

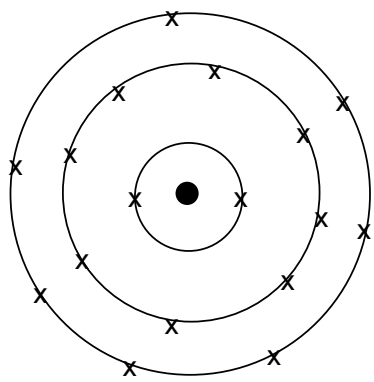
Science

Stage 9

This table gives general guidelines on marking answers involving units of length. For questions involving other quantities, correct units are given in the answers. The table shows acceptable and unacceptable versions of the answer 1.85 m.

| | Correct answer | Also accept | Do not accept |
|---|-----------------------|---|--|
| Units are not given on answer line and the question does not specify a unit | 1.85 m | Correct conversions provided the unit is stated, e.g. 1 m 85 cm 185 cm 1850 mm 0.00185 km | 1.85 185 m |
| If the unit is given on the answer line, e.g. m |1.85..... m | Correct conversions, provided the unit is stated unambiguously, e.g.185 cm..... m |185..... m1850..... m etc. |
| If the question states the unit that the answer should be given in, e.g. "Give your answer in metres" | 1.85 m | 1.85 1 m 85 cm | 185; 1850 Any conversions to other units. |

Stage 9 Paper 1 Mark Scheme

| Question | 1 | | |
|--------------|----------|--|---|
| Part | Mark | Answer | Further Information |
| (a) (i) | 1 | any temperature below -102°C | Accept 'less than' -102°C |
| (ii) | 1 | any temperature between -33°C and 183°C | Accept: between -33°C and 183°C . |
| (b) (i) | 1 | gas | |
| (ii) | 1 | 64 99 114 133 | |
| (c) | 3 |  | 1 mark for three electron shells 1 mark for eight x's in second electron shell 1 mark for seven x's in outer electron shell |
| Total | 7 | | |

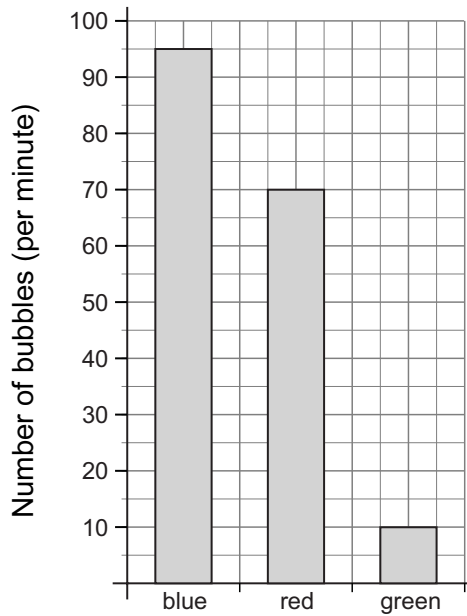
| Question | 2 | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------------|---|--|---------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Part | Mark | Answer | Further Information | | | | | | | | | | | | | | | | | | | | | |
| (a) (i) | 2 | Put wooden block (and masses) on modelling clay and measure size of dent. Repeat with different sized wooden blocks / different masses | both correct = 2 marks 1 mark each | | | | | | | | | | | | | | | | | | | | | |
| (ii) | 1 | area of block mass in grams / weight in Newtons depth of dent | Accept: 'size' of block 'number' of masses / size of mass any 2 measurements = 1 mark | | | | | | | | | | | | | | | | | | | | | |
| (iii) | 1 | reduce error / reliable | Accept to check results. | | | | | | | | | | | | | | | | | | | | | |
| (b) | 2 | example of type of table: <table border="1"> <thead> <tr> <th>area of block in suitable unit e.g. cm³</th> <th>force / weight in N</th> <th>depth of dent in suitable unit e.g. mm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> | area of block in suitable unit e.g. cm ³ | force / weight in N | depth of dent in suitable unit e.g. mm | | | | | | | | | | | | | | | | | | | 1 mark for table with headings with suitable measurements 1 mark for correct units for headings given Accept measurements given in 1 (a) (ii) even if incorrect. |
| area of block in suitable unit e.g. cm ³ | force / weight in N | depth of dent in suitable unit e.g. mm | | | | | | | | | | | | | | | | | | | | | | |
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| Total | 6 | | | | | | | | | | | | | | | | | | | | | | | |

| Question | 3 | | |
|--------------|----------|---|---|
| Part | Mark | Answer | Further Information |
| (a) | 1 | exothermic | accept any clear indication. |
| (b) (i) | 1 | temperature of change of ethanol = 18 final temperature of propanol = 41 | both needed for 1 mark |
| (ii) | 1 | propanol reason - greatest temperature change | both fuel and reason needed for 1 mark Accept different fuel if incorrect final temperature calculated in 4b(i). |
| Total | 3 | | |

| Question | 4 | | |
|--------------|----------|---|---|
| Part | Mark | Answer | Further Information |
| (a) | 2 | thick coating on stem (accept 'leaf') / thick outer layer of stem (accept 'leaf') to reduce water loss spines / no leaves to reduce water loss swollen stem to store water deep roots to reach underground water branching / many roots to collect surface water | any 2 adaptations linked to how they help = 2 marks 1 adaptation linked to how it helps = 1 mark |
| (b) | 1 | long beak to reach inside flowers have wings to stay in one position / reach the flowers / hover | any 1 = 1 mark |
| Total | 3 | | |

| Question | 5 | | |
|--------------|----------|---|--|
| Part | Mark | Answer | Further Information |
| (a) | 1 | 800 Ncm | Accept any clear indication. |
| (b) | 1 | hold the spanner nearer the end / use a longer spanner | Accept: oil the pivot / nut. Accept: increase the force applied (e.g. get someone else to help). |
| (c) | 1 | see-saw / crow bar / wheel barrow | Allow any suitable equipment that contains a pivot. Accept arm. |
| Total | 3 | | |

| Question | 6 | | |
|--------------|----------|--|---|
| Part | Mark | Answer | Further Information |
| (a) | 2 | <p>The diagram shows a central nucleus containing two particles, one black and one grey, representing a neutron and a proton. An electron is shown orbiting the nucleus. Labels with arrows point to: 'neutron or proton' (top left), 'electron' (top right), 'nucleus' (bottom left), and 'neutron or proton' (bottom right). There are 'X' marks on the labels 'electron' and 'nucleus'.</p> | <p>all 4 labels = 2 marks 2/3 labels = 1 mark 1 label = 0 marks</p> |
| (b) | 1 | nucleus | Accept proton / neutron. |
| Total | 3 | | |

| Question | 7 | | | | | | | | | | |
|--------------|--------------------------------|---|---|--------------------------------|------|----|-----|----|-------|----|--|
| Part | Mark | Answer | Further Information | | | | | | | | |
| (a) | 2 | carbon dioxide + water → glucose + oxygen | 1 mark for correct reactants in either order 1 mark for correct products in either order | | | | | | | | |
| (b) | 2 | <p>Photosynthesis is carried out by producers. <input checked="" type="checkbox"/></p> <p>Photosynthesis takes place in chloroplasts. <input checked="" type="checkbox"/></p> | each correct answer = 1 mark 1 mark for 2 correct and 1 incorrect answer more than three boxes ticked = 0 marks | | | | | | | | |
| (c) (i) | 1 | repeat the investigation (and calculate a mean) | Accept use of a longer time period. | | | | | | | | |
| (ii) | 2 |  <table border="1"> <caption>Data from Bar Chart</caption> <thead> <tr> <th>Light Colour</th> <th>Number of bubbles (per minute)</th> </tr> </thead> <tbody> <tr> <td>blue</td> <td>95</td> </tr> <tr> <td>red</td> <td>70</td> </tr> <tr> <td>green</td> <td>10</td> </tr> </tbody> </table> | Light Colour | Number of bubbles (per minute) | blue | 95 | red | 70 | green | 10 | correct bars = 1 mark correct labelling of colours and y-axis with number of bubbles (per minute) = 1 mark Accept correct bars in any order. |
| Light Colour | Number of bubbles (per minute) | | | | | | | | | | |
| blue | 95 | | | | | | | | | | |
| red | 70 | | | | | | | | | | |
| green | 10 | | | | | | | | | | |
| (iii) | 1 | photosynthesis is most effective in blue light / photosynthesis is least effective in green light | | | | | | | | | |
| (iv) | 1 | Leaves are green as they reflect the green light. / So green light is not absorbed. | | | | | | | | | |
| Total | 9 | | | | | | | | | | |

| Question | 8 | | |
|--------------|----------|---|------------------------------|
| Part | Mark | Answer | Further Information |
| (a) (i) | 1 | conduction | Accept any clear indication. |
| (ii) | 1 | (idea of) increased kinetic energy causes particles to vibrate more | |
| (b) | 1 | convection | |
| Total | 3 | | |

| Question | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----------|---|--|----|--|--|--|--|--|--|----|----|--|--|--|--|--|--|---|----|--|--|--|--|--|--|--|
| Part | Mark | Answer | Further Information | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) (i) | 1 | one period shaded | Accept any horizontal shading even if line is incomplete. | | | | | | | | | | | | | | | | | | | | | | | | |
| (ii) | 1 | Any from: Li , Be, Na, Mg, Al, K, Ca | Accept any names of metals, e.g. lithium, magnesium, etc | | | | | | | | | | | | | | | | | | | | | | | | |
| (b) (i) | 1 | Group I correctly shaded, e.g. <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="background-color: #cccccc;">Li</td> <td style="background-color: #cccccc;">Be</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="background-color: #cccccc;">Na</td> <td style="background-color: #cccccc;">Mg</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="background-color: #cccccc;">K</td> <td style="background-color: #cccccc;">Ca</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Li | Be | | | | | | | Na | Mg | | | | | | | K | Ca | | | | | | | |
| Li | Be | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Na | Mg | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | Ca | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (ii) | 1 | number of electronic shells increases increasingly reactive atomic mass increases boiling point decreases, atomic number / size increases | any 1 = 1 mark Accept examples of increasing reactivity, e.g. reacts more violently with water. | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Question | 10 | | |
|--------------|----------|---|-------------------------------------|
| Part | Mark | Answer | Further Information |
| (a) | 1 | boxes drawn with C B D A | correct order = 1 mark |
| (b) | 1 | new plants grow away from parent / less competition | |
| (c) (i) | 2 | wind light / have wings / structures to help them to be carried by the wind | |
| (ii) | 2 | 1 Date – eaten by animals who throw the seeds away. 2 Sandbur – stick to animal fur / body | Accept released in faeces for date. |
| Total | 6 | | |

| Question | 11 | | |
|--------------|----------|--|---|
| Part | Mark | Answer | Further Information |
| (a) | 1 | <ul style="list-style-type: none"> Use scales with a range of 0–100 g Measure the length of the cube with a ruler. | both answers correct = 1 mark Accept any clear indication of the answer. |
| (b) | 2 | 2.7 g / cm ³ | 1 mark for each Accept $\frac{13.5}{5}$ for 1 mark. |
| Total | 3 | | |

Stage 9 Paper 2 Mark Scheme

| Question | 1 | | |
|--------------|----------|--|---|
| Part | Mark | Answer | Further Information |
| (a) | 2 | <u>Predator:</u> pike / water beetle / water boatman / tadpole <u>Prey:</u> pike – water beetle / water boatman water beetle – tadpole water boatman – tadpole / water flea tadpole – water flea | predator = 1 mark correct prey for the predator = 1 mark |
| (b) (i) | 1 | green algae / pond weeds → (water flea) → tadpole → water beetle green algae / pond weeds → (water flea) → tadpole → water boatman green algae / pond weeds → (water flea) → water boatman → pike | any one |
| (ii) | 1 | → | arrow from left to right |
| (c) (i) | 2 | increase because they have more food | each correct answer = 1 mark |
| (ii) | 1 | fewer water beetles / water boatman or more tadpoles / water fleas | Ignore reference to green algae or pond weeds. |
| (d) | 1 | break down dead / decaying organisms | Do not accept 'breakdown' alone. |
| Total | 8 | | |

| Question | 2 | | |
|--------------|----------|--------------------------------------|---|
| Part | Mark | Answer | Further Information |
| (a) | 1 | different lamps / wires / resistance | Accept different current. |
| (b) | 1 | 0.45 (amps) | Accept 0.40 (amps). |
| (c) | 1 | 0.35 (amps) | Accept 0.30 (amps) if 0.40 (amps) given in (b). |
| Total | 3 | | |

| Question | 3 | | |
|--------------|----------|---|--|
| Part | Mark | Answer | Further Information |
| (a) | 1 | control / for comparison of normal growth / to see if there is a difference | |
| (b) | 1 | height of plant / number of leaves / size of leaves / number of flowers / length of roots / number of branches on roots / mass of plant | Accept examples of any reasonable measurement. |
| (c) (i) | 1 | small / has very little growth (nitrogen is needed for) growth / to make proteins / to make enzymes | correct observation and reason = 1 mark |
| (ii) | 1 | small / weak (phosphorous is needed for) root growth / energy storage / energy use | correct observation and reason = 1 mark |
| (iii) | 1 | yellow (magnesium is needed for) photosynthesis / to produce chlorophyll | correct observation and reason = 1 mark |
| Total | 5 | | |

| Question | 4 | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------------|--|-----------|---|-------|--|--------------------------|-------------------------------------|---|--------------------------|-------------------------------------|--|-------------------------------------|--------------------------|--|--------------------------|-------------------------------------|---|--------------------------|-------------------------------------|--|--|
| Part | Mark | Answer | | Further Information | | | | | | | | | | | | | | | | | | |
| (a) | 2 | <table border="1"> <thead> <tr> <th>Statement</th> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td>The balloons have different charges and so repel each other.</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>The balloons have a neutral charge so repel each other.</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>The balloons have the same charge so repel each other.</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>The balloons have the same charge so attract each other.</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>The balloons have a neutral charge so attract each other.</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table> | Statement | True | False | The balloons have different charges and so repel each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | The balloons have a neutral charge so repel each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | The balloons have the same charge so repel each other. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The balloons have the same charge so attract each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | The balloons have a neutral charge so attract each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | 5 correct = 2 marks 3/4 correct = 1 mark 1/2 correct = 0 marks |
| Statement | True | False | | | | | | | | | | | | | | | | | | | | |
| The balloons have different charges and so repel each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | | | | | | | | | | | | | |
| The balloons have a neutral charge so repel each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | | | | | | | | | | | | | |
| The balloons have the same charge so repel each other. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | |
| The balloons have the same charge so attract each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | | | | | | | | | | | | | |
| The balloons have a neutral charge so attract each other. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | | | | | | | | | | | | | |
| (b) (i) | 2 | (The duster is) charged / positive / negative. (The dust has) opposite (charge so it is) attracted (to the duster.) | | Accept: The duster is positive. The dust has negative charge. or The duster is negative. The dust has positive charge. Accept 'stick' for 'attracted'. 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks | | | | | | | | | | | | | | | | | | |
| (ii) | 1 | clothes clinging / (static) shocks | | Accept any situation where electrostatics are a nuisance or dangerous, e.g. refuelling / flour mills. | | | | | | | | | | | | | | | | | | |
| Total | 5 | | | | | | | | | | | | | | | | | | | | | |

| Question | 5 | | |
|--------------|----------|---|---|
| Part | Mark | Answer | Further Information |
| (a) | 1 | potassium calcium zinc nickel platinum | Accept correct chemical symbols instead of names. |
| (b) | 1 | sodium / lithium | |
| (c) | 1 | not safe / (too) dangerous / too reactive / explosive | Accept: It is more reactive than when it is in water. |
| Total | 3 | | |

| Question | 6 | | |
|--------------|----------|--|---|
| Part | Mark | Answer | Further Information |
| (a) | 1 | The metals change places. / Copper replaces magnesium. | Accept: 'Magnesium has taken the place of the copper.' |
| (b) | 2 | magnesium + lead nitrate → lead + magnesium nitrate | correct reactants in either order = 1 mark correct products in either order = 1 mark |
| (c) | 1 | Sodium is more reactive. / Copper is less reactive. | Accept: sodium is above copper in the reactivity series. |
| Total | 4 | | |

| Question | 7 | | |
|--------------|----------|---|--|
| Part | Mark | Answer | Further Information |
| (a) | 1 | temperature measured at start and end (with a thermometer) | |
| (b) (i) | 1 | evaporation | Do not accept 'boiling'. |
| (ii) | 3 | <p>The particles in warm water are gaining kinetic energy. <input type="checkbox"/></p> <p>The particles in warm water with the most kinetic energy escape. <input checked="" type="checkbox"/></p> <p>The particles in warm water with the least kinetic energy escape. <input type="checkbox"/></p> <p>The particles in warm water with less kinetic energy are left behind. <input checked="" type="checkbox"/></p> <p>The particles in warm water with more kinetic energy are left behind. <input type="checkbox"/></p> <p>The less kinetic energy the particles have, the cooler the water. <input checked="" type="checkbox"/></p> | <p>each correct answer = 1 mark</p> <p>If 4 statements are ticked and 3 correct = 2 marks</p> <p>If 4 statements are ticked and 2 correct = 1 mark</p> <p>If 4 statements are ticked and 1 correct = 0 marks</p> <p>If 5/6 statements are ticked = 0 marks</p> |
| Total | 5 | | |

| Question | 8 | | |
|--------------|----------|--|---------------------|
| Part | Mark | Answer | Further Information |
| | 2 | Arachnid A – Coddil Arachnid B – Dorril | Each name = 1 mark |
| Total | 2 | | |

| Question | 9 | | |
|--------------|-----------|---|--|
| Part | Mark | Answer | Further Information |
| (a) | 1 | magnesium + hydrochloric acid → magnesium chloride + hydrogen | reactants in either order products in either order |
| (b) (i) | 2 | wear safety goggles to protect eyes from acid / broken glass tie hair back so it will not fall into acid wear lab coat / gloves to protect from acid | safety precaution = 1 mark reason = 1 mark |
| (ii) | 1 | repeat / calculate a mean | |
| (c) (i) | 1 | all points plotted correctly | |
| (ii) | 1 | suitable line joining all points | |
| (iii) | 1 | 80 (seconds) | Accept any value between 70 and 80. Accept correct value from incorrectly drawn graph in (c) (i) |
| (iv) | 1 | 0 (and) 20 | Accept any value between 0 and 20, e.g. 0 to 1. |
| (d) | 2 | Use a less concentrated hydrochloric acid. <input type="checkbox"/> Add a catalyst. <input checked="" type="checkbox"/> Use the same mass of magnesium but as a fine powder. <input checked="" type="checkbox"/> Use the same mass of magnesium but as one large lump. <input type="checkbox"/> Increase the temperature of the acid. <input checked="" type="checkbox"/> Decrease the temperature of the acid. <input type="checkbox"/> | 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks If 4 boxes ticked, 3 correct = 1 mark If 4 boxes ticked, 2 correct = 0 marks If 5/6 boxes ticked = 0 marks |
| Total | 10 | | |

| Question | 10 | | |
|--------------|----------|-----------------------------|--|
| Part | Mark | Answer | Further Information |
| (a) | 1 | <p>lamp 1</p> <p>lamp 2</p> | correct labelling (A / ammeter) and position of ammeter (anywhere in series circuit) = 1 mark |
| (b) | 1 | 2.65 | Accept answer in the range 2.6–2.7 |
| (c) | 2 | A C | each correct circuit = 1 mark If 3 given and 2 are correct = 1 mark If 3 given and 1 is correct = 0 mark more than 3 given = 0 mark |
| Total | 4 | | |

| Question | 11 | | |
|--------------|----------|---------|--|
| Part | Mark | Answer | Further Information |
| (a) | 1 | nucleus | Accept any clear indication of correct response. |
| Total | 1 | | |