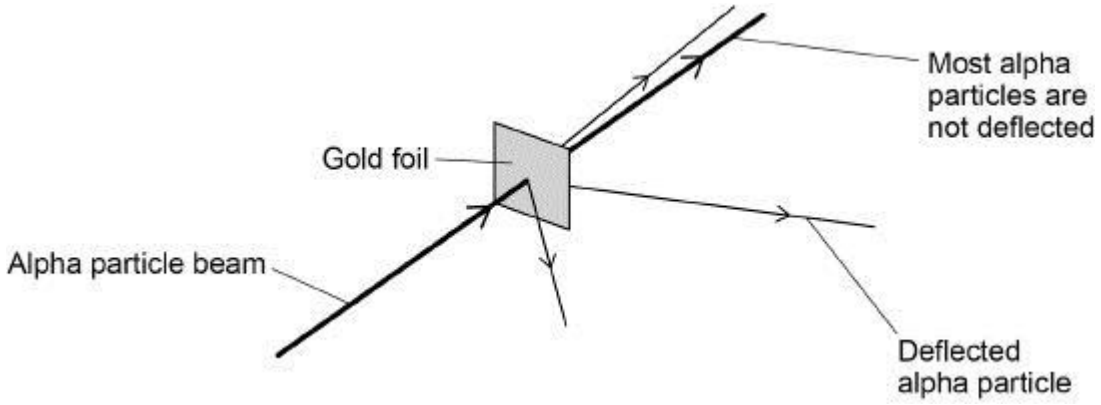
KS4 Combine Science (Trilogy) HW 5 – Atomic structure & periodic table

Q1. This question is about gold and compounds of gold.

In the alpha particle scattering experiment alpha particles are fired at gold foil.

Alpha particles are positively charged.

The diagram below shows the results.



(a) Some alpha particles are deflected.

Complete the sentence. Choose the answer from the box.

negatively charged	**not charged**	**positively charged**

Some alpha particles are deflected because the nucleus of the atom is _____.

(1)

(b) Why are most alpha particles **not** deflected? Tick (✓) **one** box.

The atom is a tiny sphere that cannot be divided. ☐

The atom is mainly empty space. ☐

The electrons orbit the nucleus at specific distances. ☐

(1)

(c) What was **one** conclusion from the alpha particle scattering experiment?

Tick (✓) **one** box.

The mass is concentrated at the centre of the atom. ☐

The mass is concentrated at the edge of the atom. ☐

The mass is spread evenly throughout the atom. ☐

(1)

Gold reacts with the elements in Group 7 of the periodic table.

(d) What are Group 7 elements known as?

Tick (✓) **one** box.

Alkali metals ☐

Halogens ☐

Noble gases ☐

(1)

(e) Fluorine, chlorine and bromine react with gold.

Which element will be the most reactive with gold?

Tick (✓) **one** box.

Fluorine ☐ Chlorine ☐ Bromine ☐

(1)

(f) 3.94 g of gold reacts with chlorine to produce 6.07 g of gold chloride.

The word equation for the reaction is:

gold + chlorine → gold chloride

Calculate the mass of chlorine that reacts with 3.94 g of gold.

_____

_____

Mass = _____ g **(1)**

(g) Calculate the relative formula mass (M_r) of gold chloride ($AuCl_3$).

Relative atomic masses (A_r): Cl = 35.5 Au = 197

Relative formula mass (M_r) = _____

(2)

(Total 8 marks)

Q2. **Answer this question (Qu2) in your book**
(Insufficient space for your response on this sheet)

This question is about elements. Caesium is in Group 1 of the periodic table.

(a) Explain what happens to caesium atoms and to oxygen atoms when caesium reacts with oxygen to produce caesium oxide.

You should answer in terms of electrons.

(4)

(b) Explain why caesium is more reactive than sodium.

You should answer in terms of electrons.

(4)

(c) The diagram below shows part of Mendeleev's periodic table.

16 **O**	19 **F**
32 **S**	35.5 **Cl**
79 **Se**	80 **Br**
128 **Te**	127 **I**

Explain why the early periodic tables placed iodine (I) before tellurium (Te), but then Mendeleev placed tellurium before iodine.

(3)

(Total 11 marks)