OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION **F** **B641/01**

GATEWAY SCIENCE
CHEMISTRY B

Unit 1 Modules C1 C2 C3

FOUNDATION TIER

THURSDAY 14 JUNE 2007

Afternoon
Time: 1 hour

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

CUP/T30393

Candidate Name

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

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

FOR EXAMINER'S USE		
Section	**Max.**	**Mark**
A	**20**	
B	**20**	
C	**20**	
TOTAL	**60**	

This document consists of **20** printed pages.

[Turn over

Answer **all** the questions.

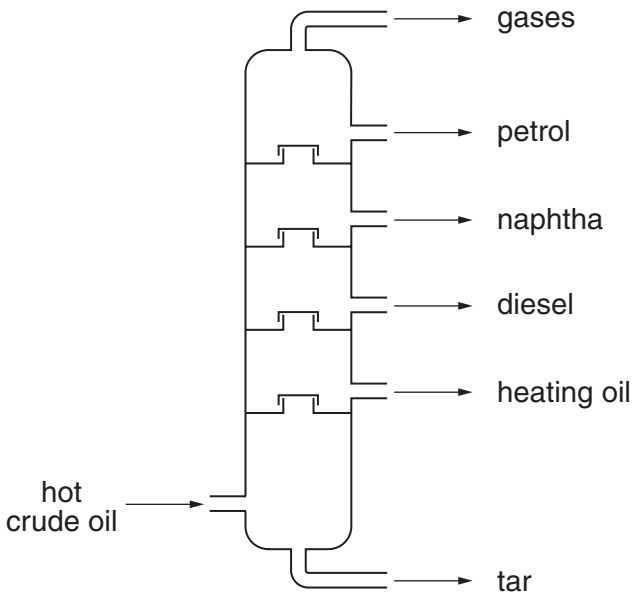
Section A – Module C1

1 This question is about crude oil.

Crude oil is a mixture of substances.

Look at the diagram.

It shows the equipment used to separate crude oil into useful substances.



(a) (i) Look at the list.

decomposition

fractional distillation

polymerisation

Finish this sentence.

Choose from the list.

Crude oil is separated by ..... . [1]

(ii) Look at the list.

boiling points

melting points

names

uses

Finish this sentence.

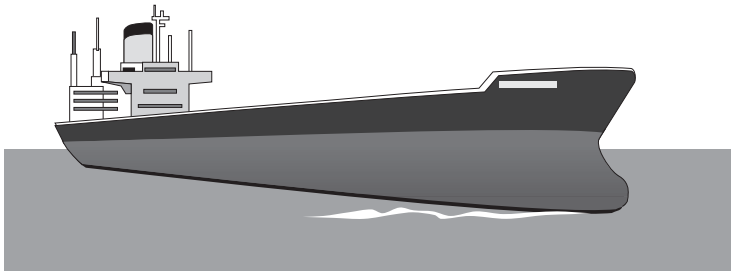
Choose from the list.

The separation of crude oil works because the useful substances have

different ..... [1]

(b) Crude oil is often transported in large ships called tankers.

This tanker has an accident.



Describe an **environmental** problem that might occur after the accident.

.....

.....[1]

(c) Cracking is also used to make useful substances from crude oil.

Write about cracking.

Your answer should include

- what cracking is
- why it is important.

.....

.....

.....

.....[2]

[Total: 5]

2 This question is about plastics.

Plastics contain large molecules.

Look at the equation.

many small molecules $\longrightarrow$ large molecules

It shows how these large molecules are made.

(a) Look at the list.

catalysts	**elements**
monomers	**polymers**

Finish these sentences.

Choose from the list.

(i) The small molecules used to make plastics are called ..... . [1]

(ii) The large molecules in plastics are called ..... . [1]

(b) A plastic is made when lots of ethene molecules are joined together.

Write down the name of this plastic.

.....[1]

(c) Ethene, C_2H_4, is a hydrocarbon.

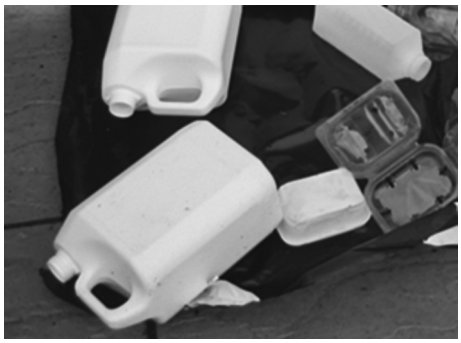
Write down the names of the **two** elements found in a hydrocarbon.

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

(d) Look at the picture.

These plastic objects are non biodegradable.

They are often thrown away and cause litter.



Explain the problems of disposing of these objects in landfill sites.

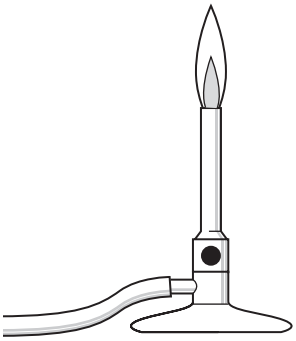
.....

.....

.....[2]

[Total: 7]

3 Look at the diagram. It shows a Bunsen burner.



This Bunsen burner uses methane gas as a fuel.

When a fuel burns, it reacts with a gas from the air.

(a) Write down the name of this gas.

.....[1]

(b) Methane, CH_4, is a hydrocarbon.

It burns in **lots** of air.

Two new substances are made.

Write down the names of these **two** substances.

1 .....

2 .....[2]

(c) If methane burns in a **shortage** of air, a poisonous gas is made.

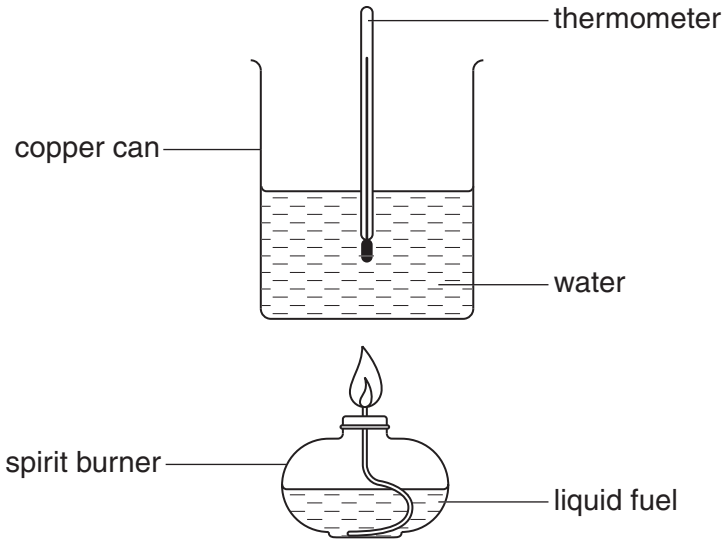
Write down the name of this gas.

.....[1]

[Total: 4]

4 John investigates four fuels.

Look at the diagram. It shows the apparatus that he uses.



Look at the table. It shows his results.

fuel	start temperature in °C	end temperature in °C	temperature change in °C
A	16	22	.....
B	17	26	9
C	15	21	6
D	16	24	8

(a) Finish the table. [1]

(b) John uses the same amount of water each time.

Which fuel gives out the most heat energy?

Choose from **A**, **B**, **C**, or **D**.

answer .....[1]

(c) Many reactions give out heat energy.

What is the scientific name for reactions that give out heat energy?

Choose from the list.

decomposition

endothermic

exothermic

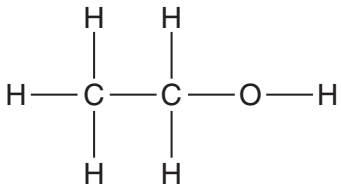
reduction

answer .....[1]

(d) Methane and ethanol are both fuels.

Methane has the molecular formula, CH_4.

Look at the displayed formula for ethanol.



Write down the molecular formula of ethanol.

.....[1]

[Total: 4]

Section B – Module C2

5 Cement is made by heating clay and limestone together.

Concrete is made from cement.

(a) Two substances are mixed with cement to make concrete.

Write down the names of these **two** substances.

1 .....

2 .....[2]

(b) Limestone has the chemical name calcium carbonate, $CaCO_3$.

Limestone is heated. Calcium oxide, CaO, and carbon dioxide, CO_2, are made.

(i) Write down the balanced symbol equation for this reaction.

.....[1]

(ii) Write down the name of this type of reaction.

Choose from this list.

combustion

cracking

exothermic

thermal decomposition

answer.....[1]

[Total: 4]

6 Air is a mixture of gases.

Look at the table. It shows the names of some gases and the amount of each gas in air.

gas	amount
carbon dioxide	0.03%
nitrogen	78%
oxygen	21%
water vapour	0.97%

(a) Write down the names of the **two** main gases in air.

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

(b) Look at this list of processes.

photosynthesis

polymerisation

respiration

rusting

Answer these questions.

Choose your answers from the list.

(i) Which process **removes** carbon dioxide from the air?

.....[1]

(ii) Which process **adds** carbon dioxide to the air?

.....[1]

(c) Sometimes small amounts of sulfur dioxide pollute the air.

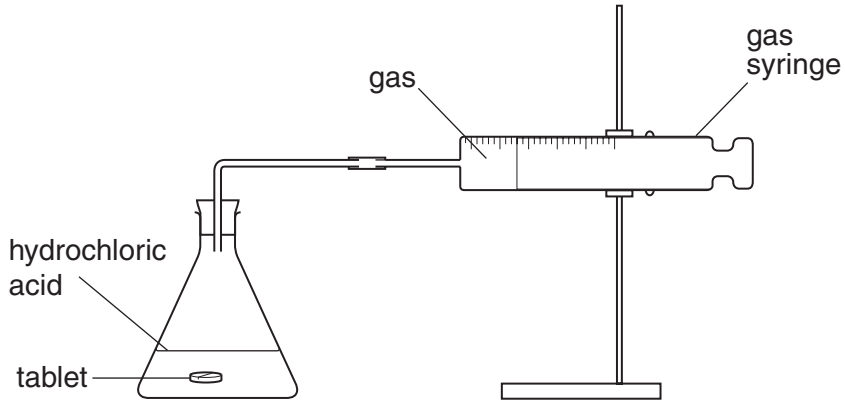
Write down **one** way in which sulfur dioxide is made.

.....[1]

[Total: 5]

7 Paul investigates the reaction between an antacid tablet and 50 cm^3 dilute hydrochloric acid.

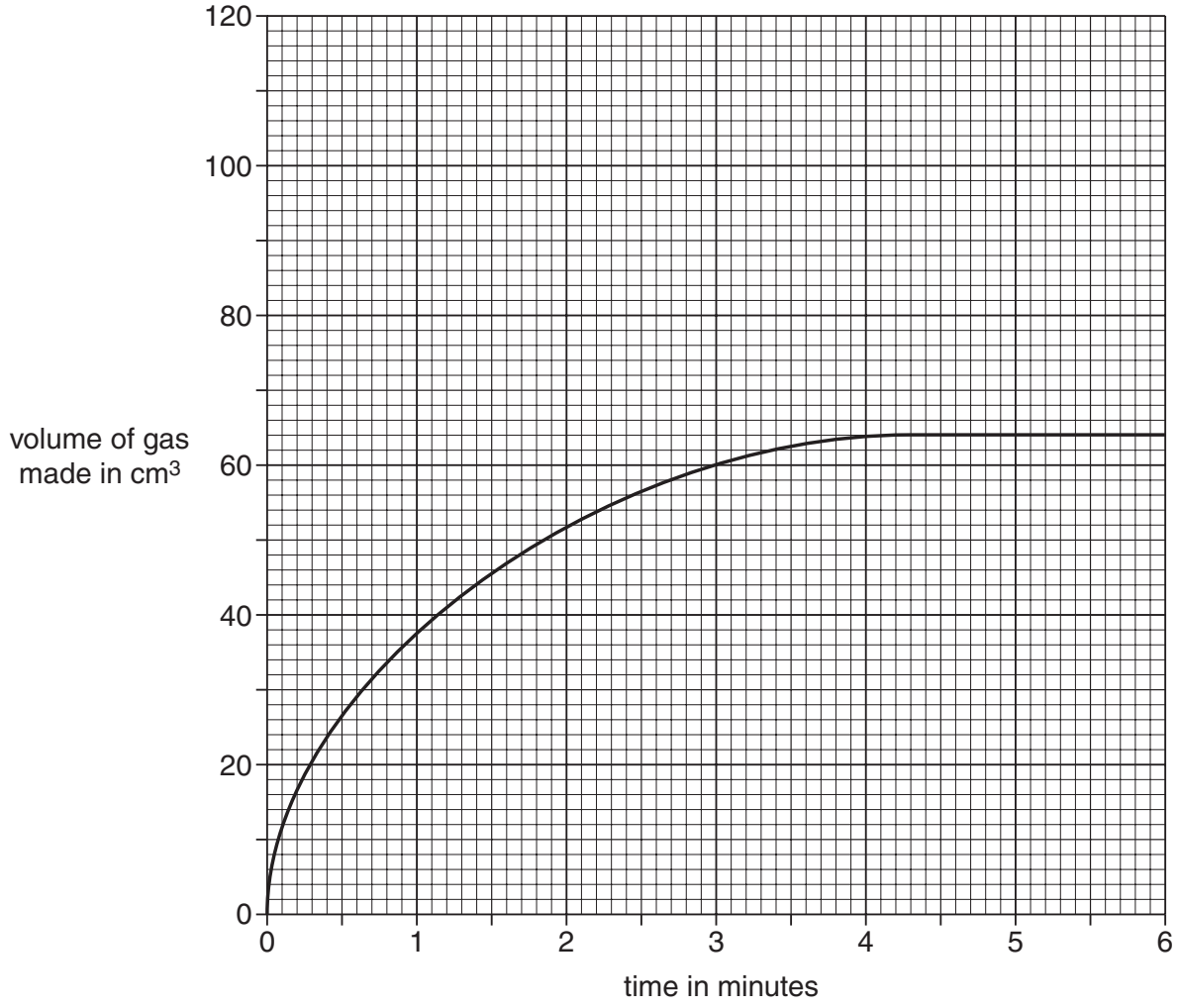
Look at the diagram. It shows the apparatus he uses.



Paul does the experiment at 20 °C.

He measures the volume of gas in the gas syringe every minute.

Look at the graph. It shows his results.



(a) Write down the volume of gas made during the first 3 minutes.

.....……cm^3 [1]

(b) Paul does the experiment again.

He still uses one antacid tablet and 50 cm^3 of dilute hydrochloric acid.

This time he uses a temperature of **40 °C** instead of 20 °C.

The reaction goes faster.

On the graph, sketch a line to show the results Paul should get. [2]

(c) Paul wants to make the reaction faster.

He does not want to change the temperature.

He still wants to use one tablet and 50 cm^3 of acid.

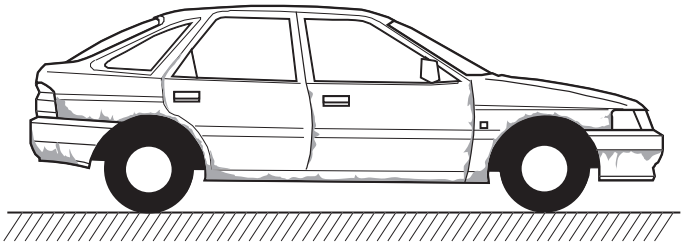
Write down **two** other things that Paul might change to make the reaction go faster.

1 .....

2 .....[2]

[Total: 5]

8 Claire has a car. The car body is made of iron and aluminium.



(a) Claire's car is made of many materials.

Write down the name of a non-metal material used to make car parts.

.....[1]

(b) Cars built using iron go rusty.

Two substances are needed to make iron go rusty.

Which **two** substances?

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

(c) Most cars are made of steel.

Steel is an alloy of iron.

What is meant by the word **alloy**?

.....[1]

(d) Aluminium does not corrode easily.

Explain why aluminium does not corrode.

.....

.....

.....[2]

[Total: 6]

Section C – Module C3

9 This question is about atoms, ions and molecules.

(a) Draw a straight line from each particle to the correct example.

particle	example
atom	Na
ion	O_2
molecule	K^+

[2]

(b) Magnesium reacts with chlorine to make magnesium chloride.

In this reaction, magnesium atoms lose electrons to make magnesium ions, Mg^{2+}.

At the same time, chlorine atoms make chloride ions, Cl^-.

Describe how chloride ions are made.

.....

.....[1]

(c) Water is a compound.

It is made of water molecules, H_2O.

(i) Complete this sentence about compounds.

A compound is 2 or more different ..... chemically joined together. [1]

(ii) The atoms in a water molecule are held together by shared pairs of electrons.

What is the name of this type of bonding?

.....[1]

[Total: 5]

10 Look at this part of the Periodic Table.

It shows the symbols of three elements in Group 1 of the Periodic Table.

Li
Na
K

The names of the three elements are lithium, sodium and potassium.

(a) What is the name of the elements in Group 1?

Choose from

alkali metals

halogens

noble gases

transition elements

answer .....[1]

(b) Put lithium, sodium and potassium in order of reactivity.

Write the most reactive element first.

most reactive .....

.....

least reactive ..... [1]

(c) Meena wants to identify metals.

She uses a flame test.

(i) Describe how Meena does the flame test.

You may draw a diagram to help your answer.

.....

.....

.....[2]

(ii) Look at the table. It shows Meena's results.

Complete this table.

metal	flame colour
sodium	.....
lithium	red
potassium	lilac

[1]

[Total: 5]

11 This question is about the elements in Group 7 and their compounds.

(a) Draw a straight line from each substance to its use.

substance	use
chlorine	antiseptic for cuts
iodine	filling balloons
sodium chloride	food flavouring
	killing bacteria in swimming pools

[3]

(b) Chlorine and iodine are both elements in Group 7 of the Periodic Table.

Write down the name of one **other** element in Group 7.

You may wish to use the Periodic Table on the back page to help you.

.....[1]

(c) Sodium reacts with chlorine to make sodium chloride.

Write the word equation for the reaction between sodium and chlorine.

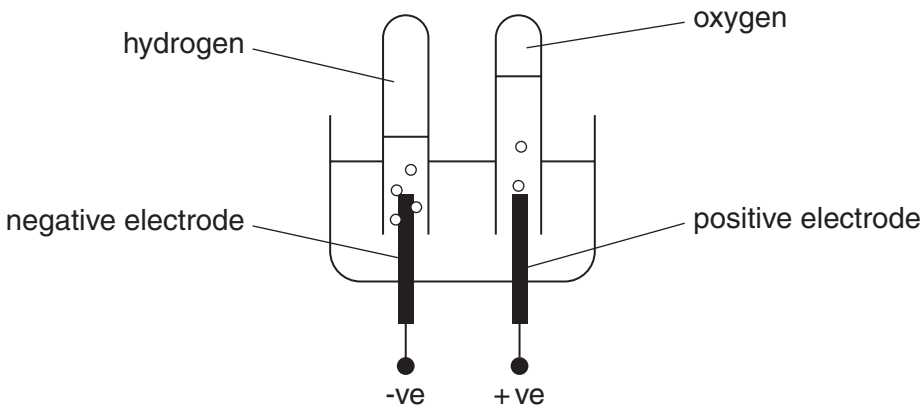
.....[1]

[Total: 5]

12 The electrolysis of dilute sulfuric acid makes hydrogen and oxygen.

Look at the diagram.

It shows the apparatus used in the electrolysis of dilute sulfuric acid.



(a) Laura wants to test for hydrogen gas.

Write down the test she should use and the result she should expect.

test .....

result .....[2]

(b) What is the name of the positive electrode?

Put a (ring) around the correct word.

anode

anion

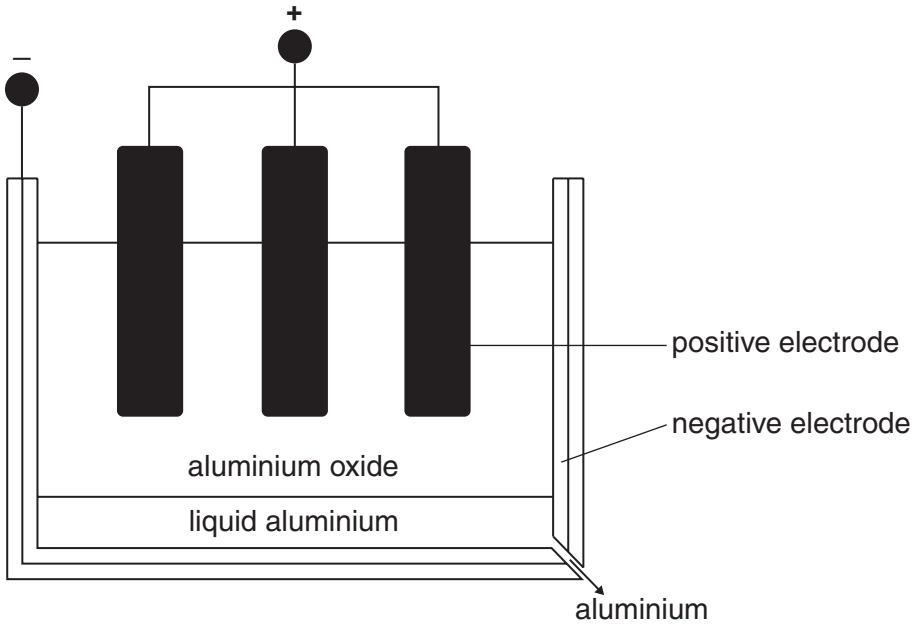
cathode

cation

[1]

[Total: 3]

13 Aluminium is made by the electrolysis of molten aluminium oxide.



(a) What is the name of an ore that contains aluminium?

Choose from the list.

bauxite

haematite

limestone

salt

answer .....[1]

(b) During electrolysis, aluminium oxide breaks down.

Aluminium and oxygen are made.

Write a word equation for this reaction.

.....[1]

[Total: 2]

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.