Q1.

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

Q2.

Question number	Answer	Mark
	B	**(1)**

Q3.

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

Q4.

	Answer	Acceptable answers	Mark
(i)	A 92		**(1)**
(ii)	neutron(s) (1)	allow phonetic spelling nutron, newtron, nuetron	**(1)**

Q5.

Question number	Answer	Mark
(i)	☒ **A** 38 B is number of neutrons C is mass number D is an irrelevant addition of two numbers	(1)

Question number	Answer	Mark
(ii)	☒ **B** 52 A is number of protons C is mass number D is an irrelevant addition of two numbers	(1)

Q6.

	Answer	Acceptable answers	Mark
(i)	☒ **C** the same as the charge on the proton		(1)
(ii)	☒ **A** electrons		(1)

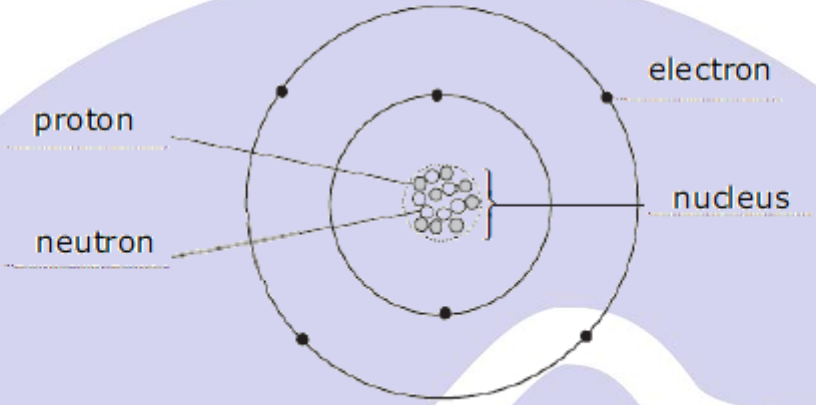
Q7.

	Answer	Acceptable answers	Mark
(ii)	**B** 5		(1)
(iii)	A		(1)

Q8.

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

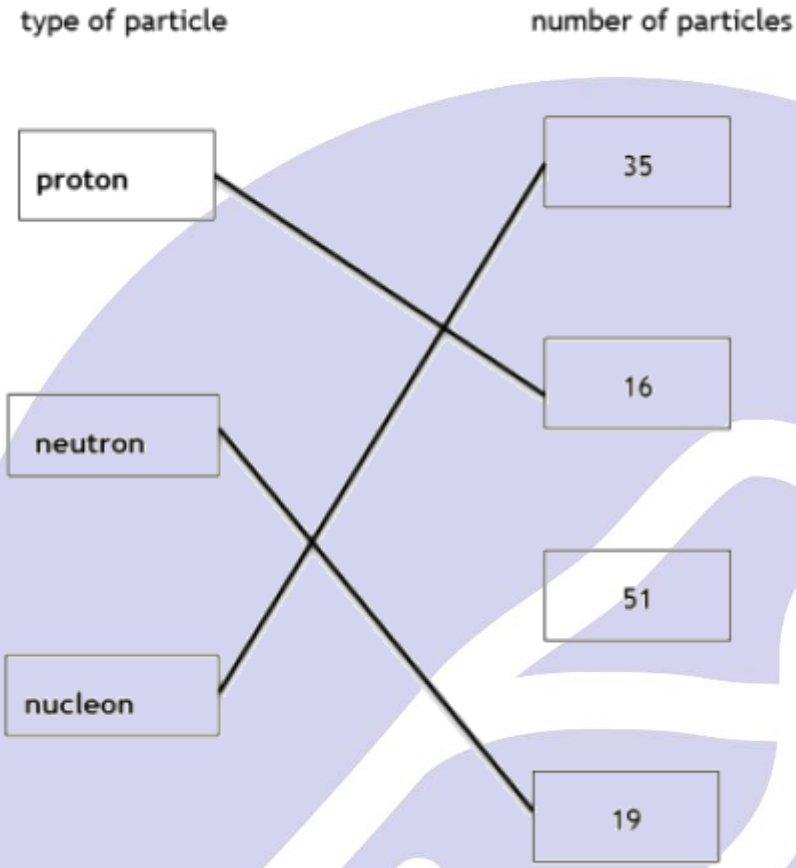
Q9.

Question number	Answer	Mark
(i)	One mark for each correct label (4)  	(4)

Question number	Answer	Mark
(ii)	B	(1)

Question number	Answer	Mark
(iii)	zero/0/no charge	(1)

Q10.

	Answer	Additional guidance	Mark
		1 mark for each correct line more than one line from a box in the left column ("type of particle") box loses the mark for the box	(3) AO2

Q11.

Question Number	Answer	Additional guidance	Mark
(i)	6 / six		(1) AO1

Question Number	Answer	Additional guidance	Mark
ii	8 / eight		(1) AO2

Q12.

Question Number	Answer	Mark
(i)	C  **A** is incorrect the proton has a mass of 1 not 0 **B** is incorrect the proton has a mass of 1 not 0 **D** is incorrect the proton has a charge of +1 not -1	(1) AO1

Question Number	Answer	Additional guidance	Mark
(ii)	substitution (1) ratio = $\frac{10^{-10}}{10^{-15}}$ evaluation (1) 10^{5}	$10^{-10} : 10^{-15}$ accept suitable equivalent ratios e.g. $1 \times 10^{5} : 1$ $1 : 10^{-5}$ or $10^{5} : 1$ 1: 0.00001 or 100000:1 allow 1 mark for inverted ratios e.g. $10^{-15} : 10^{-10}$ 0.00001:1 or 1:100000 award full marks for the correct answer with no working	(2) AO2

Question Number	Answer	Additional guidance	Mark
(iii)	an explanation linking same number / amount of (1) electrons and protons (1)	 equal number / amount of allow balanced (number / amount of) negative and positive charges ignore (neutral) neutrons reject positive/negative neutrons for 2nd marking point	(2) AO1

Q13.

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 89 {atomic/proton} number / positive charge / Z = 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)**

Q14.

Question Number	Answer	Additional guidance	Mark
	 (1) (1)	one mark for each column must have both numbers in a column correct to get the mark	**(2)**