Q1. The idea of a periodic table of the elements was started by John Newlands about 140 years ago.

He wrote down the elements he knew about in order, starting with the lightest atoms.

Then he arranged them into seven groups, like this:

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) Write down **three** differences between the groups in Newlands' periodic table and the groups in the modern periodic table (up to the element Ca, which is calcium).

.....

.....

.....

.....

.....

(3)

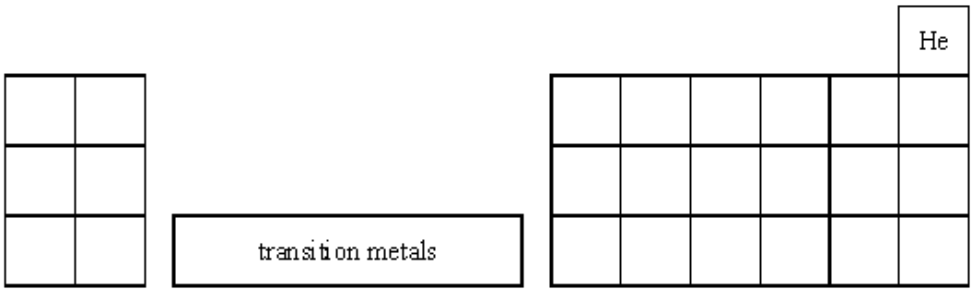
(b) Suggest one reason why this part of Newlands' table was different from the modern one.

.....

.....

(1)
(Total 4 marks)

Q2. Part of the Periodic Table is shown below. The symbol for helium is given.



(a) (i) What name is given to the group that contains helium?

.....

(1)

(ii) Give **one** use for helium and explain why it is used.

.....

.....

(2)

(iii) What is the name of another element in the same group as helium?

.....

(1)

(iv) Write the symbol for this element.

.....

(1)

(b) Give the names of **two** other elements not in Group 0 that are gases at room temperature.

..... and .....

(2)

(c) The alkali metals are in Group I of the Periodic Table.

Give the name and the symbol of **one** alkali metal.

Name ..... Symbol .....

(2)

(d) Alkali metals have low melting points.

Give another physical property of the alkali metals.

.....

(1)

(Total 10 marks)

Q3. Potassium reacts violently with cold water.

It forms an alkaline solution of potassium hydroxide and hydrogen.

potassium + **water** → **potassium hydroxide** + **hydrogen**

(a) In what physical state is hydrogen given off?

Choose your answer from the words in the box.

gas	liquid	solid	solution

.....

(1)

(b) (i) What type of substance will neutralise potassium hydroxide solution?

.....

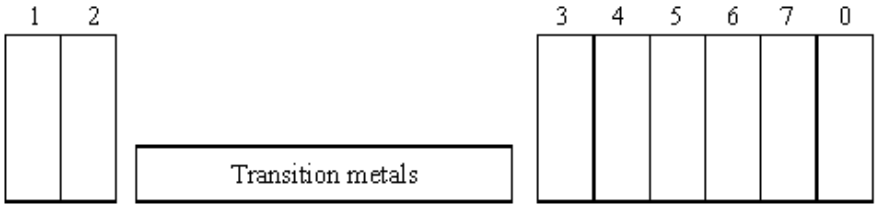
(1)

(ii) What is the pH of the neutral solution?

.....

(1)

(c) In the Periodic Table there are eight main groups.



What is the number of the group that has potassium in it?

.....

(1)

(d) Sodium is in the same group as potassium.

(i) How does sodium react with cold water and what is formed?

.....

.....

(2)

(ii) How can you prove that an alkaline solution is formed when sodium reacts with water?

.....

.....

(2)

(e) Lithium reacts more slowly with cold water than sodium.

State **two** ways the reaction can be made to go faster.

1 .....

2 .....

(2)
(Total 10 marks)

Q4. (a) Choose from the names of elements in the box the answers to the questions which follow.

aluminium	carbon	chlorine	copper
helium	iron	magnesium	sodium

Give the name of:

(i) an alkali metal

.....

(1)

(ii) a halogen

.....

(1)

(iii) a noble gas

.....

(1)

(b) The alkali metals are in Group 1 of the Periodic Table. The elements in Group 1 have a number of similar properties.

(i) Describe **one chemical** property which they have in common.

.....

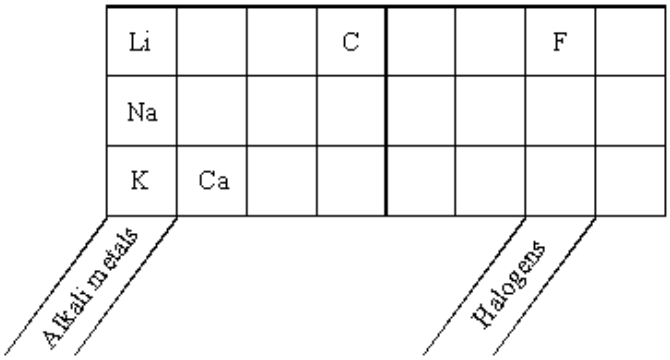
(1)

(ii) Describe **one physical** property which they have in common.

.....

(1)
(Total 5 marks)

Q5. Part of the Periodic Table is shown. It includes the symbols for six elements.



(a) Write the symbol for carbon. .....

(1)

(b) (i) Put the symbol Cl, for chlorine, into its correct position in the Table.

(1)

(ii) Bromine, chlorine, fluorine and iodine are halogens. Which one of these halogens is least reactive?

.....

(1)

(c) The alkali metals form Group 1 in the Periodic Table. Write the symbol of the most reactive alkali metal shown in the Table above.

.....

(1)

(d) Write the symbol for an element which is in the same Group as sodium.

.....

(1)

(Total 5 marks)

Q6. Use the periodic table on the Data Sheet to help you to answer these questions.

(a) Write the symbol for helium.

.....

(1)

(b) Write the name of an element in Group 4.

.....

(1)

(c) Write the name of the element which has a relative atomic **mass** of 64.

.....

(1)

(d) Write the name of the element with the next highest atomic number after Te (tellurium) in the periodic table.

.....

(1)
(Total 4 marks)

Q7. The table shows some properties of four Group 7 elements.

Element	Boiling point in ºC	Melting point in ºC	State at room temperature	Reaction with hydrogen	
				Description	Product
Fluorine	– 218	– 188	gas	Explosive reaction in dim light	Hydrogen fluoride
Chlorine	– 34	– 101	gas	Explosive reaction in sunlight	Hydrogen chloride
Bromine	+ 59	– 7		Reacts if heated	
Iodine	+ 185	+ 114		Reacts if heated strongly	Hydrogen iodide

(a) What is the state at room temperature of:

(i) bromine; .....

(ii) iodine? .....

(2)

(b) Which **one** of the four elements is most reactive?

.....

(1)

(c) Name the compound formed when hydrogen reacts with bromine.

.....

(1)
(Total 4 marks)

Q8. Use the periodic table on the Data Sheet to help you to answer these questions.

(a) Write the symbol for helium.

.....

(1)

(b) Write the name of an element in Group 4.

.....

(1)

(c) Write the name of the element which has a relative atomic **mass** of 64.

.....

(1)

(d) Write the name of the element with the next highest atomic number after Te (tellurium) in the periodic table.

.....

(1)
(Total 4 marks)

Q9. The elements in Group 1 are known as the alkali metals.

Which **three** of the following are properties of alkali metals?

Place a tick (✓) in the box against each correct property.

Hard, tough and strong ☐

Low density ☐

Form hydroxides that dissolve in water ☐

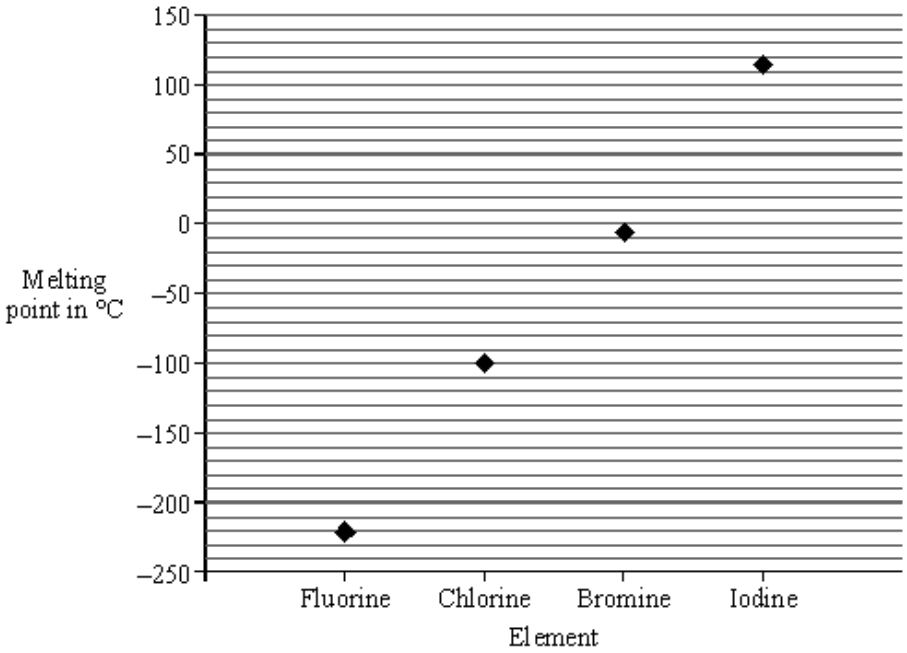
React quickly with water ☐

Used as catalysts ☐

Used to make electric cables ☐

(Total 3 marks)

Q10. The graph shows the melting point of four elements in Group 7 of the periodic table.



(a) What is the melting point of fluorine?

.....

(1)

(b) Room temperature is 20°C.

Which element is solid at room temperature?

.....

(1)

(c) Look at the periodic table on the Data Sheet.

Using data from the graph, describe the trend of melting points of the elements in Group 7.

.....

.....

.....

.....

(2)

(d) The elements in Group 7 are non-metals.

Which **two** of the following are properties of non-metals?

Place a tick (✓) in the box against each correct property.

Brittle (if solid) ☐

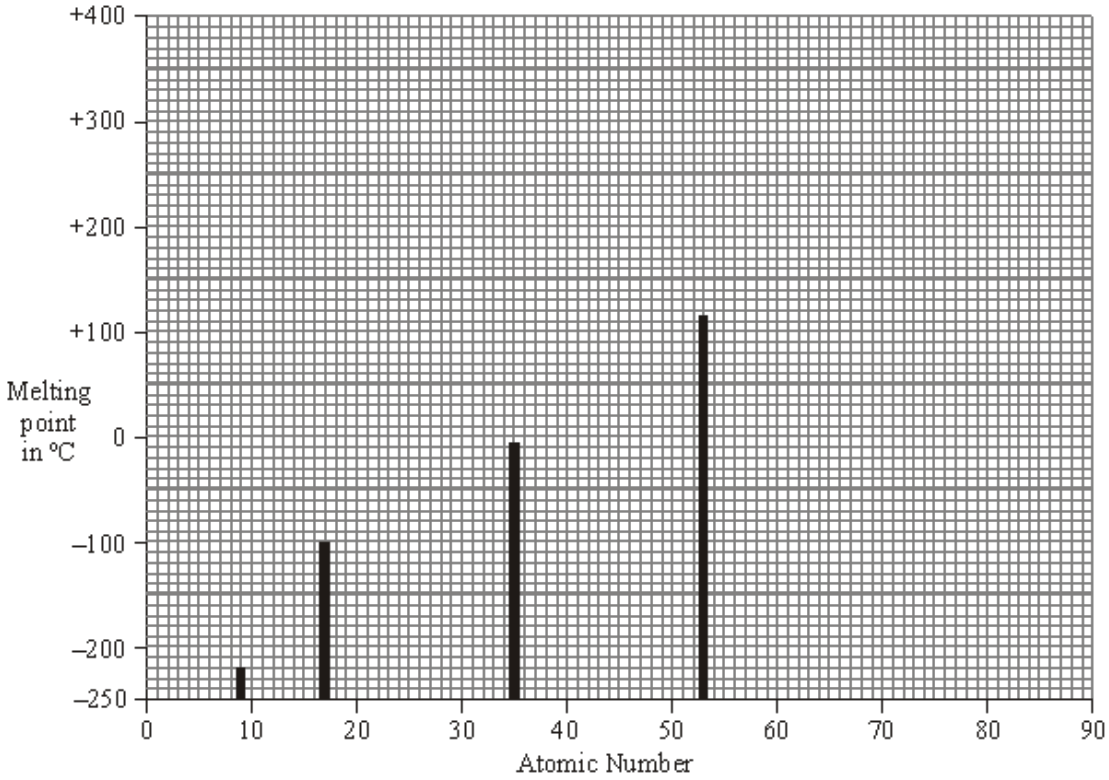
Good conductor of heat ☐

High boiling point ☐

Poor conductor of electricity ☐

(2)
(Total 6 marks)

Q11. (a) The bar graph shows the melting points of the elements in Group 7 plotted against their atomic numbers.



(i) How do the melting points of the Group 7 elements change as the atomic number increases?

.....

.....

(1)

(ii) The melting point of astatine (atomic number = 85) is not shown on the bar graph. Estimate the melting point of astatine.

..... °C

(1)

Draw a bar for this value on the bar graph.

(1)

(b) The water from wells in Japan contains bromide ions.

Bromine is extracted from this water. The bromine is displaced by adding another Group 7 element.

(i) Place a tick (✓) next to the name of **one** Group 7 element that could be used to displace bromine from this water.

Most reactive ↑ Least reactive

Group 7	(✓)
Fluorine	
Chlorine	
Bromine	
Iodine	
Astatine	

(1)

(ii) State why you have chosen this element.

.....

.....

(1)

(iii) One sample of this water contained 2 g of bromine per litre of water.

How many litres of this water would be needed to make 1 kg of bromine?
(1 kg = 1000 g)

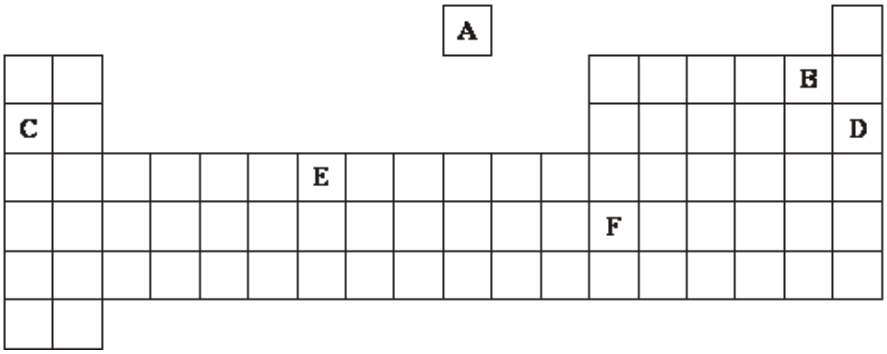
.....

..... litres

(1)

(Total 6 marks)

Q12. The diagram shows an outline of the periodic table.



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

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

Which element, **A** to **F**:

(a) is in Group 3;

.....

(1)

(b) is a metal which floats on water and reacts violently to make an alkaline solution and hydrogen gas;

.....

(1)

(c) is a gas which burns with a squeaky pop?

.....

(1)

(Total 3 marks)

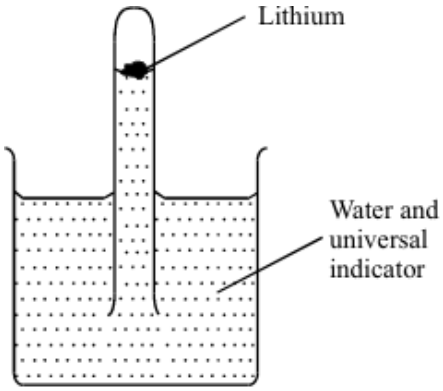
Q13. Niobium is a typical transition metal.

Put a tick (✓) next to each of the **four** properties in the table that you would expect for Niobium.

Property	
brittle	
conducts heat	
dull	
forms coloured compounds	
high melting point	
low boiling point	
strong	
very reactive	

(Total 4 marks)

Q14. The diagram shows an experiment to study the reaction of lithium with water.



(a) Describe, as fully as you can, what you would see as the lithium reacts with the water in this experiment.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

.....

.....

.....

.....

.....

(3)

(b) The reaction has two products. Complete the word equation for this reaction by choosing the correct substances from the box.

hydrogen	**lithium hydride**	**lithium hydroxide**
lithium oxide		**oxygen**

lithium + water → ..... + ...

(2)

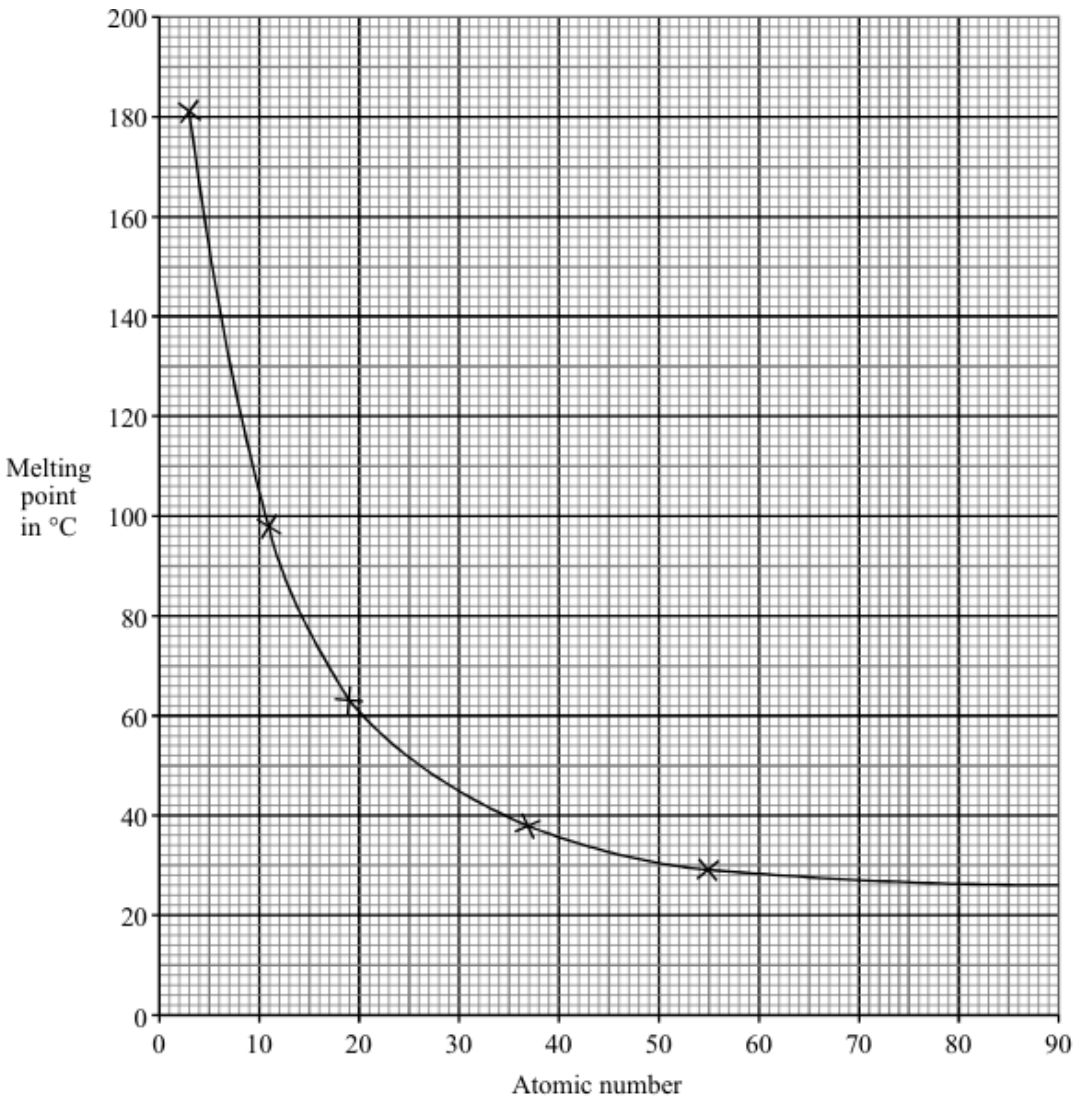
(c) Caesium is lower down in Group 1 of the periodic table than lithium.
Suggest how the reaction of caesium with water might be different from lithium's reaction.

.....

.....

(1)

(d) The graph shows the melting points of the Group 1 metals plotted against their atomic numbers.



(i) Describe fully how the melting points change as the atomic number increases.

.....

.....

.....

(2)

(ii) Francium has an atomic number of 87.
Use the graph to estimate the melting point of francium.

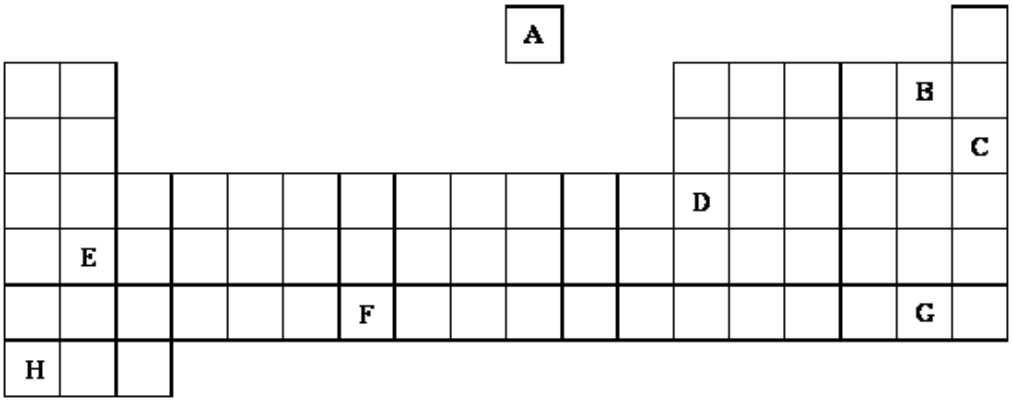
Estimate of melting point ..... °C

(1)

(Total 9 marks)

Q15. The periodic table on the Data Sheet may help you to answer this question.

The diagram shows an outline of the periodic table.



Choose your answers **only** from the letters shown on this outline table.

Which letter, **A** to **H**, represents an element which:

(a) is in Group 3,

Letter .....

(1)

(b) is in Period 2,

Letter .....

(1)

(c) is a transition element,

Letter .....

(1)

(d) is the least reactive element in Group 7,

Letter .....

(1)

(e) is the most reactive metal?

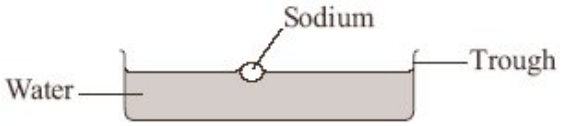
Letter .....

(1)
(Total 5 marks)

Q16. (a) Read a student's report about the reaction between sodium and water.

The reaction between sodium and water

A small piece of sodium was added to some water in a trough.



The sodium floated and started to react.

The sodium moved along the surface of the water and melted to give a
ball of molten metal.

The ball became smaller and smaller until it had all gone.

A gas was given off and a colourless solution was left.

The word equation for this reaction is:

sodium + water → sodium hydroxide + hydrogen

Use the information from the student's report to answer these questions.

(i) Which information shows that sodium has a low density?

.....

(1)

(ii) Which information shows that the reaction is exothermic?

.....

(1)

(iii) Name the gas given off.

.....

(1)

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

(i) Sodium is in Group 1.

Name a Group 1 element that is more reactive than sodium.

.....

(1)

(ii) Here are some statements about Group 1 elements.

Only **two** of these statements are correct.

Put a tick (✓) next to the two correct statements.

Statement	(✓)
They are halogens	
They are metals	
They form covalent compounds	
They form ions with a +1 charge	

(2)

(c) Dimitri Mendeleev put forward his periodic table in 1869.

Complete these sentences by drawing a ring around the correct answer.

(i) Mendeleev arranged the elements in order of their

atomic weight
density
reactivity

(1)

(ii) The table is called a periodic table because elements with properties occur at regular intervals.

identical
the same
similar

(1)

(iii) The vertical columns are known as

groups
periods
rows

(1)

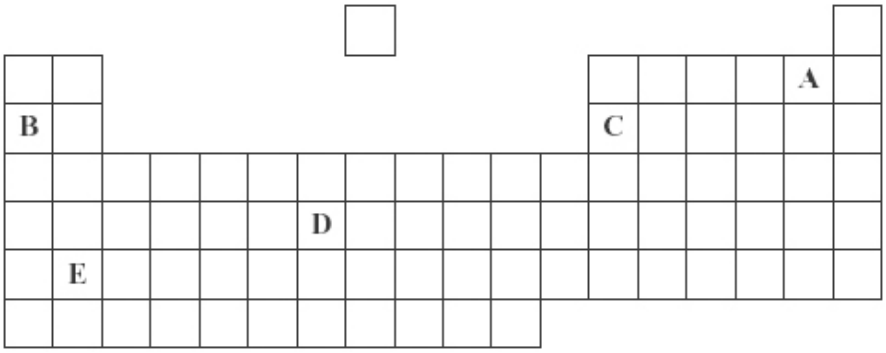
(d) How did Mendeleev overcome the problem of undiscovered elements when he designed his table?

.....

(1)
(Total 10 marks)

Q17. (a) The periodic table on the Data Sheet may help you to answer this question.

Part of the periodic table is shown below.



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

Which letter, **A** to **E**, represents:

(i) sodium

Letter .....

(1)

(ii) a non-metal

Letter .....

(1)

(iii) a Group 2 element

Letter .....

(1)

(iv) a transition element?

Letter .....

(1)

(b) Complete these sentences by drawing a ring around the correct answer.

(i) Attempts to classify the elements into a periodic table were made

by

Arrhenius and Dalton
Brønsted and Lowry
Mendeleev and Newlands

(1)

(ii) They arranged the elements in order of their

atomic weight
melting point
reactivity

(1)

(iii) They put elements in the same Group if they had similar

boiling points
chemical reactions
electrical conductivities

(1)

(iv) We now know that elements in the same Group have the same number of

electrons
neutrons
protons

in their outer shell (energy level).

(1)
(Total 8 marks)

Q18. Group 7 is an important family of elements in the periodic table.

(a) (i) What name is given to the Group 7 elements?

Draw a ring around your answer.

Halogens **Noble gases** **Transition elements**

(1)

(ii) The grid shows some statements about Group 7 elements.

Tick (✓) the **two** correct statements.

Statement	**(✓)**
They are metals	
They consist of molecules	
They have coloured vapours	
They have high melting points	

(2)

(b) The table gives information about some of the Group 7 elements.

Name of element	**Melting point in °C**	**Boiling point in °C**	**Electronic structure**
Fluorine	–220	–188	2, 7
Chlorine	–101	–35	2, 8, 7
Bromine	–7	58	2, 8, 18, 7
Iodine	114	183	2, 8, 18, 18, 7

Use information from the table to help you to answer these questions.

Write the correct number in the box to complete the sentence.

(i) All these elements are in Group 7 because they have ☐ electrons in their outer shell.

(1)

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

At 20 °C bromine is a

gas.
liquid.
solid.

(1)

(iii) Use the periodic table on the **Data Sheet** to name the Group 7 element that is **not** shown in the table.

.....

(1)

(c) A student investigated the reactivity of three Group 7 elements.

The student added:

- aqueous chlorine to potassium bromide and potassium iodide solutions
- aqueous bromine to potassium chloride and potassium iodide solutions
- aqueous iodine to potassium chloride and potassium bromide solutions.

The student's results are shown in the table.

Solutions of	**Potassium chloride**	**Potassium bromide**	**Potassium iodide**
Chlorine		Solution turned orange-brown	Solution turned brown
Bromine	No change		Solution turned brown
Iodine	No change	No change	

Explain how these results show that chlorine is more reactive than bromine and iodine.

.....

.....

.....

.....

(2)
(Total 8 marks)

Q19. The periodic table on the Data Sheet may help you to answer these questions.

Draw a ring around the correct answer to complete these sentences.

(a) The Russian chemist who introduced his periodic table in 1869 was

Brønsted.
Lowry.
Mendeleev.

(1)

(b) He put elements with similar chemical reactions in columns, known as

groups.
periods.
rows.

(1)

(c) He left gaps for elements that were

insoluble.
unreactive.
undiscovered.

(1)

(d) He did **not** put water, H_2O, into the periodic table because water is a

compound.
liquid.
mixture.

(1)
(Total 4 marks)

Q20. The periodic table on the Data Sheet may help you to answer some of these questions.

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

(i)

	compounds.
Dimitri Mendeleev attempted to classify	elements.
	mixtures.

(1)

(ii)

	atomic weight.
He arranged them in order of their	boiling point.
	electrical conductivity.

(1)

(iii)

	atomic (proton) number.
They are now arranged in order of their	atomic weight.
	mass number.

(1)

(b) In the periodic table between Groups 2 and 3 there is a block of metals which includes chromium, iron and nickel.

(i) Which **one** of the following is the correct name for this block of metals?

Draw a ring around the correct answer.

alkali metals **reactive metals** **transition metals**

(1)

(ii) The properties of iron and those of the Group 1 metal sodium are different.

Put a tick (✓) next to the **two** correct phrases which could complete the following sentence.

Compared to sodium, iron

	(✓)
has a higher melting point.	
has a lower density.	
is harder.	
is more reactive.	
is weaker.	

(2)
(Total 6 marks)

Q21. The table shows information about the halogens in Group 7 of the periodic table.

Name of halogen	Melting point in °C	Boiling point in °C	Electronic structure
Fluorine	–220	–188	.....
Chlorine	–101	–35	2,8,7
Bromine	–7	+58	2,8,18,7
Iodine	+114	+183	2,8,18,18,7

(a) Use information from the table to help you to answer these questions.

(i) Name **one** halogen that is a solid at 25°C.

.....

(1)

(ii) Name **one** halogen that is a gas at 25°C.

.....

(1)

(iii) Use the periodic table on the Data Sheet to help you to work out the correct electronic structure for fluorine. Write your answer in the table above.

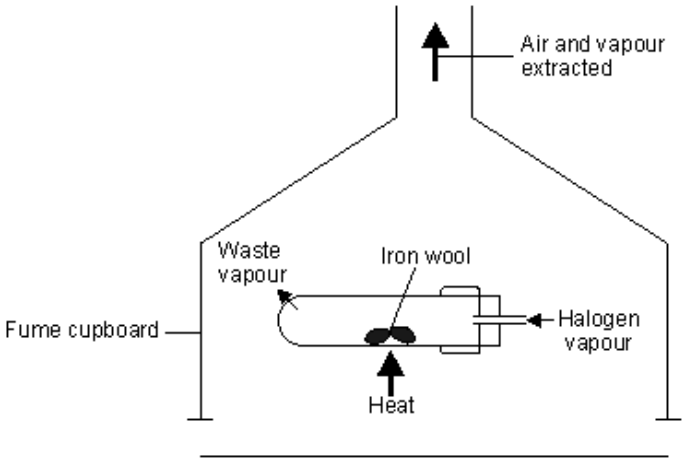
(1)

(iv) Use the periodic table on the Data Sheet to name **one** Group 7 element that is **not** shown in the table above.

.....

(1)

(b) A teacher demonstrated the reactivity of the halogens to some students. Halogen vapour was passed over heated iron wool in a fume cupboard.



The teacher's observations are shown in the table below.

	Observations	
	During the reaction	**After the reaction**
Bromine	The iron wool glowed	A red–brown solid had been produced
Chlorine	The iron wool glowed brightly	A dark brown solid had been produced
Iodine	The iron wool did not glow	A black solid had been produced

(i) What is the order of reactivity of these three halogens?

Order of reactivity: *most reactive halogen 1* .....

2 .....

least reactive halogen 3 .....

(1)

(ii) Explain how you used the teacher's observations to decide your order of reactivity.

.....

.....

.....

.....

(2)
(Total 7 marks)

Q22. Sodium is in Group 1 of the periodic table.

(a) Here are some statements about sodium.

Which **two** of these statements are correct?

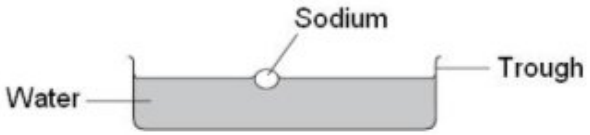
Tick (✓) **two** boxes.

Statement	**Tick (✓)**
Sodium is a metal.	
Sodium is a halogen.	
Sodium forms an ion with a +1 charge.	
Sodium forms covalent compounds.	

(2)

(b) Sodium reacts with water.

A student drew this diagram and wrote the observations **A, B, C** and **D** about the reaction between sodium and water.



A The sodium floated and started giving off a gas.

B The sodium melted.

C The piece of sodium became smaller until all the sodium had gone.

D A colourless solution was left.

Use these observations to answer parts (i) and (ii).

(i) Which observation, **A, B, C** or **D**, shows that sodium has a low density? ☐

(1)

(ii) Which observation **A, B, C** or **D**, shows that the reaction is exothermic? ☐

(1)

(iii) What is the name of the gas given off in this reaction?

.....

(1)
(Total 5 marks)

Q23. In 1869, a scientist put the 60 known elements into his periodic table.

Photograph © RIA NOVOSTI/
SCIENCE PHOTO LIBRARY

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

(a) The scientist who put these elements into a periodic table was

Boyle.
Mendeleev.
Newlands.

(1)

(b) First he put the 60 known elements in order of their

atomic weight.
boiling point.
electrical conductivity.

(1)

(c) Then he put elements with similar chemical properties in columns, known as

groups.
periods.
rows.

(1)

(d) His periodic table had gaps for elements that were

uncommon.
undiscovered.
unreactive.

(1)

(e) From 1900 onwards, the modern periodic table was produced.

The modern periodic table is an arrangement of elements in terms of

their

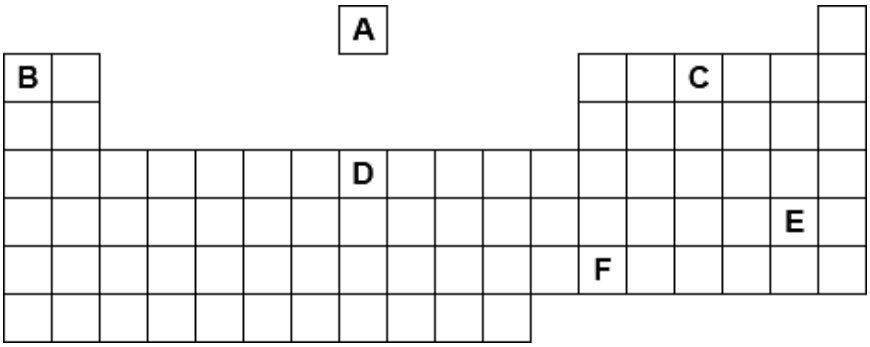
electronic structures.
neutron numbers.
atomic weights.

(1)
(Total 5 marks)

Q24. (a) Use the periodic table on the Data Sheet to help you answer these questions.

Part of the periodic table is shown below.

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



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

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

(i) hydrogen Letter ☐

(1)

(ii) a Group 3 element Letter ☐

(1)

(iii) a halogen Letter ☐

(1)

(iv) the element with atomic (proton) number of 7 Letter ☐

(1)

(v) an element with one electron in its outer shell? Letter ☐

(1)

(b) The table shows the melting points of the Group 1 metals arranged in alphabetical order.

Group 1 metal		
Name	**Symbol**	**Melting point in °C**
Caesium	Cs	29
Francium	Fr	27
Lithium	Li	180
Potassium	K	64
Rubidium	Rb	39
Sodium	Na	98

(i) Arrange these metals in order of increasing melting point. Three have been done for you.

Fr Cs Li

Lowest ⟶ Highest

(1)

(ii) Use the periodic table on the Data Sheet **and** your answer in part (b)(i) above to complete this sentence about how the melting points change.

Going down Group 1, the melting points .....

(1)

(c) The transition metals are a block of elements between Groups 2 and 3 of the periodic table. Transition metals have different properties to Group 1 metals.

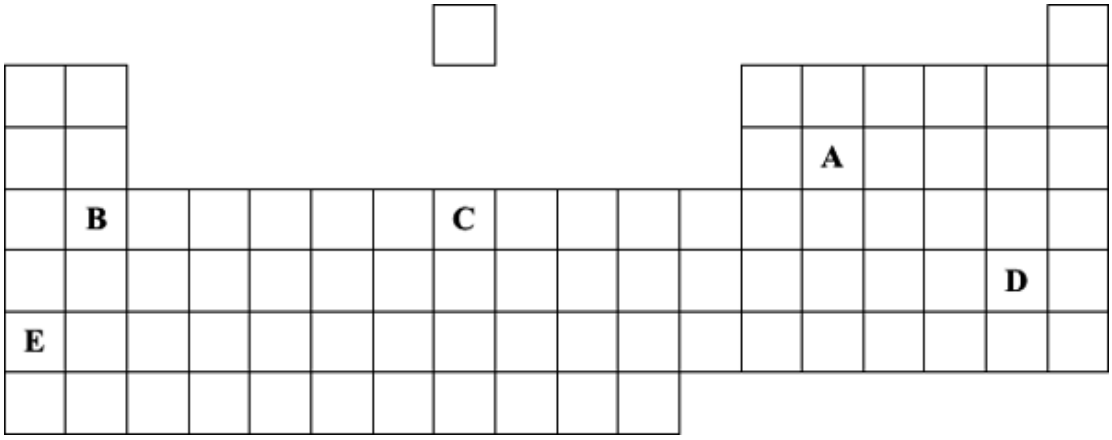
Put ticks (✓) next to the **three** correct statements about transition metals in the table below.

Statement	**(✓)**
They are harder than Group 1 metals	
They have lower densities than Group 1 metals	
They have higher melting points than Group 1 metals	
They are more reactive with water than Group 1 metals	
They often form coloured compounds but Group 1 compounds are usually white	

(3)
(Total 10 marks)

Q25. (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 ☐

(1)

(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:
- floated
- melted quickly to give a silvery ball
- moved on the surface of the water
- 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)

Q26. Use the periodic table on the Data Sheet to help you to answer these questions.

(a) The following is a list of symbols of some elements.

Sb	**Se**	**Si**	**Sn**	**Sr**

Choose your answers **only** from the symbols shown in the box above.

Which symbol represents

(i) a Group 5 element ☐

(1)

(ii) the element in the same group as oxygen (O) ☐

(1)

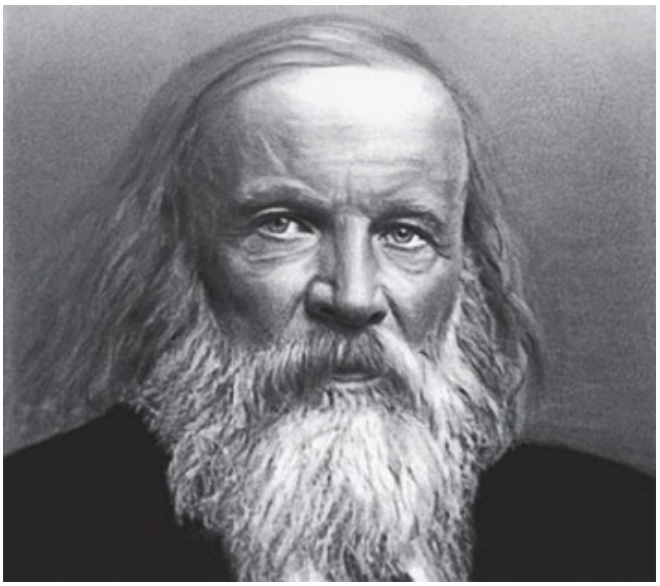
(iii) the element with atomic (proton) number of 50 ☐

(1)

(iv) silicon? ☐

(1)

(b)



Mendeleev suggested his version of the periodic table in 1869.

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 Cu	Ca Zn	# #	Ti #	V As	Cr Se	Mn Br

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

There are differences between Mendeleev's table and the periodic table on the Data Sheet.

Draw a ring around the correct answer to complete the sentences.

(i) Mendeleev left gaps (shown by #) in his table.

Mendeleev left gaps for [compounds / elements / mixtures] that had not been discovered.

(1)

(ii) Mendeleev put copper (Cu) in the same box as

- bromine (Br).
- chromium (Cr).
- potassium (K).

(1)

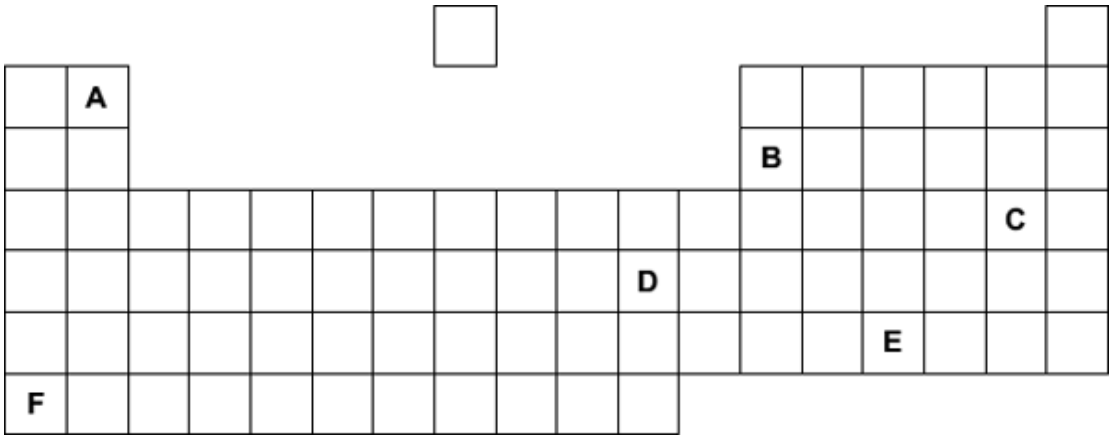
(iii) Mendeleev did **not** have a Group

- 0.
- 3.
- 5.

(1)
(Total 7 marks)

Q27. The periodic table on the Data Sheet may help you to answer these questions.

(a) Part of the periodic table is shown below.



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

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

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

(i) aluminium

(1)

(ii) a Group 5 element

(1)

(iii) an alkali metal ☐

(1)

(iv) the element with atomic (proton) number of 47 ☐

(1)

(v) an element with seven electrons in its outer shell? ☐

(1)

(b) The table shows the boiling points of the Group 7 elements.

The elements are arranged **in alphabetical order**.

Group 7 element		
Name	**Symbol**	**Boiling point in °C**
Astatine	At	337
Bromine		58
Chlorine	Cl	-34
Fluorine	F	-188
Iodine	I	184

(i) The symbol for bromine is missing from the table.

What is the symbol for bromine? Symbol = ...

(1)

(ii) Arrange these elements in order of **decreasing** boiling point. The first one and the last one have been done for you.

At .... F

Highest boiling point → Lowest boiling point

(1)

(c) The table shows some statements about Group 7 elements.

Tick (✓) the **two** correct statements.

	Tick (✓)
They are halogens.	
They are metals.	
They become less reactive down Group 7.	
They are compounds.	

(2)
(Total 9 marks)

Q28. Platinum and gold can both be used to make wedding rings.

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

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

(a) Draw a ring around the part of the periodic table in the list below to which platinum and gold belong.

group 1 **group 2** **transition elements** **group 7**

(1)

(b) Platinum and gold have properties that make them suitable for wedding rings.

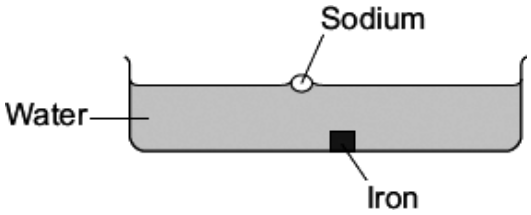
Tick (✓) **two** of these properties.

Property	**Tick (✓)**
These metals do not react with air.	
These metals have low melting points.	
These metals do not react with water.	
These metals have low densities.	

(2)
(Total 3 marks)

Q29. How a metal is used depends on its properties.

A teacher demonstrated some of the properties of sodium (an alkali metal) and iron (a transition element) by placing a small cube of each metal into water.



A student observed that:

Sodium	Iron
floated on the surface of the water	sank to the bottom of the water
melted to form a molten ball of sodium	did not melt
reacted to produce a gas	did not react
no sodium was left after 5 minutes	the cube of iron remained after 5 minutes

(a) Tick (✓) **two** properties of sodium compared with iron that are shown by the student's observations.

Sodium compared with iron	Tick(✓)
sodium has a higher boiling point	
sodium has a lower density	
sodium is harder	
sodium is more reactive	
sodium is softer	

(2)

(b) Draw a ring around the correct answer to complete the word equation.

sodium + water → sodium hydroxide + carbon dioxide / hydrogen / oxygen

(1)

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

Sodium hydroxide is an alkali because it produces

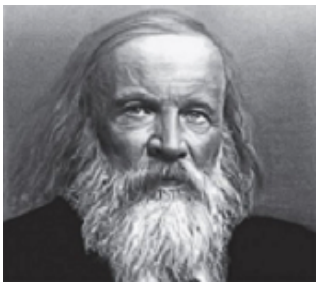
$H^+(aq)$
$OH^-(aq)$
$Na^+(aq)$

ions

in aqueous solution.

(1)
(Total 4 marks)

Q30. 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.

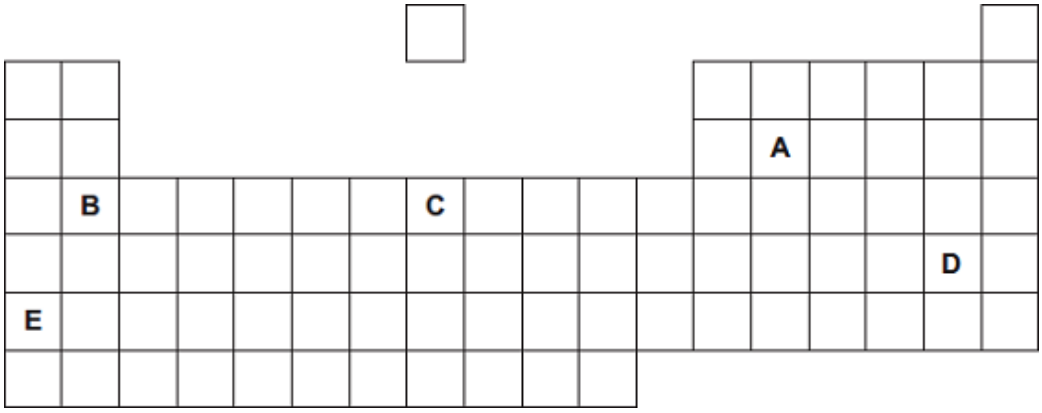
In the periodic table on your Data Sheet, the elements are arranged in order of their

atomic ..... .

(1)
(Total 4 marks)

Q31. 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:

(a) (i) an alkali metal Letter ☐

(1)

(ii) a transition element Letter ☐

(1)

(iii) a Group 4 element ? Letter ☐

(1)

(b) A chemistry teacher demonstrated the reaction between sodium and water to a class of 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 some water in a trough.

The sodium:

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

Use the information in the box to help you 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 6 marks)

Q32. 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)