OCR
RECOGNISING ACHIEVEMENT

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A322/01

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE

CHEMISTRY A

Unit 2 Modules C4 C5 C6 (Foundation Tier)

WEDNESDAY 18 JUNE 2008

Afternoon
Time: 40 minutes

Candidates answer on the question paper.
Additional materials (enclosed):
None

Calculators may be used.
Additional materials: Pencil
Ruler (cm/mm)

CUP/T44834

Candidate Forename		Candidate Surname	
Centre Number		Candidate Number	

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 42.
- The Periodic Table is printed on the back page.

FOR EXAMINER'S USE		
Qu.	**Max.**	**Mark**
1	9	
2	3	
3	7	
4	5	
5	2	
6	3	
7	13	
TOTAL	42	

This document consists of **12** printed pages.

[Turn over

Answer **all** the questions.

1 The Periodic Table shows how many elements there are.

(a) Here are symbols for some chemical elements.

K Na P Po S Sn

Which of these symbols is for sodium?

answer .....

Which of these symbols is for potassium?

answer .....[2]

(b) Elements in the Periodic Table have their electrons arranged in different ways.

Draw a straight line from each **electron arrangement** to its matching **statement**.

You may draw more than one line to each statement.

electron arrangement	**statement**
2.1	This element has one electron in the outer shell.
2.8.1	This element has two electrons in the outer shell.
2.8.2	This element has three electrons in the outer shell.
2.8.3	

[3]

(c) Some of the elements in the Periodic Table are halogens.

(i) Draw a straight line from the name of each **halogen** to its **colour**.

Draw a straight line from the name of each **halogen** to its **state** at room temperature.

colour	halogen	state
black/purple	chlorine	solid
green	bromine	liquid
orange/red	iodine	gas

[3]

(ii) Chlorine reacts with coloured dyes.

What colour will the dye change to?

Put a (ring) around the best answer.

blue **green** **orange/red** **colourless**

[1]

[Total: 9]

2 Air contains oxygen, nitrogen, carbon dioxide and water vapour.

(a) Put ticks (✓) in the boxes to show which of these are **elements** and which are **compounds**.

	elements	**compounds**
oxygen		
carbon dioxide		
nitrogen		
water vapour		

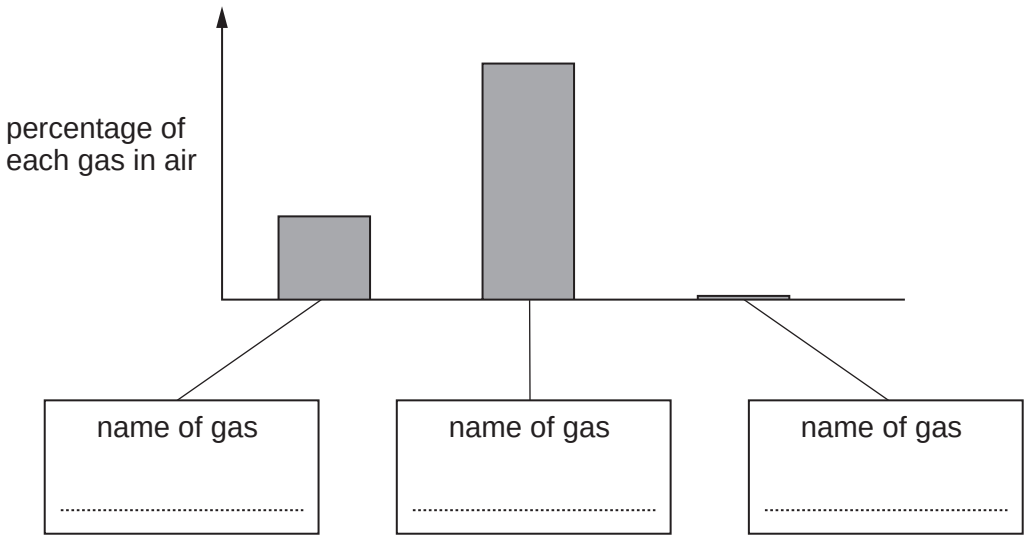
[2]

(b) The amounts of three of these gases in the air are:

nitrogen	78%
oxygen	21%
carbon dioxide	0.04%

The bar chart shows these three gases.

Fill in the labels.



[1]

[Total: 3]

3 **(a)** Sodium chloride forms ionic crystals.

Here are some statements about crystals of sodium chloride.

Write **T** in the box next to each **true** statement and **F** in the box next to each **false** one.

	T (true) or **F** (false)
Each crystal contains many molecules of NaCl.	
The bonds between the particles are strong.	
The bonds are all on the outside of the crystal.	
There is a very large number of bonds.	
The particles in the crystal are held together by attraction between opposite charges.	
The particles are arranged in a regular way.	

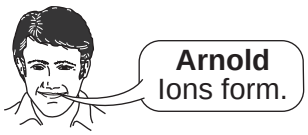
[3]

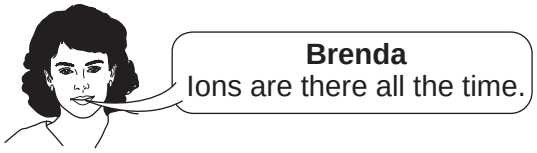
(b) Put ticks (✓) in the boxes next to the **two** statements which explain why sodium chloride has a high melting point.

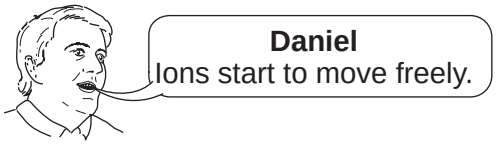
Each crystal contains many molecules of NaCl.	
The bonds between the particles are strong.	
The bonds are all on the outside of the crystal.	
There is a very large number of bonds.	
The particles are arranged in a regular way.	

[2]

(c) Mary asks her friends to describe what happens when ionic crystals melt.







Which **two** people are correct?

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

[Total: 7]

4 Here are the ten most abundant elements in the Earth's lithosphere.

element	percentage in the Earth's lithosphere
aluminium	7.5
calcium	3.4
hydrogen	0.9
iron	4.7
magnesium	1.9
oxygen	49.0
potassium	2.4
sodium	2.6
silicon	26.0
titanium	0.6

(a) Which is the most abundant element on this list?

answer .....

Which is the third most abundant element on this list?

answer .....[2]

(b) Most of the silicon is in the form of silicon dioxide.

What type of substance is silicon dioxide?

Put a ring around the **best** answer.

compound **gas** **mixture** **element** **ore**

[1]

(c) Silicon dioxide is the main substance in one of these types of rock.

What is the name of this type of rock?

Put a ring around the correct answer.

chalk **coal** **limestone** **sandstone**

[1]

(d) The crust makes up one part of the lithosphere.

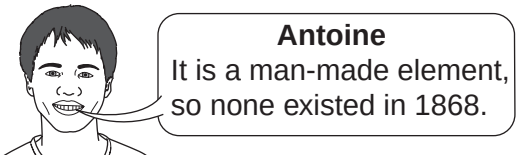
Put a ring around the name of the other part.

atmosphere **hydrosphere** **magma** **mantle**

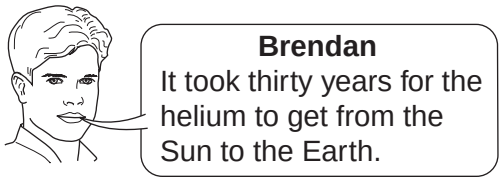
[1]

[Total: 5]

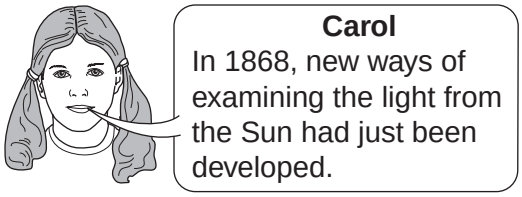
5 Bobby reads that helium was discovered on the Sun in 1868. Thirty years later it was found on Earth. He asks his friends why helium was discovered on the Sun first.



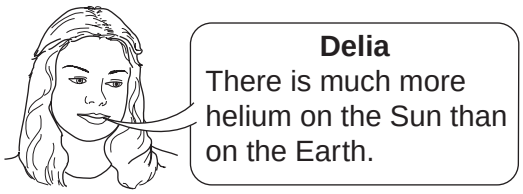
Antoine
It is a man-made element, so none existed in 1868.



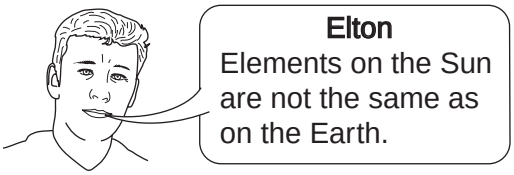
Brendan
It took thirty years for the helium to get from the Sun to the Earth.



Carol
In 1868, new ways of examining the light from the Sun had just been developed.



Delia
There is much more helium on the Sun than on the Earth.



Elton
Elements on the Sun are not the same as on the Earth.

Which **two** people give the best answers?

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

[Total: 2]

6 Chemicals used in medicines are produced to high levels of purity.

Put ticks (✓) in the **three** boxes which show why.

Impurities might have side effects.	☐
Manufacturers can charge more for pure chemicals.	☐
That way the dose is the same every time.	☐
Each medicine is designed to do one job only.	☐
Otherwise it would be impossible to test new medicines properly.	☐
All substances work better if they are as pure as possible.	☐
Tablets can be made smaller if the chemicals are purer.	☐

[3]

[Total: 3]

7 Amy reacts different chemicals with hydrochloric acid.

(a) Put a ring around the name of the reaction between an acid and an alkali.

concentration **electrolysis** **neutralisation** **reduction**

[1]

(b) Draw a straight line from the name of each **chemical** to its **formula**.

chemical	formula
hydrochloric acid	Mg
magnesium	$Mg(OH)_2$
magnesium oxide	MgO
magnesium hydroxide	HCl

[3]

(c) Complete the table to show what is formed in each reaction.

Put ticks (✓) in the correct boxes.

The first one has been done for you.

reaction	reaction forms		
	a salt	hydrogen gas	water
magnesium oxide and acid	✓		✓
magnesium and acid			
magnesium hydroxide and acid			

[3]

(d) Complete the names of the salts formed.

alkali	acid	salt
magnesium oxide	sulfuric acid	magnesium ……
copper oxide	hydrochloric acid	copper ……..……....

[2]

(e) When hydrochloric acid reacts with sodium hydroxide, which pair of ions react?

A H^+ and Cl^-

B H^+ and OH^-

C H^+ and H^+

D Na^+ and OH^-

answer .....[1]

(f) Impure salts can be purified by using the following techniques.

Draw a straight line from each **technique** to **what the technique is for**.

technique	what the technique is for
dissolving	removes a solid from a mixture of a liquid and a solid
crystallisation	removes a liquid by heating
evaporation	makes a solid appear in a solution
filtration	turns a solid into a solution

[3]

[Total: 13]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE

The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 **H** hydrogen 1										4 **He** helium 2
7 **Li** lithium 3	9 **Be** beryllium 4											11 **B** boron 5	12 **C** carbon 6	14 **N** nitrogen 7	16 **O** oxygen 8	19 **F** fluorine 9	20 **Ne** neon 10
23 **Na** sodium 11	24 **Mg** magnesium 12											27 **Al** aluminium 13	28 **Si** silicon 14	31 **P** phosphorus 15	32 **S** sulfur 16	35.5 **Cl** chlorine 17	40 **Ar** argon 18
39 **K** potassium 19	40 **Ca** calcium 20	45 **Sc** scandium 21	48 **Ti** titanium 22	51 **V** vanadium 23	52 **Cr** chromium 24	55 **Mn** manganese 25	56 **Fe** iron 26	59 **Co** cobalt 27	59 **Ni** nickel 28	63.5 **Cu** copper 29	65 **Zn** zinc 30	70 **Ga** gallium 31	73 **Ge** germanium 32	75 **As** arsenic 33	79 **Se** selenium 34	80 **Br** bromine 35	84 **Kr** krypton 36
85 **Rb** rubidium 37	88 **Sr** strontium 38	89 **Y** yttrium 39	91 **Zr** zirconium 40	93 **Nb** niobium 41	96 **Mo** molybdenum 42	[98] **Tc** technetium 43	101 **Ru** ruthenium 44	103 **Rh** rhodium 45	106 **Pd** palladium 46	108 **Ag** silver 47	112 **Cd** cadmium 48	115 **In** indium 49	119 **Sn** tin 50	122 **Sb** antimony 51	128 **Te** tellurium 52	127 **I** iodine 53	131 **Xe** xenon 54
133 **Cs** caesium 55	137 **Ba** barium 56	139 **La*** lanthanum 57	178 **Hf** hafnium 72	181 **Ta** tantalum 73	184 **W** tungsten 74	186 **Re** rhenium 75	190 **Os** osmium 76	192 **Ir** iridium 77	195 **Pt** platinum 78	197 **Au** gold 79	201 **Hg** mercury 80	204 **Tl** thallium 81	207 **Pb** lead 82	209 **Bi** bismuth 83	[209] **Po** polonium 84	[210] **At** astatine 85	[222] **Rn** radon 86
[223] **Fr** francium 87	[226] **Ra** radium 88	[227] **Ac*** actinium 89	[261] **Rf** rutherfordium 104	[262] **Db** dubnium 105	[266] **Sg** seaborgium 106	[264] **Bh** bohrium 107	[277] **Hs** hassium 108	[268] **Mt** meitnerium 109	[271] **Ds** darmstadtium 110	[272] **Rg** roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

** The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.*

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.