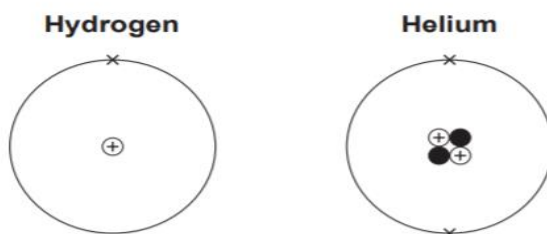


Atomic Structure Past Paper Questions AQA Chemistry GCSE -Higher

1.

1 The Sun produces helium atoms from hydrogen atoms by nuclear fusion reactions.



1 (a) Describe the differences in the atomic structures of a hydrogen atom and a helium atom.

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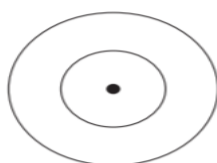
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(3 marks)

1 (b) The Sun consists of 73% hydrogen and 25% helium.
The rest is other elements.
One of the other elements in the Sun is neon.

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

1 (b) (i) Complete the diagram to show the electronic structure of a neon atom.



(1 mark)

1 (b) (ii) Why is neon in the same group of the periodic table as helium?

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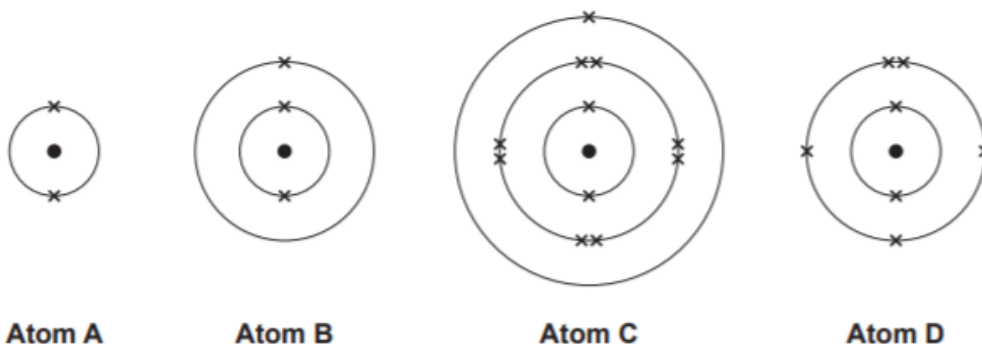
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(1 mark)

2.

The diagrams show the electronic structure of four different atoms.



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

- (a) Name the two sub-atomic particles in the nucleus of an atom.

..... (1 mark)

- (b) Why is there no overall electrical charge on each atom?

.....
 (1 mark)

- (c) Why is **Atom A** unreactive?

..... (1 mark)

- (d) Which **two** of these atoms have similar chemical properties?
 Give a reason for your answer.

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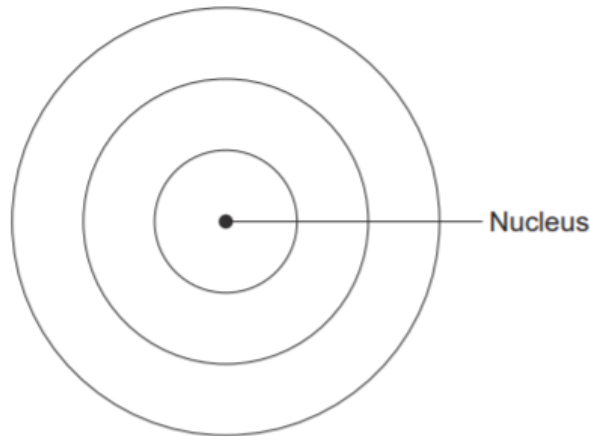
 (2 marks)

3.

Aluminium has many uses.

(a) An aluminium atom has 13 electrons.

(a) (i) Draw the electronic structure of an aluminium atom.



(1 mark)

(a) (ii) Name the **two** sub-atomic particles in the nucleus of an aluminium atom.

..... and
(1 mark)

(a) (iii) Why is there no overall electrical charge on an aluminium atom?

.....
.....
(1 mark)

4.

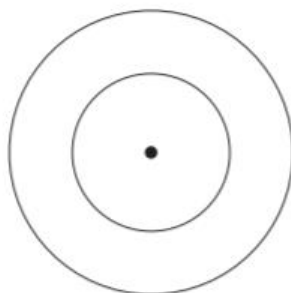
Fossil fuels contain carbon and hydrogen.

(a) (i) Use the Chemistry Data Sheet to help you to answer this question.

Complete **Figure 1** to show the electronic structure of a carbon atom.

[1 mark]

Figure 1



(a) (ii) Complete the word equation for the oxidation of hydrogen.

[1 mark]



(b) Coal is a fossil fuel.

Coal contains the elements hydrogen, sulfur, oxygen and carbon.

Name **two** products of burning coal that have an impact on the environment.

What impact does each of the products you named have on the environment?

[4 marks]

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5.

This question is about atomic structure and elements.

(a) Complete the sentences.

(a) (i) The atomic number of an atom is the number of
[1 mark]

(a) (ii) The mass number of an atom is the number of
.....
[1 mark]

(b) Explain why an atom has no overall charge.

Use the relative electrical charges of sub-atomic particles in your explanation.
[2 marks]

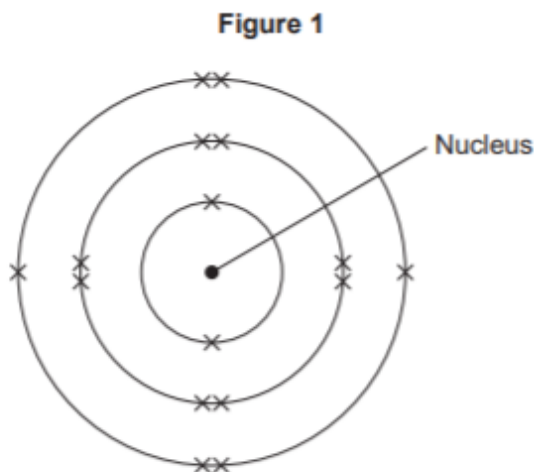
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(c) Explain why fluorine and chlorine are in the same group of the periodic table.

Give the electronic structures of fluorine and chlorine in your explanation.
[2 marks]

.....
.....
.....
.....

(d) **Figure 1** shows the electronic structure of an atom of a non-metal.



What is the chemical symbol of this non-metal?

[1 mark]

Tick (✓) **one** box.

Ar

O

S

Si

(e) When elements react, their atoms join with other atoms to form compounds.

Complete the sentences.

(e) (i) Compounds formed when non-metals react with metals consist of particles called

[1 mark]

(e) (ii) Compounds formed from only non-metals consist of particles called

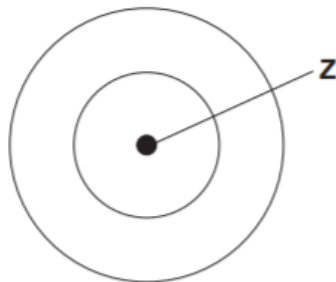
[1 mark]

6.

There are eight elements in the second row (lithium to neon) of the periodic table.

(a) **Figure 1** shows an atom with two energy levels (shells).

Figure 1



(a) (i) Complete **Figure 1** to show the electronic structure of a boron atom.

[1 mark]

(a) (ii) What does the central part labelled **Z** represent in **Figure 1**?

[1 mark]

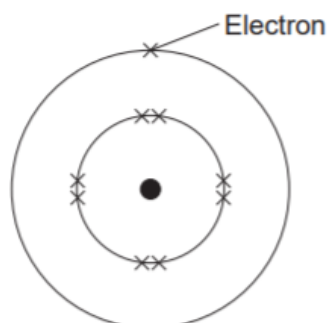
(a) (iii) Name the sub-atomic particles in part **Z** of a boron atom.

Give the relative charges of these sub-atomic particles.

[3 marks]

- (b) The electronic structure of a neon atom shown in **Figure 2** is **not** correct.

Figure 2



Explain what is wrong with the electronic structure shown in **Figure 2**.

[3 marks]

7.

Elements are made of atoms.

- (a) **Table 1** shows the atomic numbers and mass numbers of three atoms.

Table 1

Atom	Atomic number	Mass number
1	12	24
2	12	25
3	12	26

- (a) (i) Suggest, in terms of the number of subatomic particles, why the atomic numbers of the three atoms are the same.

[1 mark]

- (a) (ii) Explain, in terms of the number of subatomic particles, why the mass numbers of the three atoms are different.

[2 marks]

- (b) When elements react, their atoms join with other atoms to form compounds.

Sulfuric acid, H_2SO_4 , is a compound.

- (b) (i) How many elements are in the formula H_2SO_4 ?

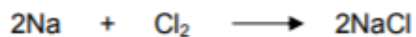
[1 mark]

- (b) (ii) How many atoms are in the formula H_2SO_4 ?

[1 mark]

8.

- (a) The chemical equation for a reaction of sodium is shown below.



Describe this reaction of sodium in terms of the names of the substances and the numbers of the atoms involved.

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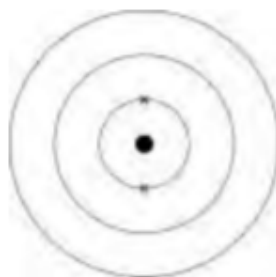
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(3 marks)

- (b) Use the periodic table on the data sheet to help you to answer this question.

- (b) (i) Complete the electronic structure of sodium.



(2 marks)

- (b) (ii) How is the electronic structure of sodium different from the electronic structure of chlorine?

.....

.....

(1 mark)