

Name:

Date:

C1 - Test 1
ATOMIC STRUCTURE AND THE
PERIODIC TABLE
Beginner

GCSE

CHEMISTRY

AQA - Combined Science

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

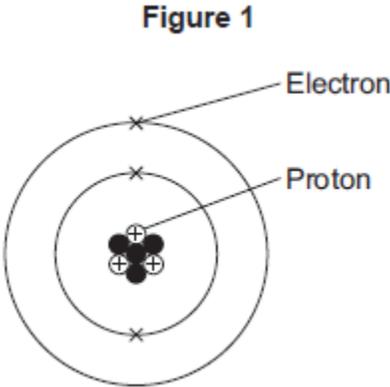
Information

- The marks for the questions are shown in brackets

1.

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

(a) **Figure 1** shows a lithium atom.



(i) What is the mass number of the lithium atom in **Figure 1**?

Tick (✓) **one** box.

3	<input type="checkbox"/>
4	<input type="checkbox"/>
7	<input type="checkbox"/>

(1)

(ii) What is the charge of an electron?

Tick (✓) **one** box.

-1	<input type="checkbox"/>
0	<input type="checkbox"/>
+1	<input type="checkbox"/>

(1)

(iii) Protons are in the nucleus.

Which other sub-atomic particles are in the nucleus?

Tick (✓) **one** box.

ions

molecules

neutrons

(1)

(b) What is **always** different for atoms of different elements?

Tick (✓) **one** box.

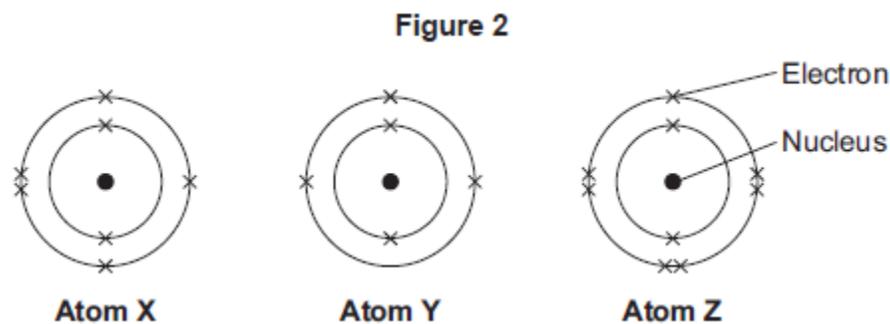
number of neutrons

number of protons

number of shells

(1)

- (c) **Figure 2** shows the electron arrangements of three different atoms, **X**, **Y** and **Z**.
 These atoms are from elements in the second row (lithium to neon) of the periodic table.



Which atom is from an element in Group 3 of the periodic table?

Tick (✓) **one** box.

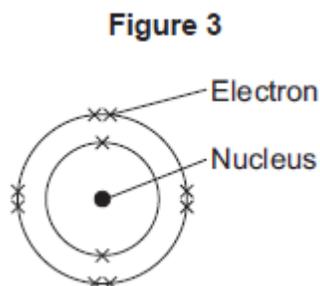
Atom X

Atom Y

Atom Z

(1)

- (d) **Figure 3** shows the electron arrangement of a different atom from an element in the second row of the periodic table.



- (i) Give the chemical symbol of this element.

(1)

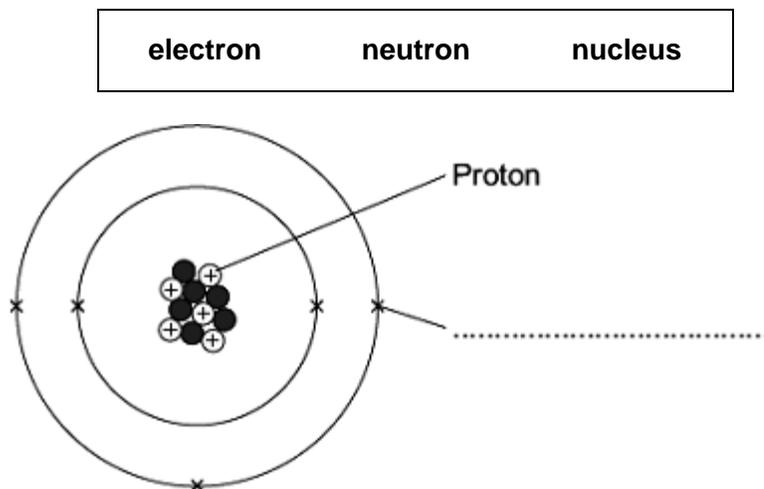
- (ii) Why is this element unreactive?

(1)

(Total 7 marks)

2. The diagram represents an atom of an element.

(a) Choose **one** word from the box to complete the label on the diagram.



(b) (i) What is the atomic (proton) number of this atom? _____ (1)

(ii) Name the element.

Use the periodic table on the Data Sheet to help you answer this question.

The name of the element is _____ .

(c) (i) Draw a ring around the mass number of this atom. (1)

5 11 16

(ii) Another atom of this element has a different mass number.

Draw a ring around the correct word in the box to complete the sentence.

Atoms of the same element with different numbers of

electrons
neutrons
protons

are called isotopes.

(1)
(Total 5 marks)

3.

This question is about the periodic table.

In 1864 John Newlands suggested an arrangement of elements.

Figure 1 shows the arrangement Newlands suggested.

Figure 1

1	2	3	4	5	6	7
H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca				

- (a) Give **two** differences between column 1 in **Figure 1** and Group 1 in the modern periodic table.

Use the periodic table to help you.

1. _____

2. _____

(2)

- (b) In 1869 Mendeleev produced his periodic table.

Complete the sentence.

Choose the answer from the box.

insoluble	magnetic	undiscovered	unreactive
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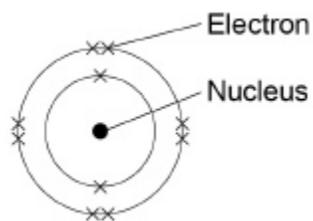
Mendeleev left gaps in his periodic table for elements that were

_____.

(1)

(e) **Figure 3** shows the electronic structure of an atom.

Figure 3



This element is in the shaded group on **Figure 2**.

Why is this element unreactive?

(1)

(f) Name the group of elements in the shaded column on **Figure 2**.

(1)

(Total 9 marks)

4.

The table below shows information about some elements.

Element	Melting point in °C	Boiling point in °C
Fluorine	-202	-188
Chlorine	-101	-35
Bromine	-7	59
Iodine	114	184
Astatine		

(a) Look at the table above.

Describe the trend in melting point from fluorine to astatine.

(1)

(b) Estimate the boiling point of astatine.

Use the table above to help you.

Boiling point of astatine = _____ °C

(1)

(c) Room temperature is 20 °C.

Which element in the table above is a liquid at room temperature?

(1)

(d) To which group of the periodic table do the elements in the table above belong?

Tick **one** box.

Group 0

Group 1

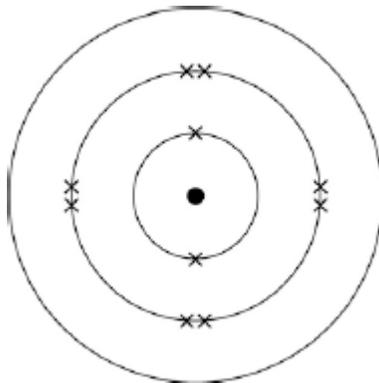
Group 5

Group 7

(1)

(e) A chlorine atom has 17 electrons.

On the figure below, use crosses to show the arrangement of electrons in the outer shell of a chlorine atom.



(1)

- (f) Chlorine reacts with sodium bromide solution to produce bromine and sodium chloride solution.

Complete the symbol equation for the reaction.



(2)

- (g) Which element in the table above will react with sodium chloride solution?

Give a reason for your answer.

(2)

(Total 9 marks)

5.

The elements in the periodic table are arranged in groups.

- (a) What is similar about the elements in the same group?

Tick **one** box.

Chemical properties

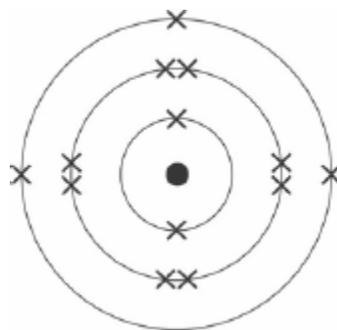
Atomic numbers

Relative atomic masses

(1)

(b) **Figure 1** shows the arrangement of electrons in an atom.

Figure 1



What group of the periodic table is this atom in?

Group _____

(1)

(c) Why are the elements in Group 0 unreactive?

Tick **one** box.

They are all gases at room temperature

They all have the same atomic number

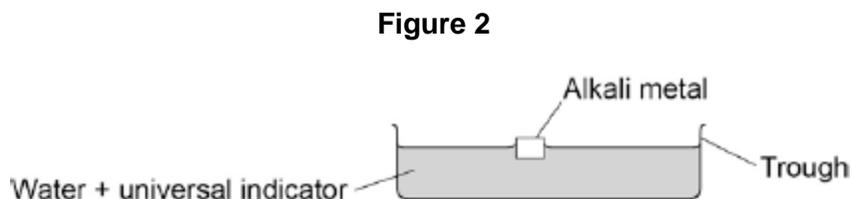
They are all in the same group of the periodic table

They all have a stable arrangement of electrons

(1)

(d) A teacher demonstrates the reaction of some alkali metals with water.

Look at **Figure 2**.



The students write what they see.

1. The alkali metals float on water.
2. The alkali metals fizz when they react with water.
3. The universal indicator changes from green to purple.
4. The sodium disappears faster than the lithium.

Give a reason for each of the four things that the students see.

1. The alkali metals float on water.

Reason _____

2. The alkali metals fizz when they react with water.

Reason _____

3. The universal indicator changes from green to purple.

Reason _____

4. The sodium disappears faster than the lithium.

Reason _____

(4)
(Total 7 marks)

(iv) Which **two** statements are correct?

Tick (✓) **two** boxes.

Iron has a higher density than potassium.

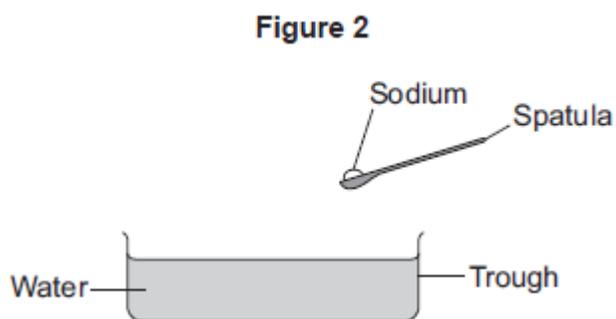
Iron is softer than potassium.

Iron reacts vigorously with water.

Iron forms ions that have different charges.

(2)

(c) **Figure 2** shows sodium being put into water.



Describe **three** observations that can be seen when sodium is put into water.

1. _____

2. _____

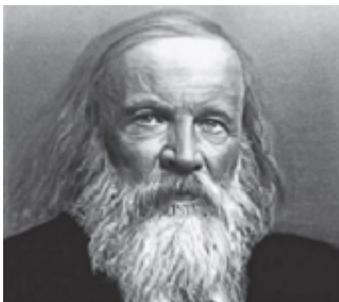
3. _____

(3)

(Total 11 marks)

8.

By 1869, about 60 elements had been discovered. Mendeleev arranged these elements in a table, in order of their atomic weight. He put elements with similar chemical properties in the same column. Mendeleev and part of his table are shown below.



Column						
1	2	3	4	5	6	7
H						
Li	Be	B	C	N	O	F
Na	Mg	Al	Si	P	S	Cl

By unknown / неизвестен (here / здесь) [Public domain], via Wikimedia Commons

Use the periodic table on the Data Sheet to help you to answer these questions.

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

In the periodic table the columns are known as

groups.
periods.
rows.

(1)

(b) Suggest **one** reason why hydrogen should **not** have been put in column 1.

(1)

(c) In 1895, the first of a new family of elements was discovered. One of the new elements was called helium.

Where has this new family of elements been placed in the modern periodic table?

(1)

(d) Complete the sentence.

In the periodic table on your Data Sheet, the elements are arranged in order of their atomic _____ .

(1)

(Total 4 marks)

9.

This question is about atoms and molecules.

(a) In the diagrams below:

(N) is a nitrogen atom

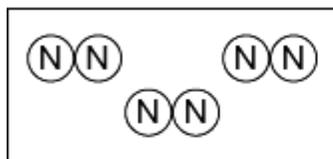
(O) is an oxygen atom

(C) is a carbon atom.

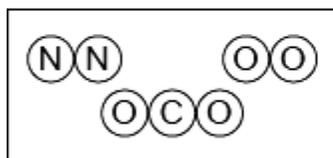
Draw **one** line from each diagram to its correct description.
One line has been done for you.

Diagram

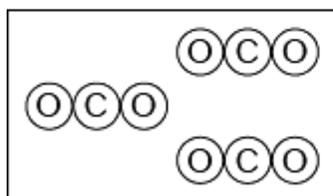
Description



Compound



Element



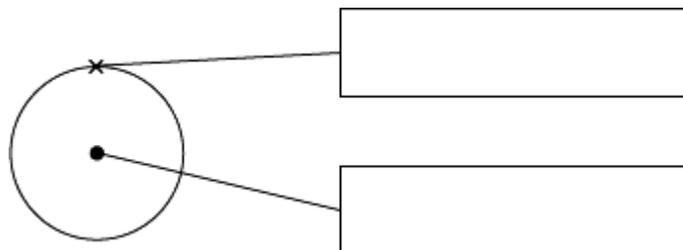
Mixture

Polymer

(2)

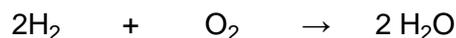
- (b) The diagram below shows a hydrogen atom.
Use words from the box to write the correct labels on the diagram.

alloy	electron	group	nucleus
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(2)

- (c) This chemical equation represents the reaction of hydrogen burning.



Complete the sentence to describe what is happening in this chemical reaction.

Hydrogen reacts with _____

(2)

(Total 6 marks)

10.

This question is about the periodic table.

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

- (a) Complete the sentences.

Elements in the periodic table are arranged in order of atomic

_____.

The elements in Group _____ are called the noble gases.

(2)

- (b) Calcium (Ca) is in Group 2.

Name **one** other element in Group 2.

(1)

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

(i) Sodium (Na) is

- an alkali metal.
- a non-metal.
- a transition metal.

(1)

(ii) Nickel (Ni) is

- an alkali metal.
- a non-metal.
- a transition metal.

(1)

(d) In 1869 Mendeleev produced his periodic table.

Why did Mendeleev leave gaps in his periodic table?

(1)

(Total 6 marks)

11.

The diagram shows the chemical symbols of five elements in the periodic table.

Group 1		2							3	4	5	6	7	0
														He
									C					
Na													Cl	
								Cu						

(a) Choose the correct chemical symbol to complete each sentence.

(i) The element that is an alkali metal is _____ .

(1)

(ii) The element that is a transition metal is _____ .

(1)

(iii) The element in Group 4 is _____ .

(1)

(iv) The element with a full outer energy level (shell) of electrons is

_____ .

(1)

(b) Which other element goes in the shaded box?

(1)

(Total 5 marks)