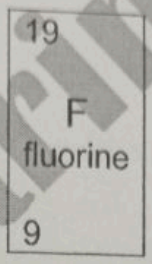
Question {2}

mass than the alpha particle. [2]

10 The element fluorine is shown in the Periodic Table as:



Use the numbers listed below to complete the sentences that follow.

9 **10** **19** **28**

A fluorine atom has:

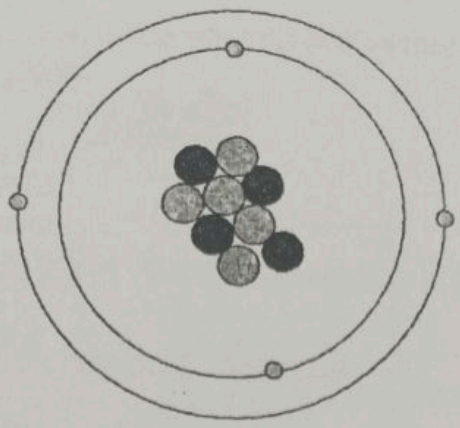
(a) an atomic number of ..... . [1]

(b) ..... electrons in its orbit. [1]

(c) ..... neutrons in its nucleus. [1]

(d) an atomic mass of ..... . [1]

8 Look at the diagram of a beryllium atom.



(a) (i) How many **electrons** are in the atom?

..... [1]

(ii) How many **neutrons** are in the atom?

..... [1]

(b) Write down the chemical symbol for beryllium.

..... [1]

(c) Lithium is the third element in the Periodic Table.

Beryllium is the fourth element.

Lithium has fewer neutrons than beryllium.

Describe **two other** ways in which the structure of a lithium atom is **different** from a beryllium atom.

1 .....

2 ..... [2]

(d) Which one of these scientists did research on the structure of an atom?

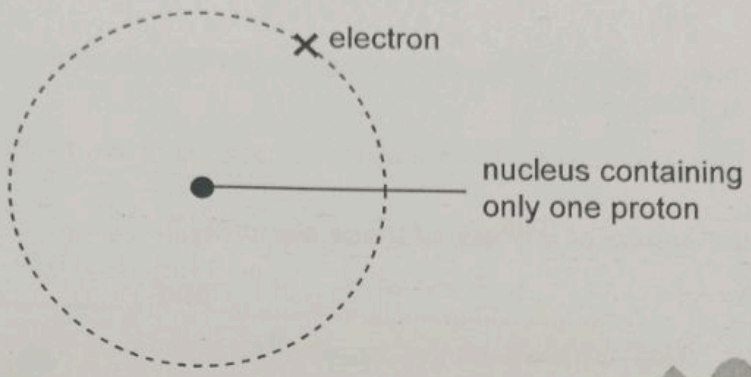
Circle the correct answer.

Darwin **Galileo** **Newton** **Rutherford**

[1]

Question {4}

12 The diagram shows the structure of an atom.



(a) Which element has atoms with this structure?

..... [1]

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

electrons **protons** **neutrons**

(i) The nucleus of an atom usually contains both

..... and ..... [1]

(ii) The particles in the atom which have a negative electrical charge are called ..... [1]

(iii) An atom of an element contains the same number of

..... and ..... [1]

Question {5}

7 (a) What is the chemical symbol for copper?

..... [1]

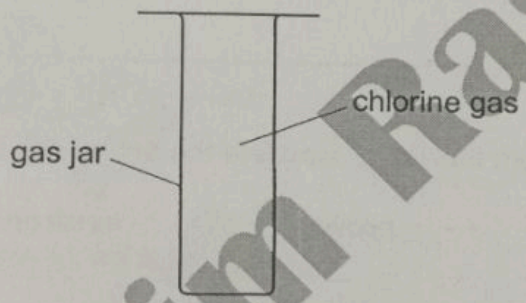
(b) (i) How many different elements are present in the substance with the formula $(NH_4)_2SO_4$?

..... [1]

(ii) Give the names of any **two** of these elements.

..... and ..... [2]

(c) The gas in the gas jar consists of chlorine molecules, Cl_2.



What is the name given to the smaller particles which have joined to form a chlorine molecule?

..... [1]

Question {6}

5 Look at the information about different atoms.

$^{19}_{9}F$	$^{32}_{16}S$	$^{23}_{11}a$	$^{20}_{10}Ne$
fluorine	sulfur	sodium	neon

Use the information above to answer the following questions.

(a) Which **two** atoms have 10 neutrons in their nuclei?

..... and ..... [1]

(b) Which atom has six electrons in its outermost shell (orbit)?

..... [1]

(c) Which atom is found in Group 1 of the Periodic Table?

..... [1]

(d) Some atoms have the same numbers of protons and neutrons.

There are **two** of these types of atoms in the list.

Which two?

..... and ..... [1]

(e) Which **two** atoms have three electron shells around the nucleus?

..... and ..... [1]

Question {7}

1 Sodium and lithium are both elements in Group 1 of the Periodic Table.

H hydrogen 1						He helium 2
Li lithium 3	Be beryllium 4			B boron 5	C carbon 6	N nitrogen 7	O oxygen 8	F fluorine 9	Ne neon 10
Na sodium 11	Mg magnesium 12			Al aluminium 13	Si silicon 14	P phosphorus 15	S sulfur 16	Cl chlorine 17	Ar argon 18
K potassium 19	Ca calcium 20								

(a) Write down the number of protons in a sodium atom.

.....[1]

(b) Complete the diagram to show how the electrons are arranged in a sodium atom.

NOT TO SCALE

[2]

(c) Describe how lithium reacts with cold water.

.....

.....

.....[2]

Question {8}

7 Look at the table of elements in Group 7 (Group 17) of the modern Periodic Table.

element	atomic mass	state at room temperature	melting point in °C	boiling point in °C
fluorine	19		–220	–188
chlorine	35	gas	–101	
bromine	80	liquid	–7	59
iodine	127	solid	114	184
astatine	210	solid	301	337

(a) Complete the sentence about the relationship between atomic mass and melting point.

As the atomic mass ..... the melting point ..... . [1]

(b) What is the state of fluorine at room temperature?

..... [1]

(c) Estimate the boiling point of chlorine.

Choose from the list.

–201°C **–34°C** **65°C** **138°C**

The boiling point of chlorine is ..... °C [1]

Question {9}

3 The table shows some information about the elements in Group 7 of the Periodic Table.

element	chemical symbol	formula of molecule	melting point in °C	speed of reaction with iron
fluorine	F	F_2	–220	very fast
chlorine	Cl	Cl_2	–102	fast
bromine	Br	Br_2	–7	
iodine	I	I_2		very slow
astatine	At			no reaction

Use the information to predict:

(a) the formula of a molecule of astatine ..... . [1]

(b) the melting point of iodine .....°C. [1]

(c) the speed of reaction of bromine with iron ..... . [1]

Question {10}

9 Sodium is in Group 1 of the Periodic Table.

(a) Write down the chemical symbol for sodium.

..... [1]

(b) Sodium is a metal.

Tick (✓) the boxes next to the **two** correct properties of sodium.

Sodium conducts electricity.	☐
Sodium does **not** conduct heat.	☐
Sodium has a low boiling point.	☐
Sodium is ductile.	☐
Sodium is **not** malleable.	☐

[2]

(c) Sodium reacts with water. A gas is formed.

(i) Name the gas that is formed.

..... [1]

(ii) Potassium is another element in Group 1.

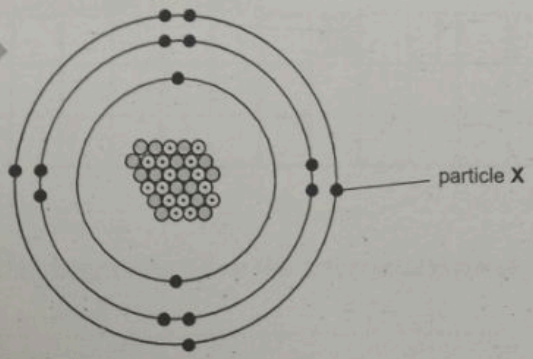
Potassium is below sodium in the Periodic Table.

Complete the sentence.

The rate of reaction of potassium with water is ..... than the rate of reaction of sodium with water. [1]

Question {11}

15 The diagram shows an atom of phosphorus.



(a) What is the name of particle **X**?

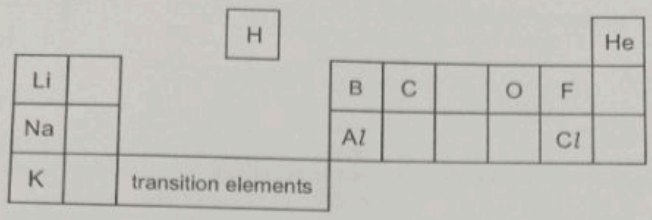
.....[1]

(b) What is the number of **particles** in the nucleus of this phosphorus atom?

.....[1]

Question {12}

10 Look at the diagram. It shows some of the elements in the Periodic Table.



Use this Periodic Table to answer these questions.

(a) Write down the chemical symbol of the **most** reactive element in Group **1**.

..... [1]

(b) An atom of an element has only **one** proton inside its nucleus.

Write down the chemical symbol for this element.

..... [1]

(c) Write down the chemical symbol of the element in Group 7 (Group 17) **and** Period 3.

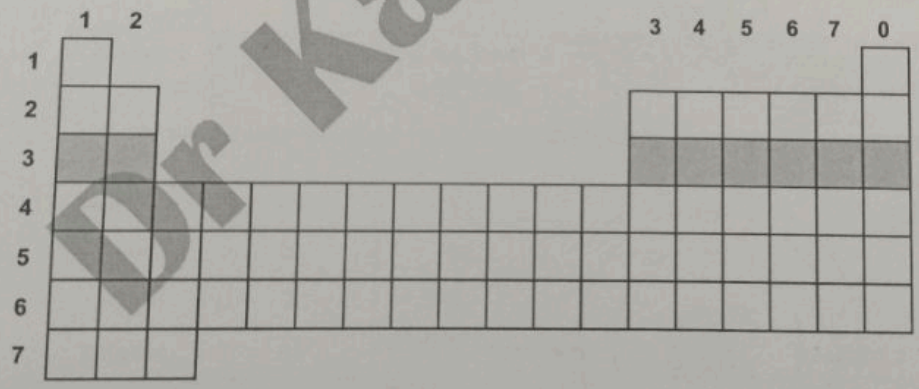
..... [1]

(d) Write down the **name** of the element in the same **group** as boron.

..... [1]

Question {13}

11 The diagram shows an outline of part of the periodic table.



(a) Name the shaded part of this periodic table.

.....[1]

(b) Answer the rest of this question **on the diagram**.

(i) Shade **group 7** of this periodic table. [1]

(ii) Put a letter **X** in the space occupied by a **noble gas**. [1]

(iii) Put a letter **Z** in the space occupied by the element with **six protons**. [1]

Question {14}

5 Look at the diagram.

It shows some of the elements in the Periodic Table.

		H									He
Li	Be					B	C	N	O	F	Ne
Na	Mg					Al	Si	P	S	Cl	Ar
K	Ca	transition elements									

(a) Use the Periodic Table to answer these questions.

(i) Write down the chemical symbol of the most reactive element in Group **7**.

..... [1]

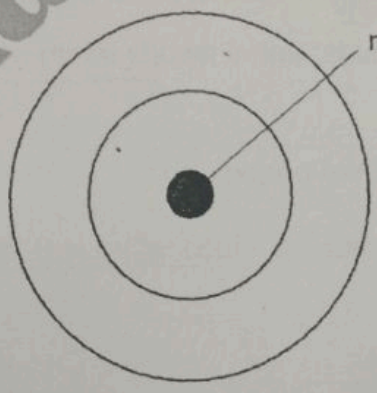
(ii) Write down the chemical symbol of the element with only three protons inside its nucleus.

..... [1]

(iii) Write down the chemical symbol of the element in Group 2 **and** Period 3.

..... [1]

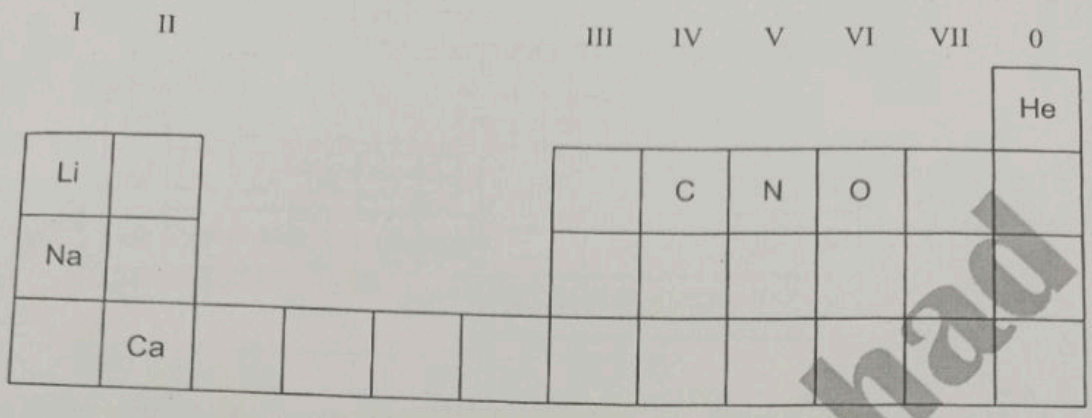
(b) Look at the diagram.



Complete the diagram to show the arrangement of electrons in an atom of carbon. [2]

Question {15}

12 Here is a part of the Periodic Table.



Use only the information in the table above to answer the following questions.

Give the **symbols** of:

(a) two elements in the same group

..... [1]

(b) an element that is an inert gas

..... [1]

(c) an element that is a non-metal solid at room temperature

..... [1]

(d) an element that is in the third period

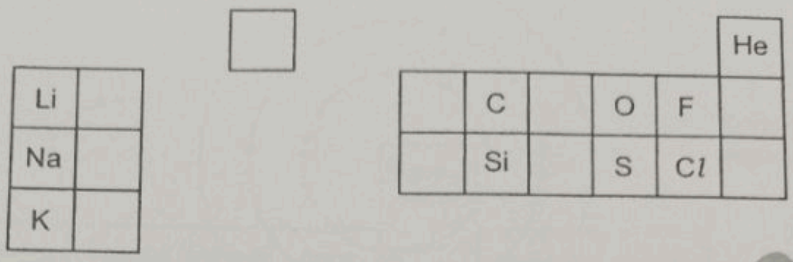
..... [1]

(e) an element that is a metal.

..... [1]

Question {16}

2 This diagram shows part of the Periodic Table of elements.



(a) Name the elements shown in the table that are **metals**.

..... [1]

(b) Write the **symbol** for hydrogen in the appropriate empty box. [1]

(c) What is the **symbol** for silicon?

..... [1]

(d) Which is the **least** reactive metal shown in the table?

..... [1]

(e) Which element shown in the table could be used to kill bacteria in a swimming pool?

..... [1]

(f) Which element shown in the table has the highest atomic (proton) number?

..... [1]

Question {17}

2 The Periodic Table of elements is arranged in groups and periods.

The diagram shows the first 20 elements of the Periodic Table.

Period number									
1	hydrogen								helium
2	lithium	beryllium		boron	carbon	nitrogen	oxygen	fluorine	neon
3	sodium	magnesium		aluminium	silicon	phosphorus	sulfur	chlorine	argon
4	potassium	calcium							

(a) Which of the following are correct statements about the Periodic Table?

Tick (✓) the correct boxes.

The reactivity decreases down Group 1.	
The atomic number increases across a period.	
Across a period the elements change from metals to non-metals.	
Boron, B, is in period 3 and group 2.	

[2]

(b) Which element is the most reactive metal shown on the table?

.....

[1]

(c) Magnesium reacts with oxygen to form a white solid compound.

What is the name of this compound?

.....

[1]

(d) Molybdenum is a typical metal.

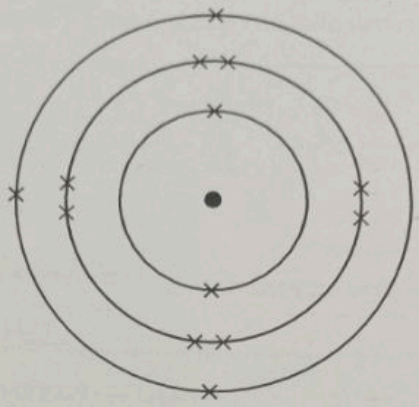
Write one physical property of molybdenum.

.....

[1]

Question {18}

11 The diagram shows the atomic structure of aluminium.



(a) How many electrons are there in one atom of aluminium?

..... [1]

(b) Which scientist discovered the structure of the atom?

Circle the correct answer.

Darwin **Einstein** **Pasteur** **Rutherford**

[1]

(c) In which group of the Periodic Table is aluminium found?

..... [1]

(d) Aluminium is used in the circuit boards and batteries of mobile phones.

Use ideas about properties to explain why.

.....

..... [1]

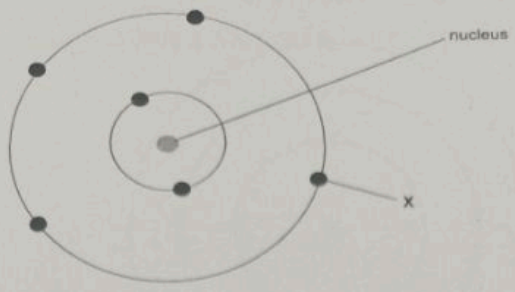
(e) Aluminium burns in air to form a compound.

What is the name of this compound?

..... [1]

Question {19}

11 The diagram shows a model of an atom of an element.



(a) Name the part of the atom labelled **X**.

..... [1]

(b) Describe how you can tell that the element is in Group 4 of the Periodic Table.

Use information from the diagram.

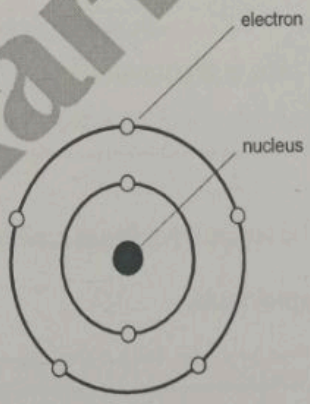
..... [1]

(c) What happens to the size of atoms as you move down Group 4?

..... [1]

Question {20}

7 Look at the diagram of a nitrogen atom.



(a) The protons are not shown on the diagram.

How many protons are in a nitrogen atom?

..... [1]

(b) Which group of the Periodic Table does nitrogen belong to?

..... [1]

(c) Write down the chemical symbol for nitrogen.

..... [1]

Question {21}

8 When lithium is added to water it forms lithium hydroxide and a gas.

(a) Complete the word equation for the reaction between lithium and water.

[3]

(b) The chemical symbol for lithium is Li.

The formula for water is H_2O.

The formula for lithium hydroxide is LiOH.

Which of these substances is an element?

Choose from **lithium**, **water** or **lithium hydroxide**.

.....

Explain your answer.

.....

.....

[2]

(c) Lithium is in Group 1 of the Periodic Table.

The diagram shows some of the elements in Group 1 of the Periodic Table.

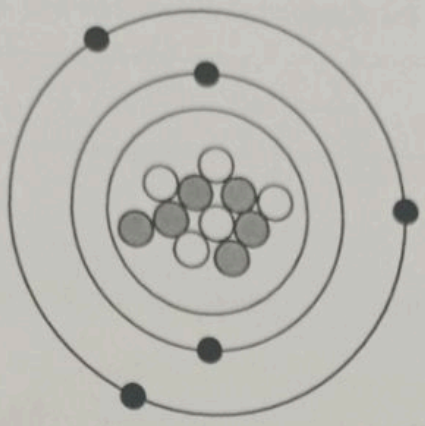
Na	sodium
K	potassium
Rb	rubidium
Cs	caesium
Fr	francium

Describe how the reactivity of the Group 1 metals changes as you go down the group.

..... [1]

Question {22}

11 The diagram shows the structure of a boron atom.



= particle **Y**
= particle **Z**

Name particles **Y** and **Z**.

particle **Y** .....

particle **Z** .....

[2]

Question {23}

2 Draw a line between the **element** and the correct **chemical symbol**.

element	chemical symbol
	Ni
nitrogen	P
phosphorus	N
potassium	Na
silicon	Po
sodium	S
sulfur	K
	Si

[4]

Question {24}

5 Look at the diagram. It shows some of the elements in the Periodic Table.

		H									He
Li	Be					B	C	N	O	F	Ne
Na	Mg					Al				Cl	
K	Ca	transition elements									

(a) Use this Periodic Table to answer these questions.

(i) Write down the chemical symbol of the most reactive element in **Group 2**.

.....[1]

(ii) Write down the chemical symbol of the atom with only **six electrons**.

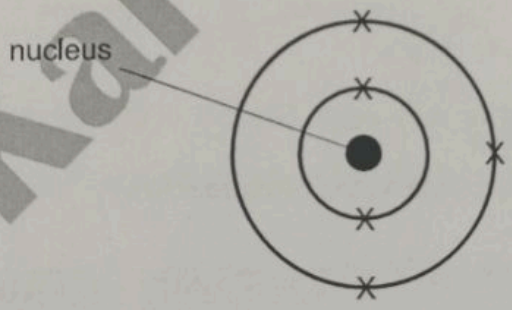
.....[1]

(b) Look at the elements in **Period 2** of the Periodic Table.

Write down the chemical symbol of the element with the **most protons** in each atom.

.....[1]

(c) Look at the diagram of an atom of an element.



(i) To which **group** of the Periodic Table does this element belong?

.....[1]

(ii) What is the number of **protons** in the nucleus of this atom?

.....[1]

Question {25}

3 A teacher shows his students the reactions of some metals with water.

He starts by adding small amounts of some metals to a bowl containing water.

The table shows the observations his students make.

metal	chemical symbol	observation
lithium	Li	fizzes slowly
sodium	Na	fizzes quickly
potassium	K	fizzes very quickly and bursts into flames

(a) When the teacher does the experiment he needs to keep himself and his students safe.

Write down **one** way he could do this.

.....[1]

(b) A gas is made when these metals react with water.

What is the **name** of this gas?

Circle the correct answer.

carbon dioxide **hydrogen** **nitrogen** **oxygen**

[1]

(c) All the metals the teacher uses are in Group 1 of the Periodic Table.

(i) Which of the three metals is the **most** reactive?

.....[1]

(ii) Rubidium is also in Group 1.

It is beneath potassium in the Periodic Table.

Predict what happens when **rubidium** is added to water.

.....[1]

Question {27}

9 **(a)** Atoms are made up of three different particles.

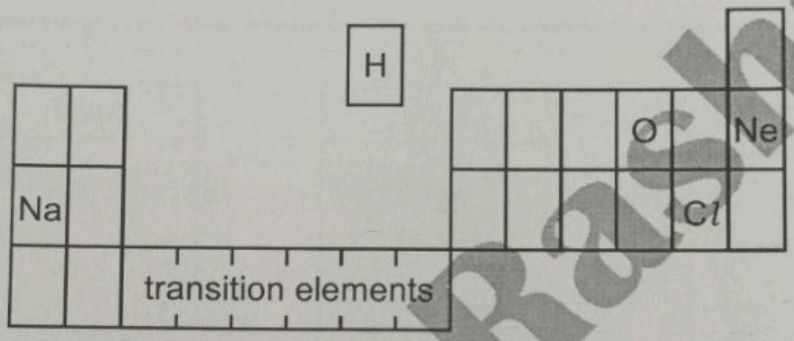
Complete the sentences about the different particles in an atom.

The nucleus of an atom contains ..... and .....

The nucleus is surrounded by particles called .....

[3]

(b) The diagram shows part of the Periodic Table.



(i) What is the chemical symbol for the **smallest** atom?

Choose from **H**, **O**, **Ne**, **Na** or **Cl**.

..... [1]

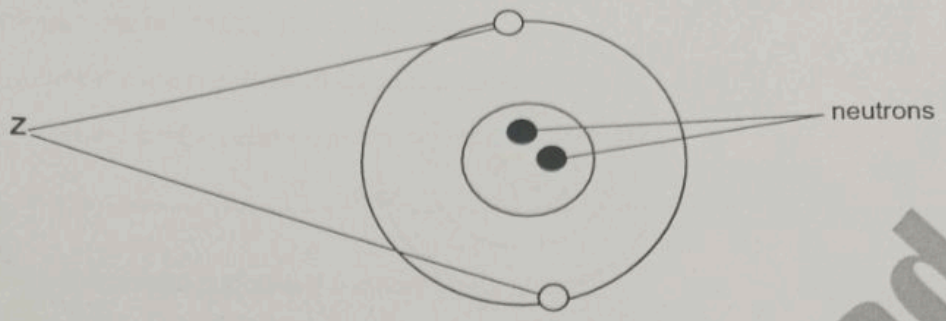
(ii) Which chemical symbol shows a **metal**?

Choose from **H**, **O**, **Ne**, **Na** or **Cl**.

..... [1]

Question {28}

7 The diagram shows part of the structure of an atom of helium.



(a) There are three types of particle in an atom.

This diagram shows only two of the types of particle.

(i) Name the particles labelled **Z**.

..... [1]

(ii) Name the particles that are missing from the diagram.

.....

Draw on the diagram the correct position and number of the missing particles.

[2]

(b) The diagram shows the group of the Periodic Table that contains helium.

The elements are in the same order as they appear in the Periodic Table.

helium
neon
argon
krypton
xenon
radon

(i) Which element in the group has the **largest** atomic number?

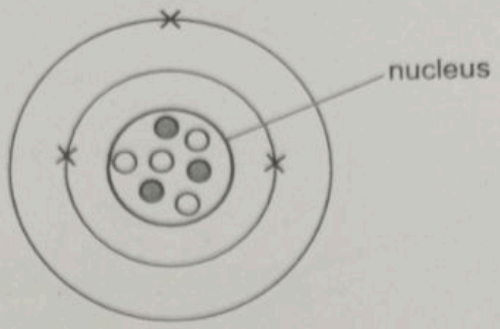
..... [1]

(ii) Describe how the radius of the atom changes as you go down the group.

..... [1]

Question {29}

8 Look at the diagram of the structure of a lithium atom.



(a) There are three electrons in a lithium atom.

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

..... [1]

(ii) How many neutrons are there in a lithium atom?

..... [1]

(b) A sodium atom contains 11 protons.

Draw the structure of a sodium atom.

[2]

Question {31}

14 Look at the diagram.

It shows part of the Periodic Table.

			H									He
Li	Be					B	C	N	O	F	Ne
Na	Mg					Al	Si	P	S	Cl	Ar
K	Ca	transition elements										

(a) Write down the chemical symbol of an element in the same **group** as chlorine.

.....

[1]

(b) Write down the chemical symbol of an element in the same **period** as sodium.

.....

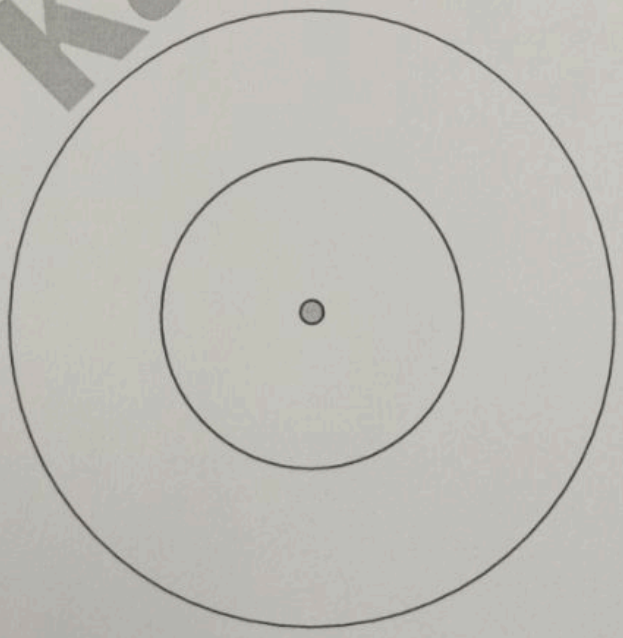
[1]

(c) Write down the chemical symbol of the element with an atom with only 8 protons.

.....

[1]

(d) Complete the diagram to show the electronic structure of lithium, Li.



[1]

Question {32}

5 Look at the table.

It shows information about some properties of the Group 1 elements.

element	melting point in °C	boiling point in °C	density in g/cm^3	atomic radius in arbitrary units
lithium	180	1342	0.53	145
sodium	98	883	0.97	180
potassium	63	759	0.89	220
rubidium		688	1.53	235

(a) Describe the trend in **boiling point** as you go down Group 1.

..... [1]

(b) Which property does **not** show a clear trend?

..... [1]

(c) Predict the **melting point** of rubidium.

The melting point of rubidium is ..... °C [1]

(d) Describe the change in reactivity of the elements as you go down Group 1.

..... [1]

Question {33}

14 Look at the information about some Group 1 elements.

element	electronic structure	melting point in °C
lithium	2.1	181
sodium	2.8.1	98
potassium	2.8.8.1	64
rubidium		

Gabriella makes some predictions about rubidium.

Rubidium is below potassium in the Periodic Table.

(a) Predict the number of electrons in the outer orbit (shell) of an atom of rubidium.

..... [1]

(b) Predict the melting point of rubidium.

melting point = ... °C [1]

(c) Predict how the reactivity of rubidium compares to lithium, sodium and potassium.

..... [1]

Question {34}

6 Look at the information about Group 1 elements.

element	melting point in °C	boiling point in °C
sodium	98	883
potassium	64	759
rubidium	39	688

(a) Lithium is **above** sodium in the Periodic Table.

Predict the melting point of lithium.

..... °C [1]

(b) Caesium is **below** rubidium in the Periodic Table.

Predict the boiling point of caesium.

..... °C [1]

(c) Which of the **three** elements in the table is the **most** reactive?

..... [1]

Question {35}

2 The table shows information about elements. 3146_01

atomic symbol	number of electrons in	
	one atom of the element	one ion of the element
Li	3	2
Mg	12	10
Al	13	10
Cl	17	18
K	19	18
Ca	20	18

(a) (i) Which atom loses three electrons to form an ion?

Circle the correct answer.

Li **Mg** **Al** **Cl** **K** **Ca** [1]

(ii) Which atom forms a negative ion?

.....

Explain your answer.

.....

.....

[2]

(iii) Two elements in the table are in Group 1.

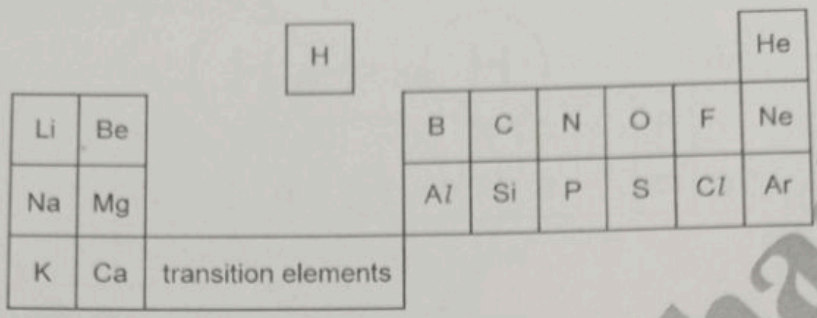
Write down the atomic symbols of these **two** elements.

Use the Periodic Table on page 18 to help you.

..... and ..... [1]

Question {1}

2 Look at the diagram of part of the Periodic Table of the elements.



(a) Use the Periodic Table to write the electronic structure of aluminium, Al.

..... [1]

(b) How many protons are in an atom of fluorine, F?

..... [1]

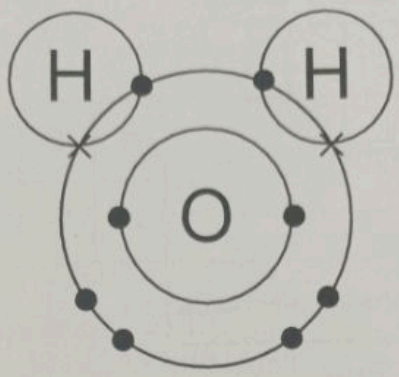
(c) A sodium atom, Na, forms a sodium ion, Na^+.

Describe, in terms of electrons, how a sodium ion is made from a sodium atom.

..... [1]

Question {2}

2 Look at the diagram of a water molecule, H_2O.



(a) State the **type** of bonding in a water molecule.

.....

Explain how you can tell.

.....

.....

[2]

(b) An oxygen atom has the electronic structure 2.6.

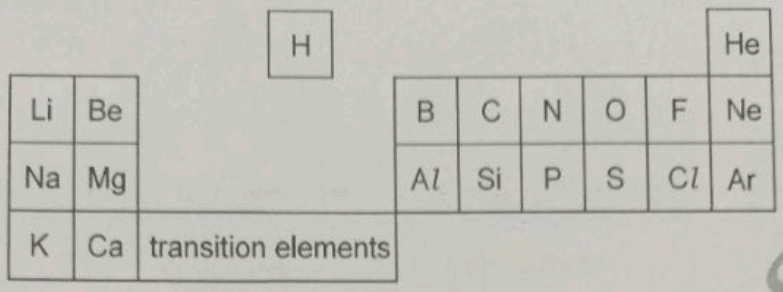
To which group of the Periodic Table does oxygen belong?

..... [1]

Question {3}

2 Look at the diagram.

It shows part of the Periodic Table.



(a) Write down the chemical symbol for the element which has the electronic structure 2.8.4.

..... [1]

(b) Write down the chemical symbol for an element in the same **group** as Be.

..... [1]

(c) Hydrogen and oxygen react together to make **molecules** of water.

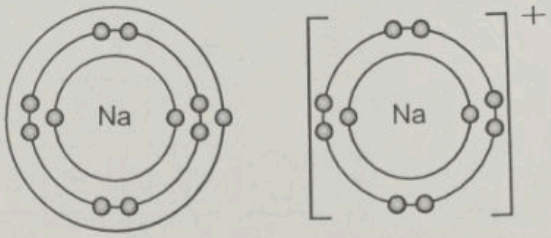
Write down the **type** of bonding in a water molecule.

..... [1]

Question {4}

3 Look at the diagrams.

They show the electronic structures of a sodium atom and of a sodium ion.



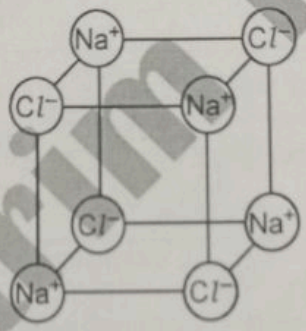
sodium atom sodium ion

(a) Describe how a sodium ion is made from a sodium atom.

..... [1]

(b) Look at the diagram.

It shows the structure of sodium chloride.



(i) Write down the name of the **type** of bonding in sodium chloride.

..... [1]

(ii) The bonding between sodium ions and chloride ions is strong.

Explain why.

.....

..... [1]

(iii) Sodium chloride has a giant structure.

Circle the melting point of sodium chloride.

–50 °C **0 °C** **52 °C** **801 °C**

[1]

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Question {5}

2 **(b)** Some elements make compounds with ionic bonds. 3146_01

Describe what is meant by the words **ionic bond**.

.....

.....

..... [2]

Question {6}

3146_02

9 **(c)** Water molecules are made in this reaction.

Name and describe the type of bond present in a water molecule.

name .....

description .....

.....

[2]