

THE PERIODIC TABLE

Period **1** **2** **3** **4** **5** **6** **7** **0**
 Group

1																	4	
																	He Helium 2	
2	7	9															19	20
	Li Lithium 3	Be Beryllium 4															F Fluorine 9	Ne Neon 10
3	23	24															35.5	40
	Na Sodium 11	Mg Magnesium 12															Cl Chlorine 17	Ar Argon 18
4	39	40	45	48	51	52	55	56	59	59	63.5	65	70	73	75	79	80	84
	K Potassium 19	Ca Calcium 20	Sc Scandium 21	Ti Titanium 22	V Vanadium 23	Cr Chromium 24	Mn Manganese 25	Fe Iron 26	Co Cobalt 27	Ni Nickel 28	Cu Copper 29	Zn Zinc 30	Ga Gallium 31	Ge Germanium 32	As Arsenic 33	Se Selenium 34	Br Bromine 35	Kr Krypton 36
5	85	88	89	91	93	96	99	101	106	108	112	115	119	122	128	131	131	131
	Rb Rubidium 37	Sr Strontium 38	Y Yttrium 39	Zr Zirconium 40	Nb Niobium 41	Mo Molybdenum 42	Tc Technetium 43	Ru Ruthenium 44	Rh Rhodium 45	Pd Palladium 46	Ag Silver 47	Cd Cadmium 48	In Indium 49	Sn Tin 50	Sb Antimony 51	Te Tellurium 52	I Iodine 53	Xe Xenon 54
6	133	137	139	178	181	184	186	190	195	197	201	204	207	209	210	210	222	222
	Cs Caesium 55	Ba Barium 56	La Lanthanum 57	Hf Hafnium 72	Ta Tantalum 73	W Tungsten 74	Re Rhenium 75	Os Osmium 76	Ir Iridium 77	Pt Platinum 78	Au Gold 79	Hg Mercury 80	Pb Lead 82	Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86	
7	223	226	227															227
	Fr Francium 87	Ra Radium 88	Ac Actinium 89															Fr Francium 87

1	H Hydrogen 1	1
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Key

Relative atomic mass
Symbol
Name
Atomic number



1. The element chlorine is a non-metal in group 7 of the periodic table.

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

..... (1)

(ii) What is the chemical symbol for an atom of chlorine?

..... (1)

(iii) Give the name and symbol for an element in group 7 that is more reactive than chlorine.

name

symbol

(2)

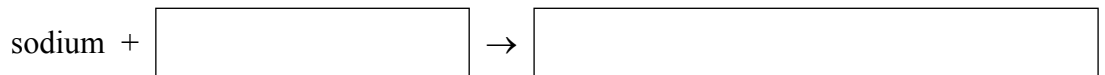
(b) Draw **one** line from each group 7 element to its appearance at room temperature.

element	appearance
bromine	• green gas
chlorine	• red-brown liquid
iodine	• red-brown solid
	• silver-grey solid

(3)

(c) Chlorine reacts with most metals.

Complete the word equation for the reaction between sodium and chlorine to form sodium chloride.



(2)

(d) Why is chlorine added to water by water companies?

.....

(1)

(Total 10 marks)

Q1

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2. Calcium carbonate has the formula CaCO_3 .

(a) (i) Name the **three** elements in calcium carbonate.

.....
(2)

(ii) Tick the object made using calcium carbonate.

a glass

a plastic bag

a stepladder

(1)

(b) (i) When calcium carbonate is strongly heated, it splits up into calcium oxide and a gas. Write the complete word equation for this reaction.



(2)

(ii) What type of reaction is this?

Tick **one** box.

electrolysis

neutralisation

thermal decomposition

(1)

(c) Calcium hydroxide is an alkali made from calcium oxide.

(i) Why do farmers sometimes spread calcium hydroxide on fields?

.....
(1)

(ii) What effect does adding calcium hydroxide have on the crops?

.....
(1)

Q2

(Total 8 marks)



3. Aluminium, copper and iron are important metals.

(a) Which of these metals is **not** a transition metal?

.....
(1)

(b) Aluminium is extracted from its ore by electrolysis.
This is an expensive process.

(i) What is an ore?

.....
.....
(1)

(ii) Why is electrolysis expensive?

.....
.....
(1)

(iii) The compound electrolysed is aluminium oxide.

Complete the word equation for the reaction showing the gas produced.

aluminium oxide → aluminium +
(1)

(c) Copper is used to make water pipes and electrical wires.

For each use, give the property that makes copper suitable.

water pipes.....

electrical wires.....
(2)



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blank

(d) (i) What is the name of the industrial plant in which iron is extracted?

Tick **one** box.

blast furnace

electrolysis cell

lime kiln

(1)

(ii) Name and give a use for a by-product of iron extraction.

name

(1)

use

(1)

(iii) Why is most of the iron produced changed into steel?

.....

(1)

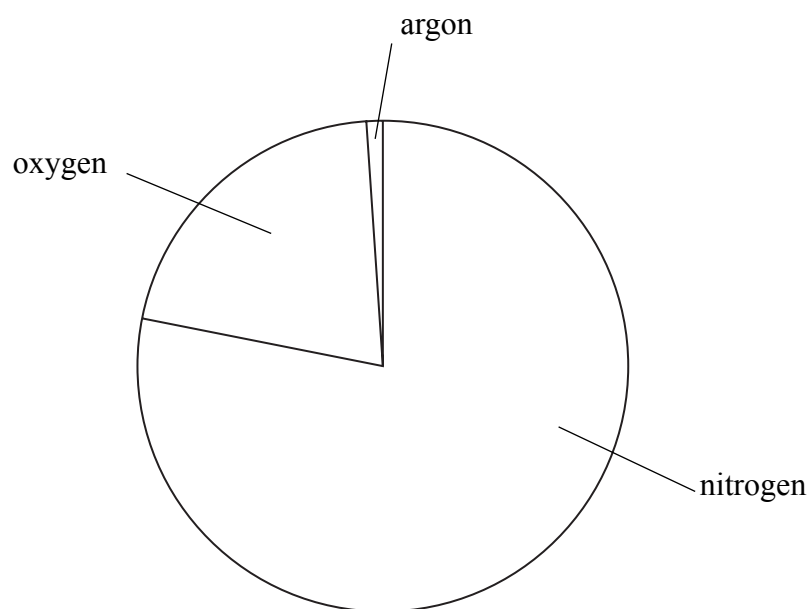
Q3

(Total 10 marks)

TURN OVER FOR QUESTION 4



4. The pie chart shows the proportions of the three main gases in dry air.



(a) Which is the most abundant gas in air?

..... (1)

(b) The early atmosphere of the Earth did not contain oxygen.

Describe how oxygen came to be present in the atmosphere.



.....
.....
.....
.....
.....
.....
..... (3)



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blank

(c) Argon is a very unreactive gas.

(i) In which group of the periodic table is argon?

.....
(1)

(ii) Why are argon atoms unreactive?

.....
.....
(1)

(d) The amount of carbon dioxide in the air is very small but increasing.

For each of the processes, tick **one** box to show whether it causes the amount of carbon dioxide in the air to increase, decrease, or stay the same.

process	increase	decrease	stay the same
combustion			
dissolving in water			
photosynthesis			
respiration			

(4)

(e) Many gases in the early atmosphere were released from volcanoes.
Volcanoes also give out magma.

What type of rock forms when magma solidifies?

.....
(1)

Q4

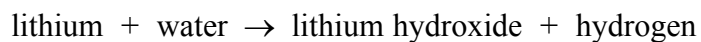
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TURN OVER FOR QUESTION 5

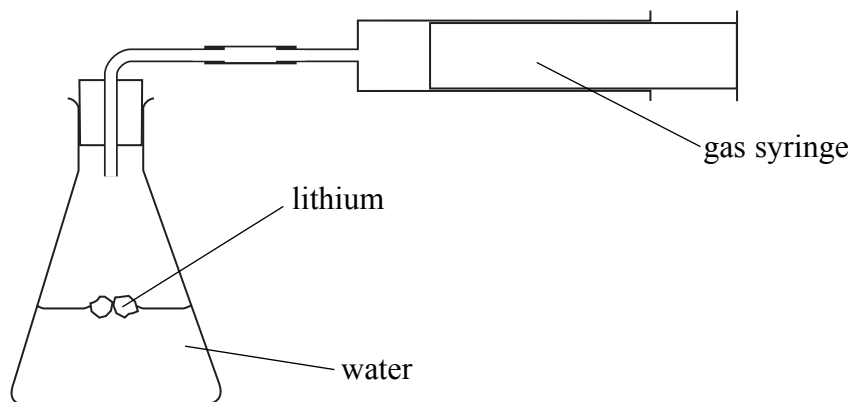


5. Lithium is in group 1 of the periodic table.

Lithium reacts with water to form lithium hydroxide and hydrogen.



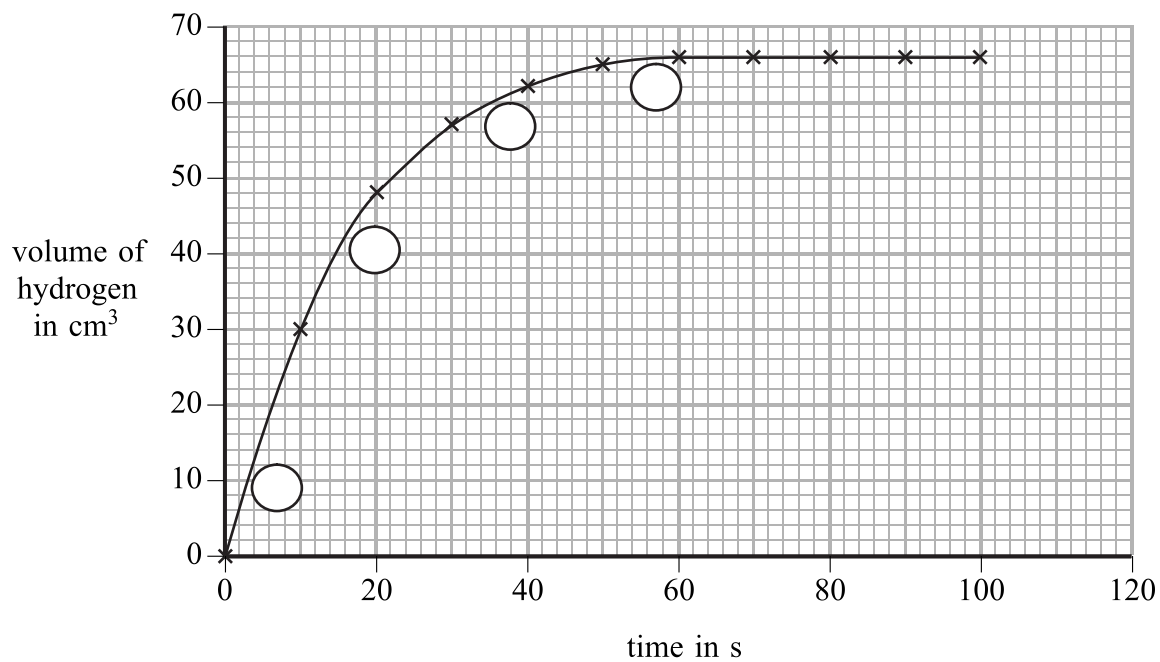
The hydrogen formed can be collected and its volume measured using the apparatus shown.



(a) Use the periodic table to find the atomic number of lithium.

The atomic number of lithium is (1)

(b) The following graph was obtained by plotting the total volume of hydrogen produced against time in seconds.



(i) In one of the circles ○ on the graph, mark X where the reaction was fastest. (1)



(ii) What was the final volume of hydrogen produced?

.....
(1)

(c) (i) When smaller pieces of lithium are used, the reaction is faster. Explain why.

.....
.....
(1)

(ii) Describe another way to make this reaction faster.

.....
.....
(1)

(d) (i) Universal indicator is added to the lithium hydroxide solution. What colour is seen?

.....
(1)

(ii) Explain why this colour is seen.

.....
(1)

(e) When sodium is used instead of lithium, a similar reaction takes place.

(i) Why would you expect a similar reaction to take place?

.....
.....
(1)

(ii) Describe how the reaction of sodium with water is different from that of lithium with water.

.....
.....
(1)

(f) Name a metal in group 1 that is more reactive with water than lithium and sodium.

.....
(1)

(Total 10 marks)

Q5

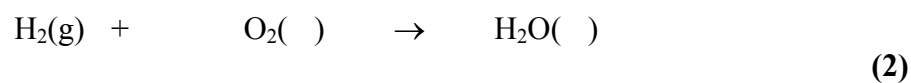


6. Read the following news item that appeared in June 2004.

Wales is likely to become the first country in the world to mass-produce a new fuel called hithane. Hithane is a mixture of hydrogen and methane. Burning hithane instead of petrol would produce a third less carbon dioxide. Under the Kyoto treaty on reducing greenhouse gases, European governments have agreed to reduce carbon dioxide emissions.

(a) When hydrogen burns, it reacts with oxygen in the air to produce water.

(i) Balance the equation and fill in the missing state symbols.



(ii) Give the name of the type of bonding between hydrogen and oxygen atoms in a water molecule.

.....
(1)

(iii) Draw a dot and cross diagram of a water molecule, showing only the outer electrons.

(2)

(b) Methane, CH₄, is a hydrocarbon.

(i) What is meant by the term **hydrocarbon**?

.....
.....
(2)

(ii) Name a natural source of methane.

.....
(1)



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(c) Incomplete combustion of petrol or methane produces carbon monoxide.

Explain the dangers of carbon monoxide in enclosed spaces.



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.....

.....

.....

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.....

.....

(3)

(d) Suggest why the use of hithane instead of petrol would reduce carbon dioxide emissions.

.....

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.....

.....

(2)

Q6

(Total 13 marks)

TURN OVER FOR QUESTION 7



7. When a piece of heated potassium is put into a gas jar of chlorine, potassium chloride is formed.

(a) Complete the table to show the relative mass, relative charge and position in an atom of an electron, a neutron and a proton.

particle	relative mass	relative charge	position in the atom
electron	negligible	-1	orbiting the nucleus
neutron	0	in the nucleus
proton	1

(3)

(b) A potassium atom has an atomic number of 19 and a mass number of 39.

Write down the number of each type of particle in this atom of potassium.

number of electrons

number of neutrons

number of protons

(3)

(c) Give the electronic structure for an atom of potassium.

.....
(2)

(d) Chlorine has seven electrons in its outer shell.

What information does this give about its position in the periodic table?

.....
.....
(1)



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(e) Describe what you would see when potassium chloride is added to water and stirred.

.....
.....
.....
.....
.....
.....

(2)

(f) Bromine is below chlorine in the halogen group.

Describe how the electronic structures of chlorine and bromine atoms are similar.

.....
.....
.....

(2)

(Total 13 marks)

Q7

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TURN OVER FOR QUESTION 8



8. Sodium chloride is found in sea water and in rocks.

(a) Electrolysis of concentrated sodium chloride solution produces two gases and an alkaline solution.

(i) Name the green gas produced at the positively charged electrode.

.....
(1)

(ii) Name the colourless gas produced.

.....
(1)

(iii) Name the alkaline solution formed.

.....
(1)

(b) Bromine compounds are often found in sea water.

Bromine has two different atoms, **A** and **B**. The numbers of electrons, neutrons and protons in each of these atoms are shown in the table.

	electrons	neutrons	protons
A	35	44	35
B	35	46	35

(i) What evidence is there in the table that **A** and **B** are both atoms of bromine?

.....
.....
(1)

(ii) What is the name given to different atoms of the same element?

.....
(1)

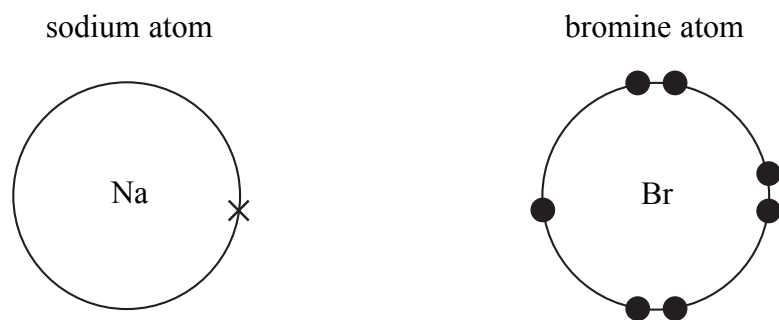


(c) Sodium reacts with bromine to form sodium bromide (NaBr).

(i) Write a balanced equation for this reaction, including state symbols.

..... (3)

(ii) The diagram shows the electrons in the outer shells of a sodium atom and a bromine atom.



Draw an arrow to show the movement of an electron when a sodium atom reacts with a bromine atom.

(1)

(iii) What name is given to atoms that have gained or lost electrons?

..... (1)

(iv) What type of bond is formed between sodium and bromine in sodium bromide?

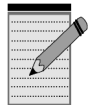
..... (1)

QUESTION 8 CONTINUES ON THE NEXT PAGE



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(d) Describe how sedimentary rocks may be formed on the sea bed.



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(4)

Q8

(Total 15 marks)

TOTAL FOR PAPER: 90 MARKS

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