2

0 1 **Figure 1** shows two models of the atom.

Figure 1

Plum pudding model   Nuclear model
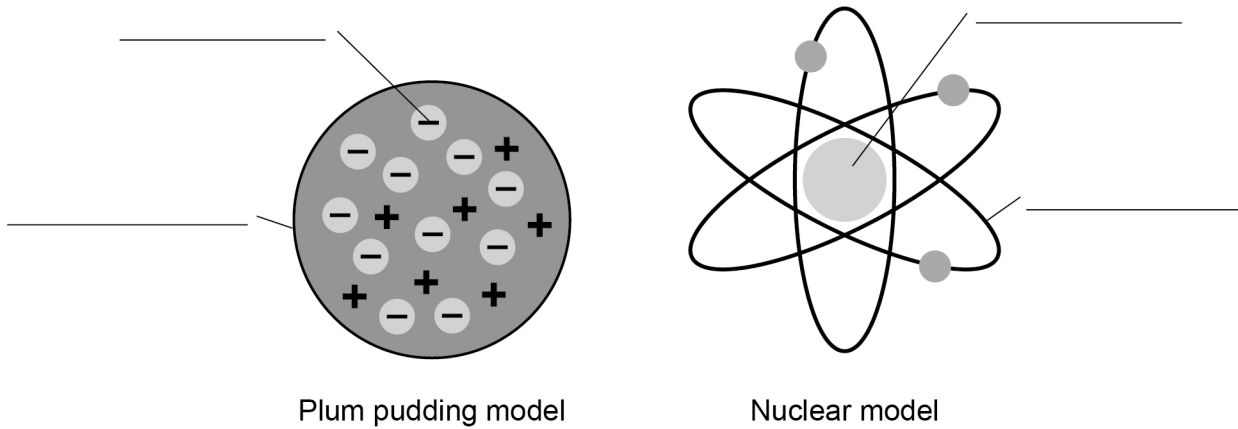
0 1 . 1 Write the labels on **Figure 1**

Choose the answers from the box.

[4 marks]

atom	**electron**	**nucleus**
neutron	**orbit**	**proton**

0 1 . 2 Explain why the total positive charge in every atom of an element is always the same.

[2 marks]

_____

_____

_____

_____

Do not write outside the box

0 1 . 3 The results from the alpha particle scattering experiment led to the nuclear model.

Alpha particles were fired at a thin film of gold at a speed of 7% of the speed of light.

Determine the speed of the alpha particles.
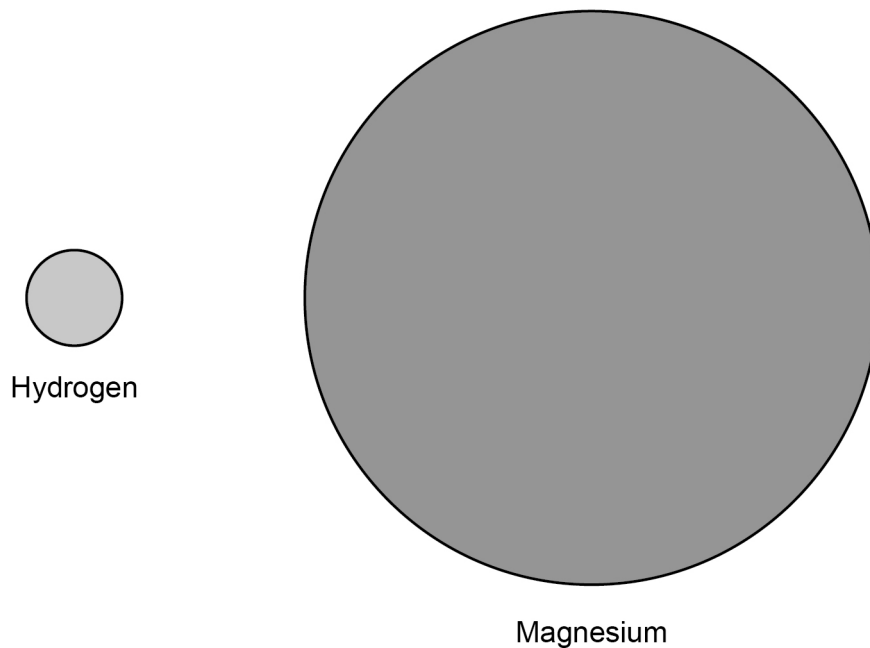
Speed of light = 300 000 000 m/s

[2 marks]

Speed = _____ m/s

0 1 . 4 **Figure 2** shows two atoms represented as solid spheres.

Figure 2

Hydrogen

Magnesium

A hydrogen atom has a radius of 2.5×10^{-11} m

Determine the radius of a magnesium atom.

Use measurements from **Figure 2**

[2 marks]

Radius = _____ m

10

Turn over ▶

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	electron		1	AO1 6.4.1.3 5.1.1.3
	atom		1	
	nucleus		1	
	orbit		1	
01.2	positive charge is provided by protons		1	AO1 6.4.1.2 6.4.1.3
	(every atom of the same element contain the) same number of protons	do **not** accept same number of protons and neutrons ignore reference to electrons	1	
01.3		an answer of 21 000 000 scores **2** marks		AO2 6.4.1.3
	$v = 300\ 00\ 000 \times \left(\dfrac{7}{100}\right)$	allow any correct method of determining 7% of 300 000 000	1	
	$v = 21\ 000\ 000$ (m/s)	allow 2.1×10^7 (m/s)	1	
01.4		an answer in the range 1.4×10^{-10} to 1.6×10^{-10} scores **2** marks		AO2 6.4.1.1
	$r = 6 \times 2.5 \times 10^{-11}$	allow a ratio in the range of 5.7–6.3 or measurements that would give this range, correctly substituted	1	
	$r = 1.5 \times 10^{-10}$ (m)	allow 1.4×10^{-10} to 1.6×10^{-10} their ratio $\times 2.5 \times 10^{-11}$ correctly calculated scores **1** mark	1	
Total			**10**	