

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
GATEWAY SCIENCE
CHEMISTRY B**

B641/01

Unit 1 Modules C1 C2 C3 (Foundation Tier)

Candidates answer on the Question Paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:

- Pencil
- Ruler (cm/mm)

**Wednesday 26 May 2010
Morning**

Duration: 1 hour



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use 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. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- The Periodic Table is printed on the back page.
- This document consists of **24** pages. Any blank pages are indicated.

Answer **all** the questions.

Section A – Module C1

- 1 This question is about foods and food additives.

Look at the table. It gives some information about E numbers.

type of food additive	E number range
food colour	E101 to E199
preservative	E200 to E299
antioxidant	E300 to E321
emulsifier	E400 to E499
sweetener	E950 to E967

Look at the food label found on a packet of cake mix.

Ingredients:

Sugar, wheat flour, vegetable oil, baking powder, E341, dried whey, E477, E471, salt and E415.

- (a) What type of food additive is E477?

..... [1]

- (b) Name the ingredient that is found in the **smallest** amount.

..... [1]

- (c) One of the ingredients in the cake mixture is baking powder.

Write down **one** reason why baking powder is used for baking cakes.

..... [1]

(d) Baking powder contains sodium hydrogencarbonate.

When sodium hydrogencarbonate is heated it breaks down.

Look at the word equation for the breakdown of sodium hydrogencarbonate.



Write down the name of one **product** of this reaction.

..... [1]

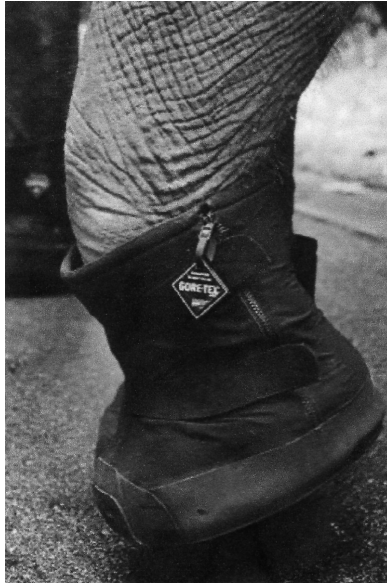
(e) How can you test for **carbon dioxide** gas?

name of the chemical used

result you would expect to see [2]

[Total: 6]

- 2 An elephant in a zoo has an injured foot. A vet makes a shoe for the elephant.



The shoe is made out of Gore-Tex®.

The shoe is hard-wearing and waterproof. It is also breathable.

- (a) Suggest **one** reason why the elephant's shoe was **not** made out of nylon.

..... [1]

- (b) Gore-Tex® and nylon are both polymers.

It can be difficult to dispose of some polymers.

Look at the list of sentences about the disposal of polymers.

Two of the following sentences are correct.

Put ticks (✓) in the **two** boxes next to the correct sentences.

Most polymers break down quickly in landfill sites.

Some polymers release toxic fumes when burned.

Microbes decompose biodegradable polymers.

Recycling polymers wastes valuable resources.

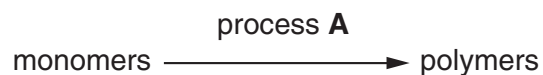
Polymers are easy to sort for recycling.

[2]

(c) Polymers are very large molecules.

They are made from small molecules called monomers.

This is shown in the equation.



(i) Give the name of process **A**.

..... [1]

(ii) Polystyrene is made from styrene.

Ethene is used to make a polymer.

Write down the **name** of this polymer.

..... [1]

(d) Polystyrene is a polymer.

Write down **one** use of polystyrene.

..... [1]

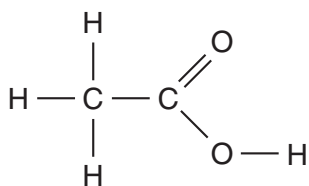
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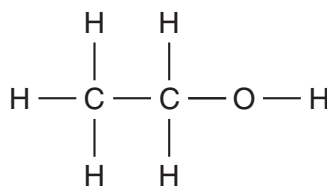
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3 This question is about compounds that contain carbon.

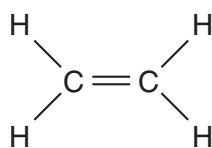
Look at the displayed formulas of some compounds that contain carbon.



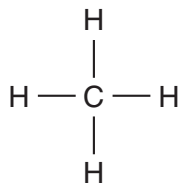
ethanoic acid



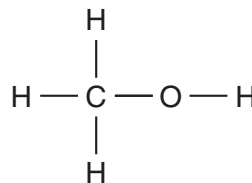
ethanol



ethene



methane



methanol

(a) Write down the **name** of a compound that is a hydrocarbon.

Choose from the compounds shown.

..... [1]

(b) Write down the **name** of a compound that is an alkane.

Choose from the compounds shown.

..... [1]

(c) Look at the displayed formula for ethanol.

How many **atoms** are shown in the displayed formula for ethanol?

..... [1]

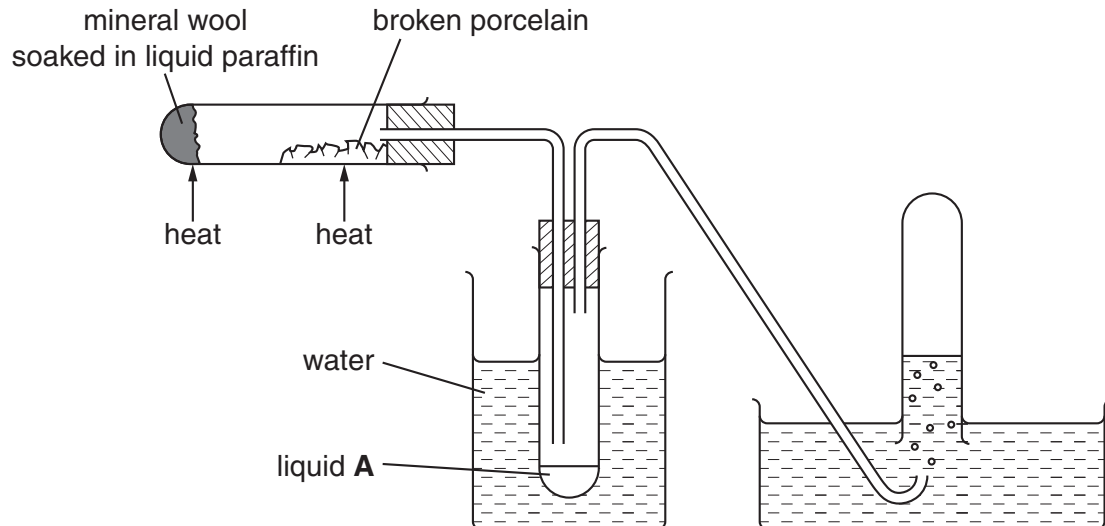
[Total: 3]

4 This question is about cracking.

Cracking is an important reaction used in the oil industry.

Look at the diagram.

It shows the apparatus that can be used in a laboratory to crack liquid paraffin.



(a) Give the name of liquid **A**.

Choose from the list.

bitumen

petrol

water

answer [1]

(b) Cracking is used to make ethene.

On the diagram showing the apparatus, put the letter **X** to show where ethene is collected. [1]

(c) Write about cracking.

Your answer should include

- the conditions needed for cracking
- what happens to hydrocarbon molecules during cracking
- why cracking is a useful reaction.

.....

.....

.....

.....

.....

.....

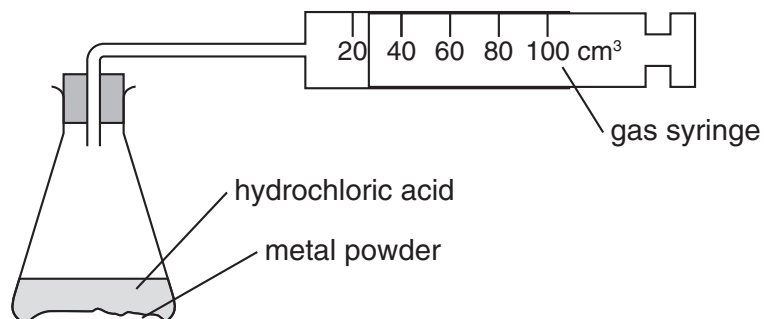
..... [3]

[Total: 5]

Section B – Module C2

5 Cameron investigates the reaction of metal powders with dilute hydrochloric acid.

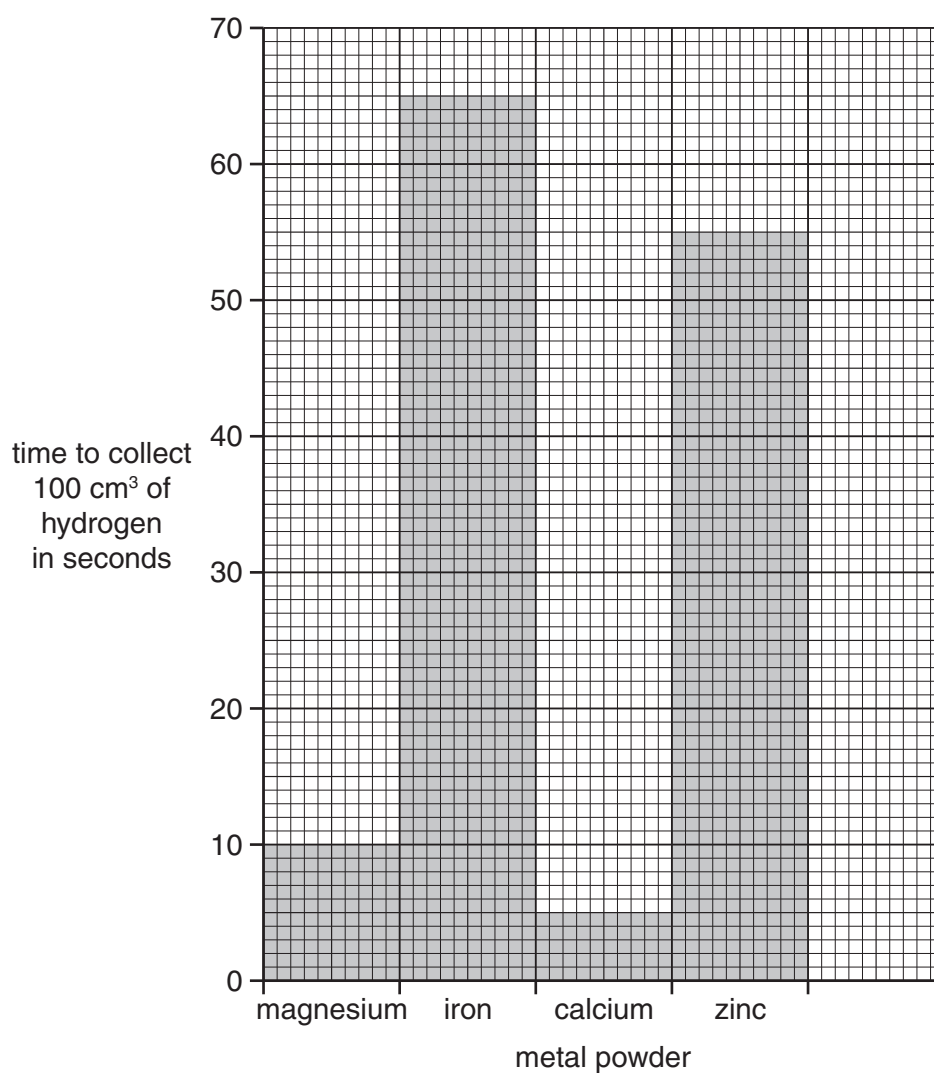
Look at the apparatus he uses.



Cameron measures the time it takes to collect 100 cm³ of hydrogen in the gas syringe.

He makes sure that all of his experiments are fair.

Look at the bar chart of Cameron's results.



(a) Look at the bar for **magnesium**.

How long does it take to collect 100 cm³ of hydrogen?

..... seconds [1]

(b) Name the metal that takes the **longest** time to collect 100 cm³ of hydrogen.

..... [1]

(c) Cameron repeats the experiment with zinc.

This time he uses a **more** concentrated solution of hydrochloric acid.

Write down what happens to the time taken for the zinc to make 100 cm³ of hydrogen.

.....

Explain your answer.

.....

..... [2]

(d) Cameron does the experiment with zinc again.

This time he uses acid at a **higher** temperature.

The reaction is much **faster**.

Explain why.

Use ideas about particles.

.....

.....

..... [2]

(e) Cameron does the experiment with zinc again.

This time he uses a **lump** of zinc rather than zinc **powder**.

Write down what happens to the rate of reaction.

.....

Explain your answer.

.....

.....

..... [2]

[Total: 8]

Turn over

6 This question is about air.

Air contains oxygen, carbon dioxide and water vapour.

Air also contains pollutants such as carbon monoxide, oxides of nitrogen and sulfur dioxide.

(a) Write down the name of **one other** gas found in air.

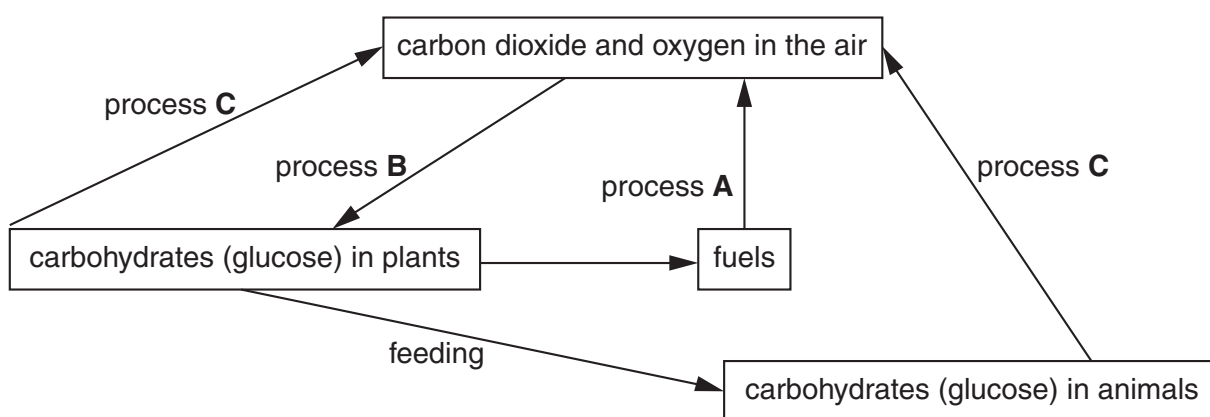
..... [1]

(b) The levels of oxygen and carbon dioxide in the air are almost constant.

The carbon cycle helps to keep these levels constant.

Look at the diagram.

It shows a simple carbon cycle.



(i) Find process **A** on the diagram.

It increases the level of carbon dioxide and decreases the level of oxygen in the air.

Give the name of process **A**.

..... [1]

(ii) Find process **B** on the diagram.

It decreases levels of carbon dioxide and increases levels of oxygen in the air.

Give the name of process **B**.

..... [1]

(iii) Find process **C** on the diagram.

It increases the level of carbon dioxide and decreases the level of oxygen in the air.

Give the name of process **C**.

..... [1]

(c) Oxides of nitrogen are pollutants in the air.

Write down one problem caused by oxides of nitrogen in the air.

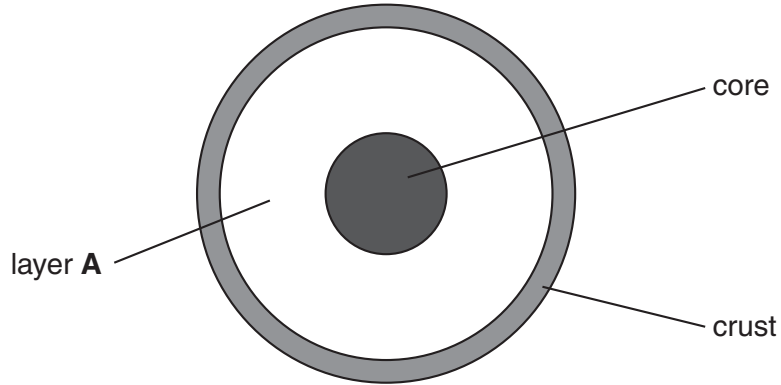
..... [1]

[Total: 5]

7 The Earth is made of several layers.

Look at the diagram.

It shows the structure of the Earth.



(a) Give the name of layer A.

..... [1]

(b) Give the name of the main element that makes up the core.

Choose from

calcium

carbon

hydrogen

iron

silicon

answer [1]

(c) The crust is made of tectonic plates.

The tectonic plates move very slowly.

Finish the sentence.

The movement of tectonic plates can cause volcanoes and [1]

(d) Lava is liquid (molten) rock that erupts from a volcano.

(i) Give the **type** of rock that is made when lava cools down.

Choose from

- igneous
- magma
- metamorphic
- sedimentary

answer [1]

(ii) Lava often cools down very rapidly.

Describe how the size of crystals in the rock is affected by the rate of cooling.

.....
..... [1]

(e) Construction materials are used to make buildings.

Brick and glass are construction materials.

Brick and glass are made from rocks from the Earth's crust.

(i) Look at the table about brick and glass.

Finish the table.

construction material	rock from which the construction material is made
brick	clay
glass

[1]

(ii) Write down the name of **one other** construction material.

..... [1]

[Total: 7]

Section C – Module C3

- 8 This question is about the elements in the Periodic Table.

Look at the list of elements.

aluminium	oxygen
argon	phosphorus
chlorine	potassium
helium	sodium
iodine	sulfur

Answer the questions.

Choose **all** your answers from the list.

You can use each element **once, more than once** or **not at all**.

The Periodic Table on the back page may help you.

- (a) Write down the **name** of an element in Group 1 (an alkali metal).

..... [1]

- (b) Write down the **name** of the element used for sterilising cuts and wounds.

..... [1]

- (c) Write down the **name** of the element with atomic number 16.

..... [1]

- (d) Write down the **name** of the element with 8 electrons in its outer shell.

..... [1]

- (e) Write down the **name** of an element that forms a positive ion.

..... [1]

[Total: 5]

9 The Group 7 elements are called the halogens.

Look at the table.

It shows some information about the halogens.

element	molecular formula	colour	state at room temperature
fluorine	F ₂	pale yellow	gas
chlorine	Cl ₂	pale green	gas
bromine	Br ₂	liquid
iodine	I ₂	dark grey
astatine	At ₂	black	solid

(a) Complete the table to show

- the **colour** of bromine
- the **state** of iodine at room temperature.

[2]

(b) Give the name of the most reactive halogen.

..... [1]

(c) Sodium reacts with chlorine.

Sodium chloride is made.

Write down a **use** for sodium chloride.

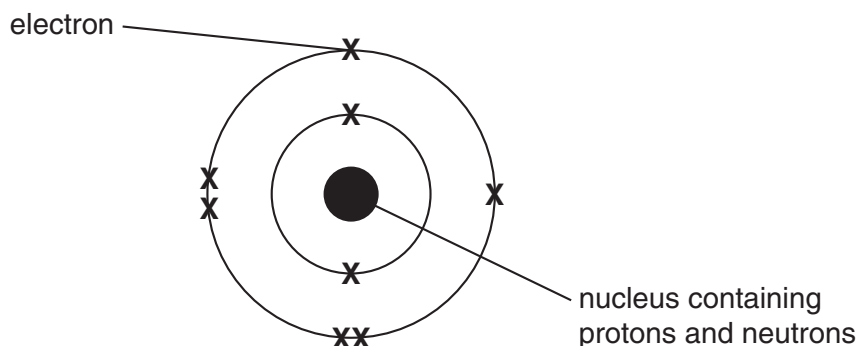
..... [1]

[Total: 4]

10 This question is about atoms.

Look at the diagram.

It shows an oxygen atom.



(a) (i) How many electrons are there in an oxygen atom?

..... [1]

(ii) Write down the electrical charge on an electron.

Choose from the list.

negative

neutral

positive

answer [1]

(b) Write down the electrical charge on the nucleus.

Choose from the list.

negative

neutral

positive

answer [1]

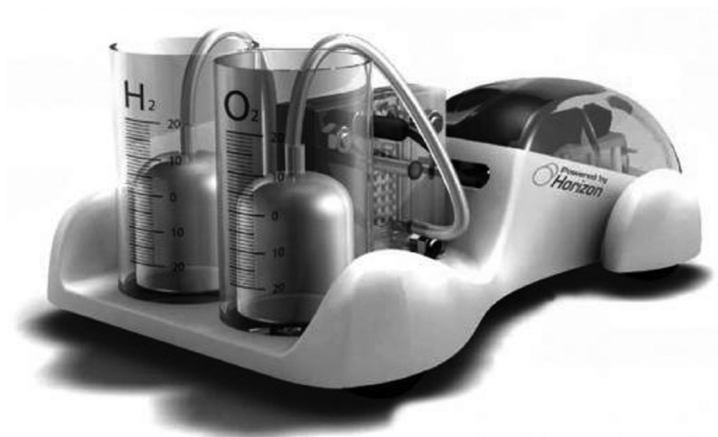
(c) Oxygen is in period 2 of the Periodic Table.

Use the diagram of the oxygen atom to explain why oxygen is in period 2 of the Periodic Table.

..... [1]

[Total: 4]

- 11 A company has created a new toy car that uses hydrogen and oxygen.



- (a) Hydrogen and oxygen react to make water.

Write a **word equation** for this reaction.

..... [1]

- (b) Describe how you would test for **hydrogen** gas.

Your answer should include

- what you would do
- the result of the test.

..... [2]

- (c) The hydrogen and oxygen can both be made by **electrolysis**.

Draw a straight line between each **word** and its correct **description**.

You should draw only three lines.

word	description
anode	a negative electrode
cathode	a liquid that conducts electricity during electrolysis
electrolyte	a positive electrode

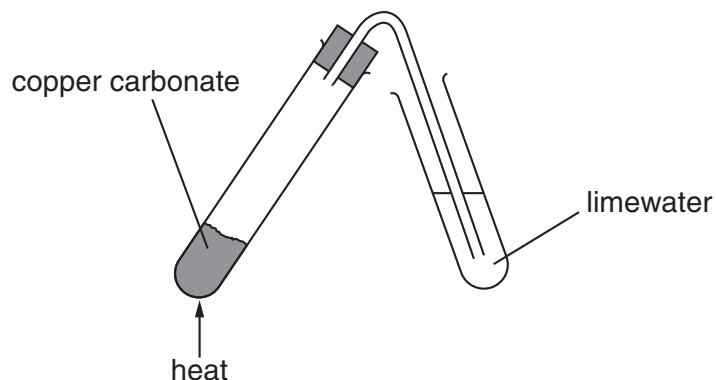
[2]

[Total: 5]

Turn over

12 Helen and Brian heat copper carbonate.

Look at the diagram. It shows the apparatus they use.



(a) The word equation for the reaction is



This is an example of **thermal decomposition**.

What is meant by thermal decomposition?

.....
 [1]

(b) The formula of copper carbonate is CuCO_3 .

How many different **elements** are combined together in copper carbonate?

..... [1]

[Total: 2]

END OF QUESTION PAPER

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The Periodic Table of the Elements

1	2	3	4	5	6	7	0										
7 Li lithium 3	9 Be beryllium 4	11 Na sodium 11	12 Mg magnesium 12	13 Al aluminium 13	14 Si silicon 14	15 P phosphorus 15	16 S sulfur 16	17 Cl chlorine 17	18 Ar argon 18								
19 K potassium 19	20 Ca calcium 20	21 Sc scandium 21	22 Ti titanium 22	23 V vanadium 23	24 Cr chromium 24	25 Mn manganese 25	26 Fe iron 26	27 Co cobalt 27	28 Ni nickel 28	29 Cu copper 29	30 Zn zinc 30	31 Ga gallium 31	32 Ge germanium 32	33 As arsenic 33	34 Se selenium 34	35 Br bromine 35	36 Kr krypton 36
37 Rb rubidium 37	38 Sr strontium 38	39 Y yttrium 39	40 Zr zirconium 40	41 Nb niobium 41	42 Mo molybdenum 42	43 Tc technetium [98]	44 Ru ruthenium 44	45 Rh rhodium 45	46 Pd palladium 46	47 Ag silver 47	48 Cd cadmium 48	49 In indium 49	50 Sn tin 50	51 Sb antimony 51	52 Te tellurium 52	53 I iodine 53	54 Xe xenon 54
55 Cs caesium 55	56 Ba barium 56	57 La* lanthanum 57	72 Hf hafnium 72	73 Ta tantalum 73	74 W tungsten 74	75 Re rhenium 75	76 Os osmium 76	77 Ir iridium 77	78 Pt platinum 78	79 Au gold 79	80 Hg mercury 80	81 Tl thallium 81	82 Pb lead 82	83 Bi bismuth 83	84 Po polonium 84	85 At astatine 85	86 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						

1	H hydrogen 1
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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.