

Mark Scheme

Q1.

Question Number	Answer	Mark
	B 10^{-10} m	(1)

Q2.

	Answer	Acceptable answers	Mark
	P and M OR M and P OR N and Q OR Q and N	one mark for a pair	(1)

Q3.

Question Number	Answer	Additional guidance	Mark												
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>7</td> <td>6</td> </tr> <tr> <td></td> <td>8</td> <td>6</td> </tr> <tr> <td></td> <td>(1)</td> <td>(1)</td> </tr> </table>					7	6		8	6		(1)	(1)	one mark for each column must have both numbers in a column correct to get the mark	(2)
	7	6													
	8	6													
	(1)	(1)													

Q4.

	Answer	Acceptable answers	Mark
(i)	negative (1)		(1)
(ii)	(much) smaller than a neutron (1)		(1)

Q5.

	Answer	Acceptable answers	Mark
(i)	does not emit (ionising) radiation / no (radioactive) decay	it is not radioactive	(1)
(ii)	${}^8_4\text{Be}$ B5		(1)
(iii)	${}^8_4\text{Be}$ ${}^8_4\text{Be}$ A		(1)

Q6.

Question Number	Answer	Additional guidance	Mark
	substitution (1) $\frac{1.6726 \times 10^{-27}}{9.1094 \times 10^{-31}}$ evaluation (1) 1836 evaluation to 2 sf (1) 1800	Allow 1 mark for answers that round to 1.836 to any power of ten for this mark 1.836×10^3 OR 1.80×10^3 accept 1840 or any rounding of 1836.125 1.8×10^3 any number shown to 2 sf gets this mark award full marks for the correct answer without working	(3)

Q7.

Question Number	Answer	Acceptable answers	Mark
	A description including any four from: (there are) 89 particles in the nucleus (1) protons (1) (there are) 36 (protons) (1) neutrons (1) (there are) 53 (neutrons) (1) i.e. 36 protons and 53 neutrons gains four marks	ignore all references to electrons (its) {mass/nucleon} number / RAM / A_r / A is <u>89</u> {atomic/proton} number / positive charge / $Z = \underline{36}$ Numbers must be correctly linked to gain credit e.g. 36 neutrons gets 1 mark (for neutrons) 53 protons and 36 neutrons gains two marks (for protons and neutrons) 89 protons and neutrons gets 3 marks (altogether there are) 89 protons and neutrons. 36 are protons gains 4 marks	(4)

Q8.

Question Number	Answer	Acceptable answers	Mark
(i)	A protons B neutrons C electrons	OR A neutrons B protons C electrons	(3)

Question Number	Answer	Acceptable answers	Mark
(ii)	12		(1)

Q9.

	Answer	Acceptable answers	Mark
(i)	<input checked="" type="checkbox"/> C the same as the charge on the proton		(1)
(ii)	<input checked="" type="checkbox"/> A electrons		(1)

Q10.

Question Number	Answer	Additional guidance	Mark									
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>7</td> <td>6</td> </tr> <tr> <td></td> <td>8</td> <td>6</td> </tr> </table> <p style="text-align: center;">(1) (1)</p>					7	6		8	6	<p>one mark for each column</p> <p>must have both numbers in a column correct to get the mark</p>	(2)
	7	6										
	8	6										

Q11.

Question Number	Answer	Acceptable answers	Mark
(i)	B 21		(1)

Question Number	Answer	Acceptable answers	Mark
(ii)	A 39 19 K		(1)

Question Number	Answer	Acceptable answers	Mark
(iii)	<p>A description to include any two of</p> <ul style="list-style-type: none"> • (nucleus/isotope is) unstable (1) • (nucleus/isotope is) radioactive (1) • decay is random (1) • long half life (1) 		(2)

