

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(i)</b>	2.3		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(ii)</b>	A		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark												
<b>1(a)(iii)</b>	<table border="1"> <thead> <tr> <th>particle</th> <th>relative mass</th> <th>relative charge</th> </tr> </thead> <tbody> <tr> <td>electron</td> <td></td> <td>-</td> </tr> <tr> <td>neutron</td> <td>1</td> <td>0 /neutral/no charge</td> </tr> <tr> <td>proton</td> <td>1</td> <td></td> </tr> </tbody> </table> <p>4 correct = 2 marks 2/3 correct = 1 mark 1/0 correct = 0 mark</p>	particle	relative mass	relative charge	electron		-	neutron	1	0 /neutral/no charge	proton	1			<b>(2)</b>
particle	relative mass	relative charge													
electron		-													
neutron	1	0 /neutral/no charge													
proton	1														

Question Number		Indicative content	Mark
<b>QWC</b>	<b>*1(b)</b>	<p>An explanation linking some of the following</p> <p><b>Structure of boron-11</b> boron-11 atom has</p> <ul style="list-style-type: none"> <li>• 5 /same number of protons</li> <li>• 5 /same number of electrons</li> <li>• 6 neutrons / one more neutron than boron 10</li> </ul> <p><b>Working out RAM</b> relative atomic mass is 10.8 because</p> <ul style="list-style-type: none"> <li>• weighted mean</li> <li>• more boron-11 than boron-10</li> <li>• boron-11 atoms are heavier</li> <li>• (therefore) relative atomic mass nearer 11 than 10</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• in sample given 20/100 of the atoms have a mass of 10</li> <li>• in sample given 80/100 of the atoms have a mass of 11</li> <li>• <math>20/100 \times 10 = 2</math></li> <li>• <math>80/100 \times 11 = 8.8</math></li> <li>• <math>2 + 8.8 = 10.8</math></li> </ul> <p>NB the diagram in part (a) gives the structure for boron-10 so do not give credit for this (even if claimed to be structure of boron-11 by referring to it as 'it')</p>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1-</b>	<ul style="list-style-type: none"> <li>• a limited description e.g. boron-11 has 5 protons and 6 neutrons</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3-</b>	<ul style="list-style-type: none"> <li>• a simple explanation e.g. boron-11 has 5 protons, 5 electrons and 6 neutrons and is heavier than boron-10.</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 – 6</b>	<ul style="list-style-type: none"> <li>• a detailed explanation e.g. boron-11 has 5 protons, 5 electrons and 6 neutrons, is heavier than boron-10 and there is more of boron-11 therefore relative atomic mass nearer to 11 than 10.</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>	

Question Number	Answer	Acceptable answers	Mark
<b>1(c)</b>	<p>Answer should include one idea from each list</p> <p><u>similarities</u> both put</p> <ul style="list-style-type: none"> <li>• elements into groups / periods (1)</li> <li>• elements with similar properties in same group (1)</li> <li>• metals and non-metals in separately (1)</li> </ul> <p><u>differences</u> Mendeleev's table</p> <ul style="list-style-type: none"> <li>• was arranged by relative atomic mass(1)</li> <li>• had gaps (1)</li> <li>• had fewer elements (1)</li> <li>• did not include the noble gases (1)</li> </ul>	<p>reverse argument for modern periodic table</p> <p>specific examples e.g germanium</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	A, B and C	Mg Ca Au (any order) magnesium calcium gold (any order)	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	A and B	Mg Ca (any order) magnesium calcium (any order)	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	8 (protons)		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(i)</b>	A : 10		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(ii)</b>	(in 100 atoms)  mass of mass number 20 atoms = $20 \times 90$ (1) mass of mass number 22 atoms = $22 \times 10$ (1) relative atomic mass = $\{(22 \times 10) + (20 \times 90)\} / 100$ (=20.2) (1)  OR  20 contributes = $90/100 \times 20$ (1) 22 contributes = $10/100 \times 22$ (1) relative atomic mass $90/100 \times 20 + 10/100 \times 22$ (= 20.2) (1)	20.2 = 3 marks  21.8 = 2 marks (only 1 error made)	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(d)</b>	An explanation linking any two of  (the element is) group 0 / noble gas / unreactive / inert / does not react (1) { (has) 8 electrons / full } outer shell (1) prevents filament from reacting (1)	ignore 'not very reactive'  does not {gain / lose / share} electrons	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)</b>	<p>An explanation including the following points</p> <ul style="list-style-type: none"> <li>metal (1)</li> <li>because {on left of / below} the line dividing metals and non-metals/because boron only non-metal in group 3 (1)</li> </ul>	<p>correct statement relating to neighbouring metallic elements surrounded by metals</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)</b>	2.8.3	283	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(i)</b>	A five protons		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(ii)</b>	<p>An explanation including the following points</p> <ul style="list-style-type: none"> <li>atoms of same element / same {number of protons / atomic number} (1)</li> <li>different {numbers of neutrons / mass numbers} (1)</li> </ul>	ignore electrons	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(iii)</b>	more atoms have mass 11 (than 10) / ORA	boron 11 isotope more abundant OWTE	<b>(1)</b>