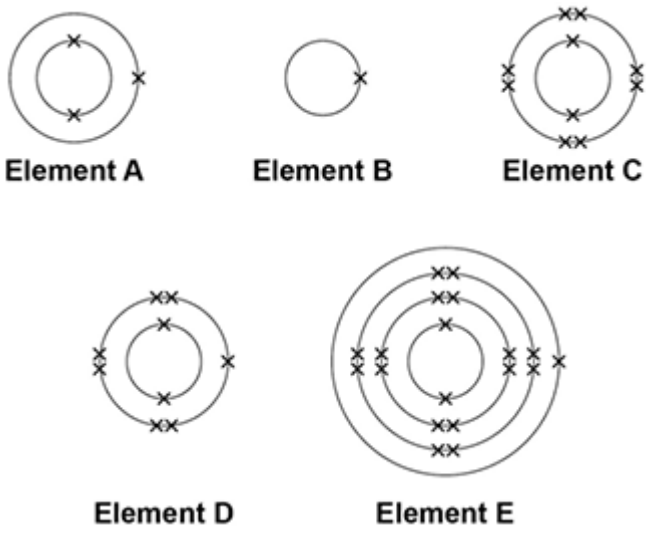
Q1. The electronic structure of the atoms of five elements are shown in the figure below.

The letters are **not** the symbols of the elements.



Choose the element to answer the question. Each element can be used once, more than once or not at all.

Use the periodic table to help you.

(a) Which element is hydrogen?

Tick **one** box.

A ☐ **B** ☑ **C** ☐ **D** ☐ **E** ☐

(1)

(b) Which element is a halogen?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☑ **E** ☐

(1)

(c) Which element is a metal in the same group of the periodic table as element **A**?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☑

(1)

(d) Which element exists as single atoms?

Tick **one** box.

A ☐ **B** ☐ **C** ☑ **D** ☐ **E** ☐

(1)

(e) There are two isotopes of element **A**. Information about the two isotopes is shown in the table below.

Mass number of the isotope	6	7
Percentage abundance	92.5	7.5

Use the information in the table above above to calculate the relative atomic mass of element **A**.
Give your answer to 2 decimal places.

(A * Abundance + B * Abundance + etc.) / 100

((6 * 92.5) + (7 * 7.5)) / 100

555 + 52.5 = 607.5

607.5 / 100 = 6.075

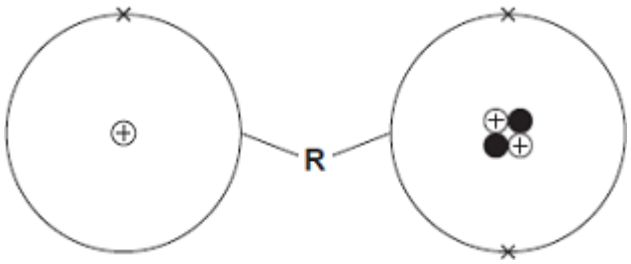
Relative atomic mass = 6.075

(4)

(Total 8 marks)

Q2. The Sun is mainly hydrogen and helium.
The diagrams show an atom of hydrogen and an atom of helium.

Hydrogen **Helium**



(a) Draw a ring around the correct answer to complete each sentence.

(i) The centre of each atom is called the

molecule.
nucleus.
shell.

(1)

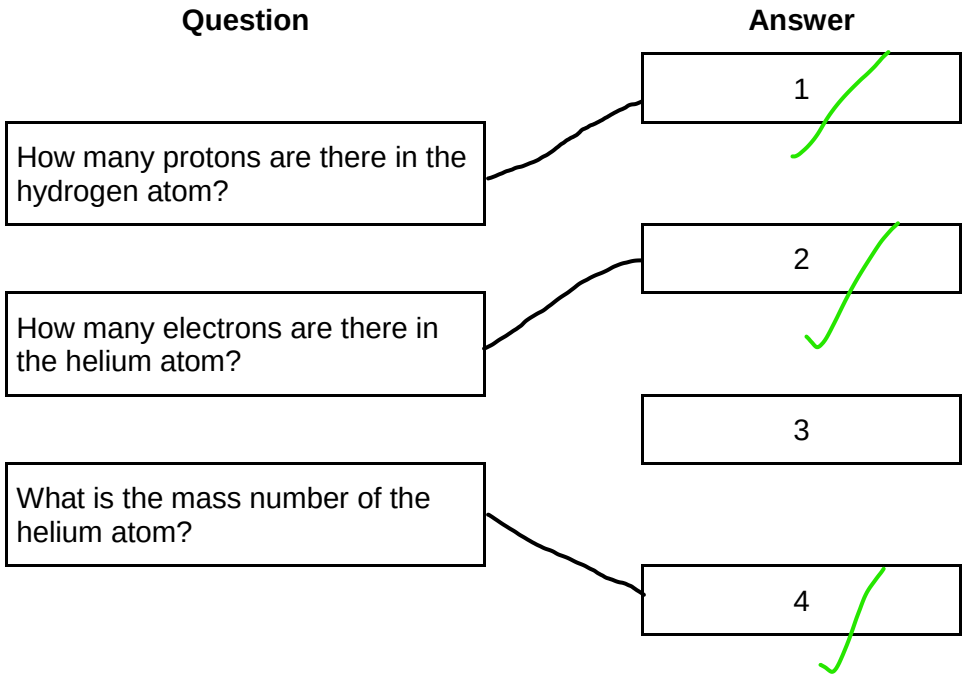
(ii) The circle (labelled **R**) around the centre of each atom is called

a bond.
an electrical charge.
an energy level (shell).

(1)

(b) Use the diagrams in part (a) to help you to answer these questions.

Draw **one** line from each question to its correct answer.



(3)

(c) The Sun is 73% hydrogen and 25% helium. The rest is other elements.

What is the percentage of other elements in the Sun?

73 + 25 = 98
100 - 98 = 2

..... 2 .. %

(1)

(d) One of the other elements in the Sun is neon.
Neon is in the same group of the periodic table as helium.

Use the Chemistry Data Sheet to help you to answer these questions.

(i) How many protons are there in a neon atom?

10 .....

(1)

(ii) Which group of the periodic table are helium and neon in?

0 or 8 or 18 or Noble Gases .....

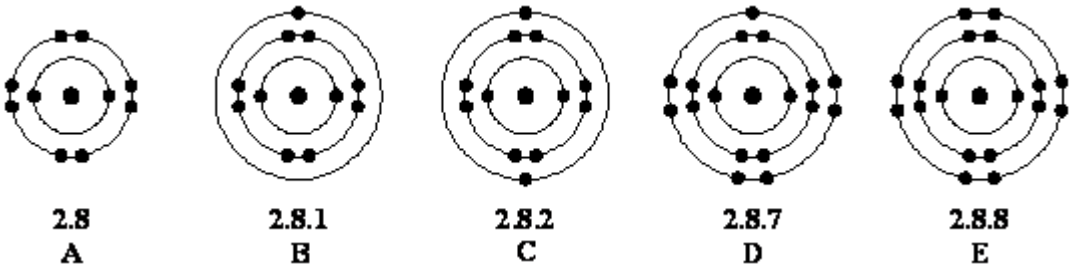
(1)

(Total 8 marks)

Asks specifically to ignore group 8 and 18 so don't include in exams.

Q3. Use the Data Sheet to help you answer this question.

When sodium reacts with water it forms sodium ions.
The diagrams below represent the electron arrangements of some atoms and ions.



Which of the diagrams, **A** to **E**, represents the electron arrangement of each of the following?

(i) A sodium atom, Na ..... B

(ii) A sodium ion, Na^+ ..... A

2

(Total 2 marks)

Q4. You will find it helpful to use the information on the Data Sheet when answering this question.

In the nucleus of an aluminium atom are:

13 protons
and 14 neutrons.

(a) Complete these sentences.

(i) The mass number of the aluminium atom is ..... 27 ..... .

(ii) In an atom of aluminium there are ..... 13 ..... electrons.

2

(2)

(b) Why is an aluminium atom electrically neutral?

It has no charge as the number of protons and electrons are the same

.....

.....

state what charges each particle has/add reasoning

.....

1

(2)

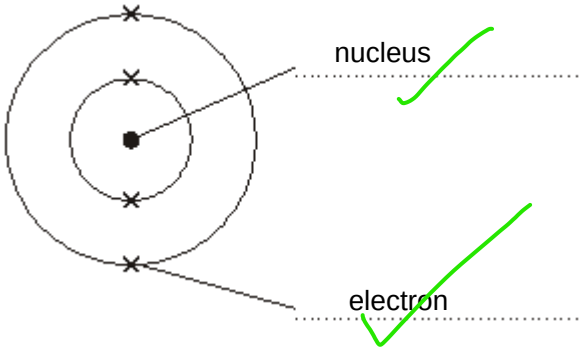
(c) Complete the table for the element fluorine.

PARTICLE	NUMBER OF PROTONS	NUMBER OF NEUTRONS	NUMBER OF ELECTRONS
Fluorine atom	9	10	9
Fluoride atom	9	10	10

(3)
(Total 7 marks)

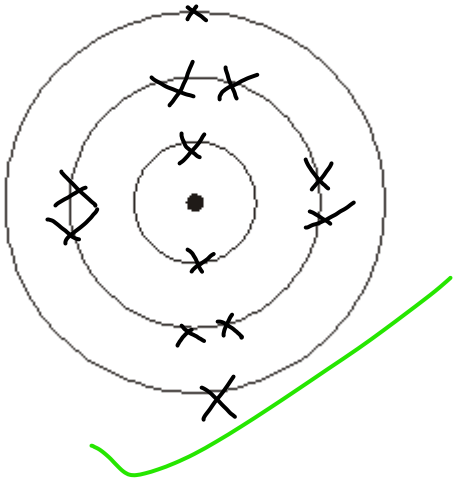
Q5. (a) The diagram represents an atom of beryllium. Use words from the box to label the diagram.

electron	**ion**	**isotope**	**molecule**	**nucleus**



(2)

(b) Use crosses (*x*) to complete the diagram to show the electronic structure of a magnesium atom. The atomic (proton) number of magnesium is 12.



(2)
(Total 4 marks)

Q6. This question is about the structure of atoms.

(a) Choose words from the list to complete the sentences below.

electrons **ions** **neutrons** **protons**

In an atom, the particles with a negative charge are called electrons

Particles in the nucleus with no charge are called neutrons

An atom has no overall charge because is has the same number of electrons and protons

(3)

(b) Two isotopes of the element carbon are:

$^{12}_{6}C$ and $^{14}_{6}C$

Complete the table of information for these two isotopes.

	ATOMIC NUMBER	MASS NUMBER	NUMBER OF PROTONS	NUMBER OF NEUTRONS
Isotope $^{12}_{6}C$	6	12	6	6
Isotope $^{14}_{6}C$	6	14	6	8

(2)

(Total 5 marks)