1) at the end of that marking point.
4. Abbreviations, annotations and conventions used in the detailed Mark Scheme:

   ORA = or reverse argument
   NOT = point that is not given credit
   AW/owtte = alternative wording/or words to that effect: allow any expression that is clearly equivalent
   / = Alternative and acceptable answers for the same marking point
   point = point must be present to gain the mark
   (description) = description which need not be present to gain the mark

   E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy'
   work done = 0 marks
   work done lifting = 1 mark
   change in potential energy = 0 marks
   gravitational potential energy = 1 mark
5. If a candidate alters his/her response, examiners should accept the alteration.
6. The list principle: if a list of responses greater than the number requested is given, you work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, i.e. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.
7. Marking method for tick boxes:
   If there is a set of boxes, some of which should be ticked and others left empty, then you need to judge the entire set of boxes.

   E.g. If a question requires candidates to identify a city in England, then in the boxes

| | |
|---|---|
| Edinburgh | |
| Manchester | |
| Paris | |
| Southampton | |

   the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out). For a two-mark question, the rationale would be:
   All boxes are indicated scores 0 marks.
   All boxes blank scores 0 marks.
   All four boxes correct scores 2 marks.
   Three boxes correct scores 1 mark.
   Two boxes correct scores 1 mark.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Edinburgh | | | ✓ | | | ✓ | ✓ | ✓ | ✓ | |
| Manchester | ✓ | × | ✓ | ✓ | ✓ | | | | ✓ | |
| Paris | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | |
| Southampton | ✓ | × | | ✓ | | ✓ | ✓ | | ✓ | |
| Score: | **2** | **2** | **1** | **1** | **1** | **1** | **0** | **0** | **0** | **NR** |

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# A321/01 Modules C1, C2, C3 Foundation Tier

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>1</td><td>a</td><td></td><td>
<table>
<tr><th>gases present in both…</th><th>gases present only in…</th></tr>
<tr><td>argon</td><td>carbon monoxide</td></tr>
<tr><td>nitrogen</td><td>nitrogen dioxide</td></tr>
<tr><td>oxygen</td><td></td></tr>
</table>
</td><td>3</td><td>do not count any name appearing in both columns<br>names can appear in any order<br>all 5 in correct columns (3)<br>3 or 4 correct (2)<br>2 correct (1)<br>1 or fewer correct (0)<br><br>Do not penalise poor spelling<br>Accept formulae, e.g. $O_2$ for Oxygen (not O), Ar for Argon (not AR), $N_2$ for Nitrogen (not N), CO for Carbon Monoxide (not Co), $NO_2$ for Nitrogen Dioxide (not NO or No)<br><br>Ignore any extra gases</td></tr>
<tr><td></td><td>b</td><td></td><td>
<table>
<tr><th>product from burning petrol</th><th>atoms from petrol</th><th>atoms from air</th></tr>
<tr><td>carbon dioxide, $CO_2$</td><td>carbon</td><td>oxygen</td></tr>
<tr><td>water, $H_2O$</td><td>hydrogen</td><td>oxygen</td></tr>
</table>
</td><td>2</td><td>mark row across the table<br>each correct row scores (1)<br><br>Ignore symbols<br><br>Names must be correct eg not ‘oxide’</td></tr>
</table>

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | c | | It is used by plants in photosynthesis (1) ✓<br>It dissolves in sea water (1) ✓ | 2 | One mark each |
| | | | **Total** | **7** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | i | Total sulfur dioxide released decreased... (1) ✓<br>The number of coal fired power stations decreased…(1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |
| | | ii | Coal contains more sulfur-containing… (1) ✓ | 1 | |

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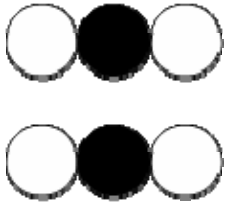
| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | iii | low-sulfur petrol and diesel fuels…(1) ✓<br>devices were fitted to remove…(1) ✓ | 2 | One mark each |
| | b | |  | 2 | (1) for each correct set of three circles, two white and one black, joined together in order white black white<br>allow circle with c for black and circle with o for white<br>allow lines to represent touching<br><br>each circle in a set of three must touch another to get the mark, circles can touch at any angle, but two whites must not touch<br><br>assume a shaded circle is black unless it obviously has vertical stripes, which will not score |
| | | | **Total** | **7** | |

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<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>3</td><td>a</td><td></td><td>cotton<br>silk<br>wool</td><td>2</td><td>Three correct circles = 2,<br>two circles correct = 1,<br>one correct circle = 0</td></tr>
<tr><td></td><td>b</td><td></td><td>
<table>
<tr><th>statement</th><th>advantage</th><th>disadvantage</th></tr>
<tr><td>…stronger than paper</td><td>✓</td><td></td></tr>
<tr><td>…gives off poisonous fumes when burned</td><td></td><td>✓</td></tr>
<tr><td>…is waterproof</td><td>✓</td><td></td></tr>
<tr><td>…more flexible than paper</td><td>✓</td><td></td></tr>
<tr><td>…does not rot in landfill sites</td><td></td><td>✓</td></tr>
</table>
</td><td>3</td><td>5 rows correct = 3<br><br>4 rows correct = 2<br><br>3 rows correct = 1<br><br>1 or 2 rows correct = 0</td></tr>
</table>

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<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>3</td><td>c</td><td></td><td>
<table>
<tr><th>materials</th><th>single chemical</th><th>mixture</th></tr>
<tr><td>iron</td><td>✓</td><td></td></tr>
<tr><td>milk</td><td></td><td>✓</td></tr>
<tr><td>wood</td><td></td><td>✓</td></tr>
<tr><td>distilled water</td><td>✓</td><td></td></tr>
</table>
</td><td>2</td><td>4 rows correct = 2<br>2 or 3 rows correct = 1<br>1 row correct = 0</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>7</td><td></td></tr>
</table>

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 4 | a | i | The range of results is too large (1) ✓ | 1 | One tick in box 3 |
| | | ii | 4 (1) | 1 | |
| | | iii | 12 mm (1) | 1 | **allow** 12 / 12.0 / twelve<br>any other answer (0)<br>Ignore “sample 3” |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 4 | a | iv | taking more measurements…(1) ✓<br>there may be small variations…(1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |
| | b | | liquid sap can be taken from the…(1) ✓<br>crude oil is a finite resource (1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |
| | | | **Total** | **7** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 5 | a | i | E (1) | 1 | two or more letters (0)<br>any other answer (0) |
| | | ii | A (1) | 1 | two or more letters (0)<br>any other answer (0) |
| | | iii | A (1) | 1 | two or more letters (0)<br>any other answer (0) |
| | b | | hydrogen (1)<br>oxygen (1) | 2 | One mark each |
| | c | | when crops are harvested nitrogen…(1) ✓<br>with less nitrogen the land…(1) ✓ | 2 | One mark each |
| | | | **Total** | **7** | |

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<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>6</td><td>a</td><td></td><td><table><tr><td>Fat</td><td>green</td></tr><tr><td>Saturates</td><td>green</td></tr><tr><td>Sugar</td><td>red</td></tr><tr><td>Salt</td><td>amber</td></tr></table></td><td>1</td><td>all four colours in the correct boxes (1)<br>any other answer (0)<br>two colours in one box scores (0)</td></tr>
<tr><td></td><td>b</td><td></td><td>The maximum amount of each food..<br>(1)<table><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr><tr><td>✓</td></tr></table></td><td>1</td><td></td></tr>
</table>

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | c | i | The sugar in these products is… (1) ✓<br>Eating these products may cause… (1) ✓ | 2 | One mark each |
| | | ii | red<br>sugar | 1 | **both** red and sugar must be circled for (1)<br>any other word circled in either space circled (0)<br>two or more words circled in each space (0) |
| | d | | It is an independent food safety watchdog (1) ✓<br>It protects the public's health and consumer interest in food (1) ✓ | 2 | One mark each |
| | | | **Total** | **7** | |
| | | | | | |
| | | | **Paper Total** | **42** | |

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# A321/02 Modules C1, C2, C3 Higher Tier

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | a | i | The range of results is too large (1) ✓ | 1 | one mark for a tick in box 3 |
| | | ii | 12 | 2 | 11 scores (1) |
| | | iii | Taking more measurements reduces... (1) ✓<br>There may be small variations… (1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | b | | The mean for the results from… (1) ✓<br>The mean for the results from… (1) ✓ | 2 | one mark each for ticks in boxes 1 and 4 |
| | c | | Liquid sap can be obtained from the.. (1) ✓<br>Crude oil is a finite resource (1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |
| | | | **Total** | **9** | |

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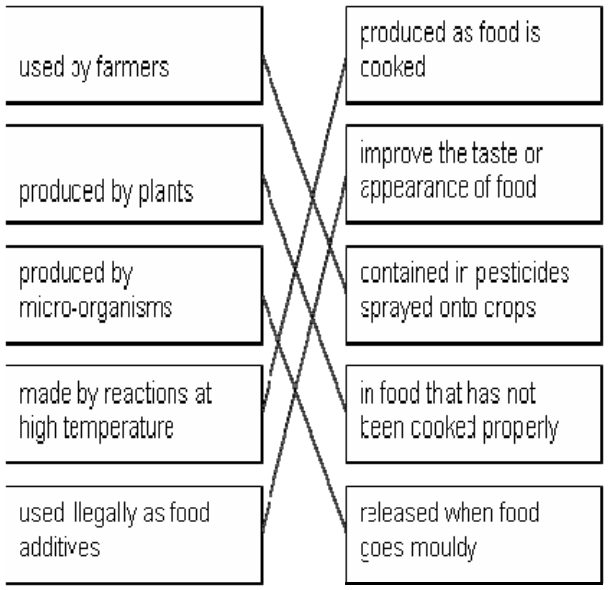
| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | i | E (1) | 1 | more than one letter = 0 |
| | | ii | A (1) | 1 | more than one letter = 0 |
| | | iii | A (1) | 1 | more than one letter = 0 |
| | b | | hydrogen / $H_2$ / H (1)<br>oxygen / $O_2$ /O (1) | 2 | one mark for each correct word or symbol<br>allow either order |
| | c | | phosphorus / P (1)<br>potassium / K (1) | 2 | one mark for each correct word or symbol<br>allow either order |
| | | | **Total** | **7** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 3 | a | |  | 3 | all lines from and to correct boxes (3)<br>three or four lines from and to correct boxes (2)<br>two lines from and to correct boxes (1)<br><br>more than one line from or to a box negates the mark |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 3 | b | i | The chance of aspartame causing them harm (1) ✓<br>The consequences of the harm aspartame may do to them (1) ✓ | 2 | one mark each for ticks in boxes 1 and 4 |
| | | ii | We do not know whether aspartame… (1) ✓<br>If you are not sure about the outcome… (1) ✓ | 2 | one mark each for ticks in boxes 2 and 5 |
| | | | **Total** | **7** | |

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<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>4</td><td>a</td><td></td><td>Because there is not enough… (1) ✓<br><br>Some of the carbon dioxide… (1) ✓<br><br>Some of the carbon atoms… (1) ✓</td><td>3</td><td>one mark each for ticks in boxes 1, 4 and 6</td></tr>
<tr><td></td><td>b</td><td></td><td><table><tr><th>product from one molecule of propane</th><th>total number of carbon atoms</th><th>total number of hydrogen atoms</th><th>total number of oxygen atoms</th></tr><tr><td>carbon dioxide</td><td>3</td><td></td><td>6</td></tr><tr><td>water</td><td></td><td>8</td><td>4</td></tr></table></td><td>2</td><td>judge the two answer boxes in each row<br><br>each correct row scores (1)<br><br>ignore any numbers filled into the shaded boxes</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>5</td><td></td></tr>
</table>

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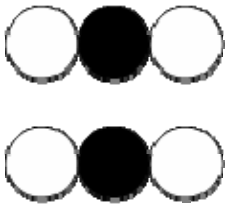
| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 5 | a | i | C (1) | 1 | more than one letter = 0 |
| | | ii | D and E (1) | 1 | both needed in either order; more than one letter for either = 0 |
| | | iii | B and D (1) | 1 | both needed in either order; more than one letter for either = 0 |
| | | iv | Low-sulfur petrol and diesel fuels… (1) ✓<br>Devices were fitted to remove… (1) ✓ | 2 | one mark each for ticks in boxes 2 and 4 |
| | b | | C A F D B G | 2 | letter E absent from boxes (1)<br>first five letters in correct order (1) |
| | c | |  | 2 | (1) for each correct set of three circles, two white and one black, joined together in order white black white<br>allow circle with c for black and circle with o for white<br>allow lines to represent touching<br>each circle in a set of three must touch another to get the mark, circles can touch at any angle, but two whites must not touch<br>assume a shaded circle is black unless it obviously has vertical stripes, which will not score |
| | | | **Total** | **9** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | a | | …environmental impact of making (1) ✓<br>…environmental impact of using… (1) ✓ | 2 | one mark each for ticks in boxes 3 and 4 |
| | b | | plasticiser<br>chains<br>energy<br>melts | 2 | all four correct for (2)<br>two or three correct for (1) |
| | c | | Making the chain length of the polymer shorter (1) ✓ | 1 | one mark for a tick in box 2 |
| | | | **Total** | **5** | |
| | | | | | |
| | | | **Paper Total** | **42** | |

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# A322/01 Modules C4, C5, C6 Foundation Tier

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | a | | the piece of sodium fizzes (1) ✓<br>the piece of sodium moves around quickly (1) ✓ | 2 | one mark each for ticks in boxes 4 and 5 |
| | b | | the chemicals are very hazardous (1) ✓ | 1 | one mark for a tick in box 1 |
| | c | | Na (1) | 1 | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | d | | when sodium is cut it is very shiny (1) — ✗<br>sodium goes dull very quickly (1) — ✓ | 2 | one mark each for ticks in boxes 1 and 3 |
| | e | | potassium — is in the same group as sodium... .<br>lithium — has the symbol K.<br>calcium — reacts with sodium to make a salt.<br>chlorine — is a metal and is in a different... . | 2 | all four correct (2)<br>2 or 3 correct (1)<br><br>More than one line to or from a box means that box cannot score |
| | | | **Total** | **8** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | | group metal<br>period non-metal | 3 | all four correct (3)<br>3 correct (2)<br>2 correct (1)<br>1 correct (0) |
| | b | | nine (1)<br>seven (1)<br>neutrons (1) | 3 | allow numbers 9 and 7 |
| | | | **Total** | **6** | |

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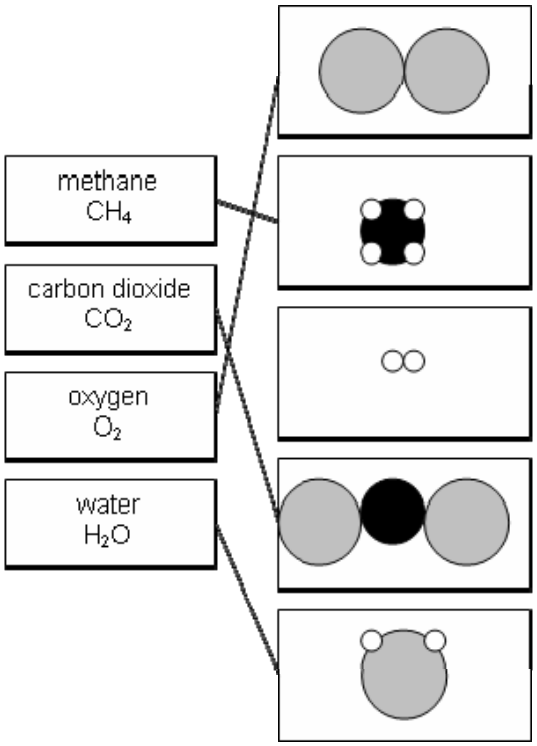
<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>3</td><td>a</td><td></td><td> 
</td><td>3</td><td>all four correct (3)<br>3 correct (2)<br>2 correct (1)<br>1 correct (0)<br><br>More than one line to or from a box means that box cannot score</td></tr>
<tr><td></td><td>b</td><td></td><td><table>
<tr><th>statement</th><th>true</th><th>false</th></tr>
<tr><td>Gases are good conductors of electricity</td><td></td><td>✓</td></tr>
<tr><td>Gases are made of small molecules</td><td>✓</td><td></td></tr>
<tr><td>There are very weak forces of attraction between gas molecules</td><td>✓</td><td></td></tr>
</table></td><td>2</td><td>3 correct (2)<br>2 correct (1)<br>1 correct (0)</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>5</td><td></td></tr>
</table>

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 4 | a | | 9.5 (1) | 1 | |
| | b | i | most silicon and oxygen in the Earth's crust is in the form… ; the table shows that there are large amounts of silicon ... — ✓ ✓ | 1 | one mark for ticks in both boxes 2 and 3 |
| | | ii | high melting point (1) ✓ ; does not dissolve in water (1) ✓ | 2 | one mark each for ticks in boxes 1 and 2 |
| | c | | there would be a lot of waste…(1) ✓ | 1 | one mark for a tick in box 3 |
| | d | | reduction (1) ✓ | 1 | one mark for a tick in box 4 |
| | | | **Total** | **6** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 5 | | | electricity<br>negative<br>oxygen | 2 | 3 correct (2)<br>2 correct (1)<br>1 correct (0) |
| | | | **Total** | **2** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | a | | sulfuric (acid) (1)<br><br>$H_2SO_4$ (1) | 2 | ignore hydrogen sulphate<br><br>do not allow lower case symbols eg h<br>symbol O must be at least half height of symbol S<br>numbers must be subscripts or clearly smaller than letters<br>allow other order eg $SO_4H_2$ |
| | b | | litmus paper (1) ✓ | 1 | one mark for a tick in box 4 |
| | c | | larger,<br>faster,<br>higher,<br>more | 2 | all four correct (2)<br>3 or 2 correct (1)<br>1 or 0 correct (0) |
| | d | i | 81 (1) | 1 | |
| | | ii | 25 % (1) | 1 | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | e | | Liz spilt some of her product out of the beaker (1) ✓<br>Liz did not measure out enough acid (1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |
| | f | | The product has not been purified (1) ✓ | 1 | one mark for a tick in box 2 |
| | | | **Total** | **10** | |

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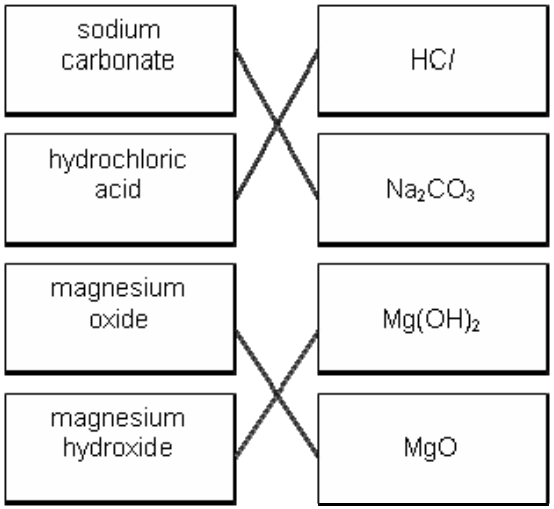
| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 7 | a | |  | 3 | all four correct (3)<br>2 or 3 correct (2)<br>1 correct (1)<br><br>More than one line to or from a box means that box cannot score |
| 7 | b | | Wear goggles (1) ✓<br><br><br><br><br>Make sure she does not get splashes ... (1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |
| | | | **Total** | **5** | |
| | | | | | |
| | | | **Paper Total** | **42** | |

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# A322/02 Modules C4, C5, C6 Higher Tier

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | a | | hydrogen **and** $H_2$ (1)<br><br>correct formula NaOH (1)<br><br>balanced 2Na and 2NaOH (1) | 3 | <br><br>Allow elements in any order e.g. OHNa<br>Do not allow NA or Na<br><br>Balancing mark can only be scored if formulae are correct |
| | b | | when sodium is cut it is very shiny (1) ✓<br><br>sodium goes dull very quickly (1) ✓ | 2 | one mark each for ticks in boxes 1 and 3 |
| | c | | ... 12 neutrons: ✓<br><br>... one electron in the outer shell: ✓<br><br>... 3 electron shells: ✓ | 2 | all 5 correct (2)<br>2 – 4 correct (1)<br>1 correct (0) |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | d | | potassium → is in the same group as sodium but is less reactive<br>lithium → has the symbol K<br>calcium → reacts with sodium to make salt<br>chlorine → is a metal and is in a different group to sodium | 2 | all four correct (2)<br>2 or 3 correct (1)<br><br>More than one line to or from a box means that box cannot score |
| | | | **Total** | **9** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | | look for a particular colour in the flame (1) ✓ | 1 | one mark for a tick in box 4 |
| | b | | $Ca^{2+}$ (1) | 1 | Do not allow $C_A^{2+}$ |
| | c | | 8 (1) | 1 | |
| | d | | calcium chloride solution contains ions (1) ✓<br>the particles in the solution are free to move (1) ✓ | 2 | one mark each for ticks in boxes 1 and 5 |
| | | | **Total** | **5** | |

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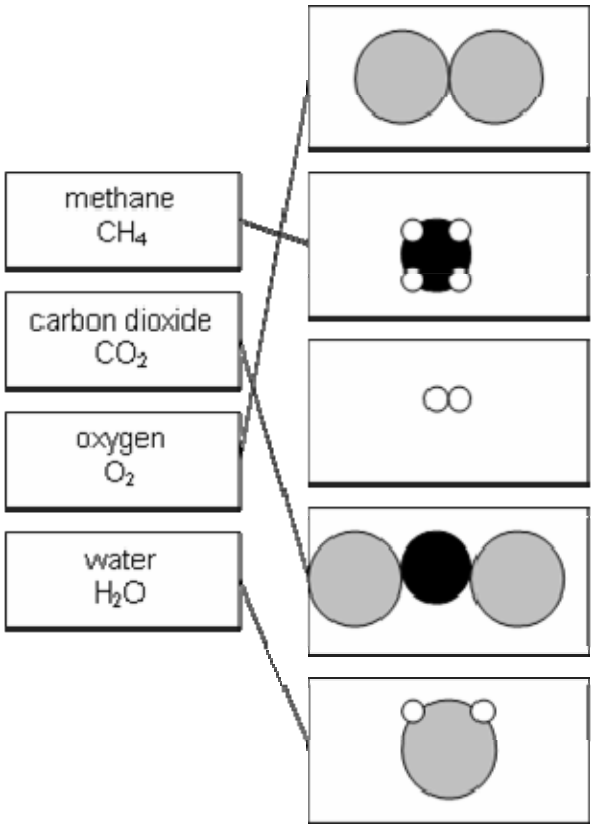
| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 3 | a | |  | 3 | all 4 correct (3)<br>3 correct (2)<br>2 correct (1)<br>1 correct (0)<br><br>More than one line to or from a box means that box cannot score |
| | b | i | oxygen (1) | 1 | |
| | | ii | iron (1) | 1 | |
| | | | **Total** | **5** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 4 | a | | B (1) | 1 | |
| | b | | A (1) | 1 | |
| | c | | D (1) | 1 | |
| | | | **Total** | **3** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 5 | a | | reduction (1) ✓ | 1 | one mark for a tick in box 4 |
| | b | | aluminium is too reactive (1) ✓ | 1 | one mark for a tick in box 2 |
| | c | | 3e / 3e- (1)<br>A*l* (1) | 2 | Allow large lower case '*l*' but do not allow AL |
| | d | | Large amounts of ore need to be mined for the process (1) ✓<br>aluminium extraction uses large amounts of electricity (1) ✓ | 2 | one mark each for ticks in boxes 1 and 2 |
| | | | **Total** | **6** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | a | | sulfuric (acid) (1)<br><br>$H_2SO_4$ (1) | 2 | **ignore** hydrogen sulphate<br><br>do not allow lower case symbols eg h<br>symbol O must be at least half height of symbol S<br>numbers must be subscripts or clearly smaller than letters<br>allow other order eg $SO_4H_2$ |
| | b | i | litmus paper (1) ✓ | 1 | one mark for a tick in box 4 |
| | | ii | C (1) | 1 | |
| | c | i | 8.05 g (1) | 1 | Accept correct answer if ringed in list |
| | | ii | 243 g (1) | 1 | |
| | d | | Liz forgot to dry her product. (1) ✓<br><br>Liz used more zinc oxide than she meant to. (1) ✓ | 2 | one mark each for ticks in boxes 1 and 4 |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | e | | The product has not been purified (1) ✓ | 1 | one mark for a tick in box 2 |
| | | | **Total** | **9** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 7 | a | i | A (1) | 1 | |
| | | ii | D (1) | 1 | |
| | b | | she uses half as much magnesium (1) ✓ | 1 | one mark for a tick in box 3 |
| | c | | The curve on the graph is steeper at the beginning (1) ✓<br>The graph levels out sooner (1) ✓ | 2 | one mark each for ticks in boxes 2 and 3 |
| | | | **Total** | **5** | |
| | | | | | |
| | | | **Paper Total** | **42** | |

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# Grade Thresholds

**General Certificate of Secondary Education**
**Chemistry A (Specification Code J634)**
**January 2009 Examination Series**

**Unit Threshold Marks**

| Unit | | Maximum Mark | A* | A | B | C | D | E | F | G | U |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **A321/01** | Raw | 42 | N/A | N/A | N/A | 27 | 22 | 18 | 14 | 10 | 0 |
| | UMS | 34 | N/A | N/A | N/A | 30 | 25 | 20 | 15 | 10 | 0 |
| **A321/02** | Raw | 42 | 34 | 30 | 25 | 21 | 16 | 13 | N/A | N/A | 0 |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | N/A | N/A | 0 |
| **A322/01** | Raw | 42 | N/A | N/A | N/A | 28 | 25 | 22 | 19 | 16 | 0 |
| | UMS | 34 | N/A | N/A | N/A | 30 | 25 | 20 | 15 | 10 | 0 |
| **A322/02** | Raw | 42 | 38 | 32 | 25 | 19 | 14 | 11 | N/A | N/A | 0 |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | N/A | N/A | 0 |

**Specification Aggregation Results**

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

| | Maximum Mark | A* | A | B | C | D | E | F | G | U |
|---|---|---|---|---|---|---|---|---|---|---|
| **J634** | 300 | 270 | 240 | 210 | 180 | 150 | 120 | 90 | 60 | 0 |

The cumulative percentage of candidates awarded each grade was as follows:

| | A* | A | B | C | D | E | F | G | U | Total No. of Cands |
|---|---|---|---|---|---|---|---|---|---|---|
| **J634** | 20.0 | 40.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 5 |

**128 candidates were entered for aggregation this series.**

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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