

Questions for you to complete and then mark.

Q1.

The elements in group 7 of the periodic table are known as the halogens.

	melting point in °C	boiling point in °C	relative atomic mass	colour of element at room temperature, 20°C
fluorine	-220	-188	19	very pale yellow
chlorine	-101	-34	35.5	greenish yellow
bromine	-7	59	80	reddish brown
iodine	114	184	127	dark grey
astatine			210	

- (a) (i) Predict the physical state of astatine at room temperature.

.....

1 mark

- (ii) Predict the colour of astatine at room temperature.
Tick the correct box.

colourless

yellow

brown

black

1 mark

- (b) The reactions of chlorine and bromine with some sodium salts are given below.

salt	colour of salt solution	colour after addition of chlorine solution, which is greenish yellow	colour after the addition of bromine solution which is orange
sodium chloride	colourless	pale greenish yellow	orange
sodium bromide	colourless	orange	orange
sodium iodide	colourless	dark brown	dark brown

(i) Use these observations to put the elements bromine, chlorine and iodine in order of reactivity.

least reactive

.....

most reactive

1 mark

(ii) A solution of iodine, which is dark brown, is added to a solution of sodium bromide. What will be the colour of the resulting solution?

1 mark

(c) Predict, with a reason, if there will be a reaction between:

(i) fluorine and sodium chloride solution.

.....

.....

1 mark

(ii) astatine and sodium iodide solution.

.....

.....

1 mark

Maximum 6 marks

Q2.

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

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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)

Q3.

- (a) The periodic table on the Data Sheet may help you to answer these questions.

Part of the periodic table is shown below.

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

Choose your answers **only** from the letters shown in the periodic table above.

Which letter, **A**, **B**, **C**, **D** or **E**, represents:

i) an alkali metal Letter

(1)

(ii) the element calcium Letter

(1)

(iii) a transition element Letter

(1)

(iv) a Group 4 element? Letter

- (b) A chemistry teacher demonstrated the reaction between sodium and water to some students. One of the students wrote the following notes.

The reaction between sodium and water

A piece of sodium was cut easily into smaller pieces with a knife.

The sodium was added to water in a trough.

The sodium:

- ϕ floated
- ϕ melted quickly to give a silvery ball
- ϕ moved on the surface of the water
- ϕ fizzed.

Use the information in the box to help you to answer these questions.

What evidence is there that:

- (i) sodium has a low melting point

.....
.....

(1)

- (ii) sodium is soft

.....
.....

(1)

- (iii) a gas was produced?

.....
.....

(1)

(Total 7 marks)

Q4.

- (a) The table below shows information about five elements.

element	melting	boiling	conducts	colour
---------	---------	---------	----------	--------

	point (°C)	point (°C)	electricity	
A	-7	59	no	brown
B	-218	-183	no	colourless
C	1535	2750	yes	silvery
D	113	445	no	yellow
E	1083	2567	yes	orange

(i) Which **two** of these elements are likely to be metals?

Write the letters.

..... and

1 mark

(ii) Which element in the table is liquid at room temperature?

Write the letter.

.....

1 mark

(b) What is the chemical symbol for copper?

Tick the correct box.

Cr Cu C Co Ca

1 mark

(c) How many atoms of iron and oxygen are there shown in the formulas for FeO and Fe₂O₃?

Complete the table below.

compound	number of atoms of iron	number of atoms of oxygen
FeO		
Fe ₂ O ₃		

2 marks
maximum 5 marks

Mark schemes

Q1.

- (a) (i) solid 1
- (ii) black ✓
if more than one box is ticked award no mark 1
- (b) (ii) iodine
bromine
chlorine
***all three** elements in the correct order are required for the mark*
*do **not** accept 'iodine, bromide, chloride' or 'sodium iodide, sodium bromide, sodium chloride'* 1
- (ii) dark brown
accept 'brown' 1
- (c) (i) yes, because fluorine is more reactive than chlorine
***both** the prediction and the reason are required for the mark*
accept 'fluorine is above chlorine' or 'fluorine is very reactive' or 'chlorine is less reactive than fluorine' or 'chlorine is below fluorine'
accept 'fluorine reacts with water'
accept 'fluorine is higher in the periodic table than chlorine'
*do **not** accept 'fluorine is more reactive than sodium chloride' or 'fluoride is more reactive than chloride' or 'because fluorine is stronger'* 1
- (ii) no, because iodine is more reactive than astatine.
***both** the prediction and the reason are required for the mark*
accept 'iodine is above astatine' or 'astatine is less reactive than iodine' or 'astatine is below iodine' or 'astatine is very unreactive'
accept 'astatine is radioactive and does not last long enough to react'
accept 'iodine is higher in the periodic table than astatine'
*do **not** accept 'astatine is less reactive than sodium iodide'* 1

[6]

Q2.

- (a) groups 1
- (b) it is a non-metal
allow it is not a metal 1
- (c) to the right of column 7 / Group 7
accept in Group 0
ignore Group 8 / noble gases 1
- (d) (atomic) number
allow proton number 1

[4]

Q3.

- (a) (i) E 1
- (ii) B 1
- (iii) C 1
- (iv) A 1
- (b) (i) quickly melted
allow melts in contact with water,
allow bp 100 °C (of water) shows mp is low
ignore one other piece of information 1
- (ii) easily cut
ignore one other piece of information 1
- (iii) effervescence / fizzing / bubbling
ignore named gas
ignore one other piece of information 1

[7]

Q4.

- (a) (i) • C and E
***both** answers are required for the mark*

answers may be in either order

1 (L5)

(ii) • A

1 (L5)

(b) • Cu ✓

if more than one box is ticked, award no mark

1 (L6)

(c) •

<i>number of atoms of iron</i>	<i>numbers of atoms of oxygen</i>
1	1
2	3

*for all **four** numbers correct, award two marks
for **two** or **three** numbers correct, award one mark
for **one** number correct, award no marks*

2 (L5)