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Student number

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Name _____

Date _____

Attempt/Time taken _____

GCSE CHEMISTRY

Topic Paper: 1.2 The periodic table and Trends (Group 0, 1 and 7)
Part 1

Time allowed: 35 minutes

Materials

For this paper you must have:

- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
 - is clear, logical, sensibly structured
 - fully meets the requirements of the question
 - shows that each separate point or step supports the overall answer.



30 Marks



Q1. In 1869, Dmitri Mendeleev produced his periodic table of the elements.

Mendeleev placed the alkali metals in the same group.

(a) What evidence did Mendeleev use to decide that the alkali metals should be in the same group?

.....
.....

(1)

(b) Describe how the elements in the modern periodic table are arranged:

(i) in terms of protons

.....
.....

(1)

(ii) in terms of electrons.

.....
.....

(1)

(c) State **two** properties of transition elements that make them more useful than alkali metals for making water pipes.

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(2)



(d) Describe and explain the trend in reactivity of the alkali metals (Group 1).

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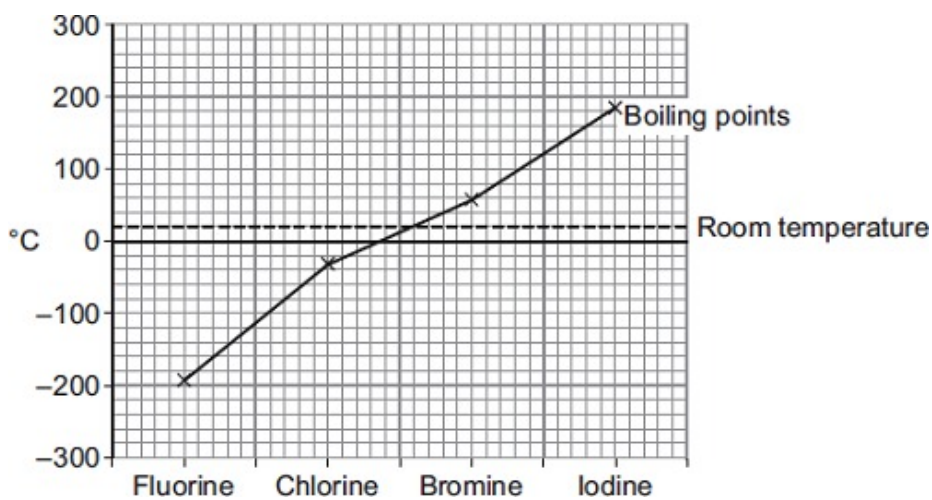
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(4)
(Total 9 marks)

Q2. The graph shows the boiling points of the halogens.



(a) Use the graph to help you answer these questions.

(i) Use the correct answer from the box to complete the sentence.

gas	liquid	solid
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At room temperature chlorine is a

(1)

(ii) Describe the trend in boiling point from fluorine to iodine.

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.....

(1)



(b) Chlorine reacts with metals to produce metal chlorides.

(i) When a chlorine atom forms a chloride ion it gains one electron.

What is the charge on a chloride ion?

.....

(1)

(ii) Write a word equation for the reaction between sodium and chlorine.

.....

(1)

(c) In the UK water companies add chlorine to tap water.

Why is chlorine added to tap water?

.....

(1)

(d) Water companies add fluoride to tap water in some parts of the UK.

Fluoride is added to improve dental health.

Suggest **one** reason why some people are against adding fluoride to tap water.

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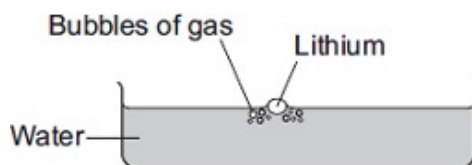
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(1)

(Total 6 marks)

Q3. Lithium is in Group 1 of the periodic table.

Lithium reacts with water to produce a gas and an alkaline solution.



(a) (i) Name the gas produced.

.....

(1)

(ii) Which ion causes the solution to be alkaline?

.....

(1)



- (b) Potassium is also in Group 1 of the periodic table.
Potassium reacts with water in a similar way to lithium.

Write down **two** differences you would see between the reactions of potassium and lithium with water.

1

.....

2

.....

(2)
(Total 4 marks)

Q4. Platinum and gold are transition elements. They can both be used to make wedding rings.



By Jeff Belmonte from Cuiabá , Brazil (Flickr) [CCBY-2.0], via Wikimedia Commons

- (a) Platinum and gold are good materials for making wedding rings.

Use your knowledge of the properties of transition elements to suggest why.

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(2)



- (b) Explain, in terms of electronic structure, why transition elements have similar chemical properties.

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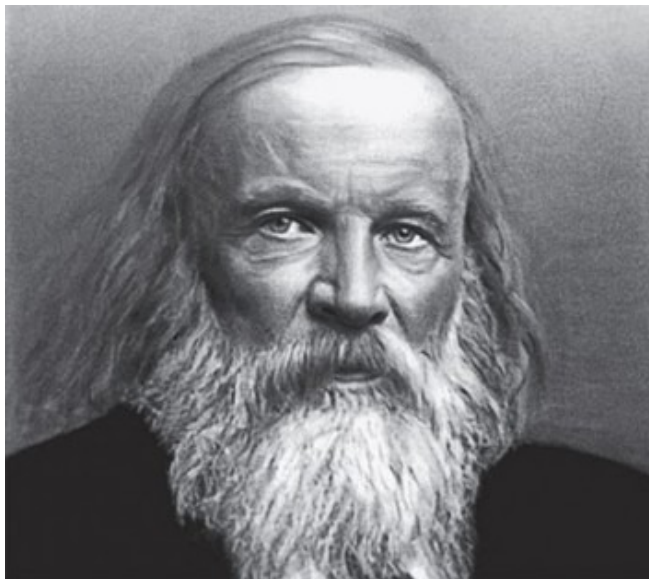
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(2)
(Total 4 marks)



Q5. Use the periodic table on the Data Sheet and the information below to help you answer these questions.



Mendeleev was one of the first chemists who classified elements in a systematic way based on atomic weight. He suggested his version of the periodic table in 1869.

He put the elements in order of their atomic weights but reversed the order for some pairs of elements. Then he arranged them in a table so that chemically similar elements were in columns known as Groups. He also left gaps and made predictions.

Part of Mendeleev's table is shown below.

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
H						
Li	Be	B	C	N	O	F
Na	Mg	Al	Si	P	S	Cl
K	Ca	#	Ti	V	Cr	Mn
Cu	Zn	#	#	As	Se	Br
Rb	Sr	Y	Zr	Nb	Mo	#
Ag	Cd	In	Sn	Sb	Te	I

The gaps Mendeleev left are shown by #.



3

(a) Which group of elements in the modern periodic table is missing from Mendeleev's table?

.....

(1)

(b) Mendeleev reversed the order for some pairs of elements. For example, he put tellurium (Te, atomic weight 128) before iodine (I, atomic weight 127), as shown in his table.

Why did he do this?

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.....

(1)

(c) In 1869 many chemists did **not** agree with Mendeleev's periodic table.

Suggest **three** reasons why.

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(3)

(d) In the 20th century, the arrangement of elements in the periodic table was explained in terms of atomic structure.

Describe the links between atomic structure and the periodic table.

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(2)

(Total 7 marks)