

## GENERAL CERTIFICATE OF SECONDARY EDUCATION

## GATEWAY SCIENCE

## CHEMISTRY B

Unit 1 Modules C1 C2 C3  
(Foundation Tier)

B641/01

\* C U P / T 6 3 9 2 8 \*



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)

**Thursday 15 January 2009**  
**Afternoon**

**Duration:** 1 hour



Candidate Forename						Candidate Surname					
Centre Number						Candidate Number					

**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, however additional paper may be used if necessary.

**INFORMATION FOR CANDIDATES**

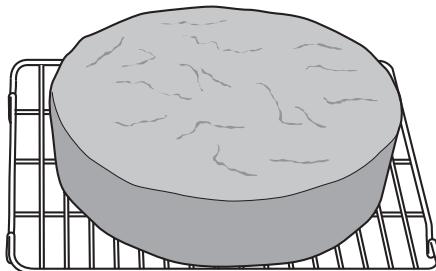
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The Periodic Table is printed on the back page.
- The total number of marks for this paper is **60**.
- This document consists of **20** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Section	Max.	Mark
A	20	
B	20	
C	20	
<b>TOTAL</b>	<b>60</b>	

Answer **all** the questions.

**Section A – Module C1**

1 Colin baked this cake in an oven.



(a) Baking a cake is a chemical change.

Describe **one** change that happens during a chemical change.

.....  
.....

[1]

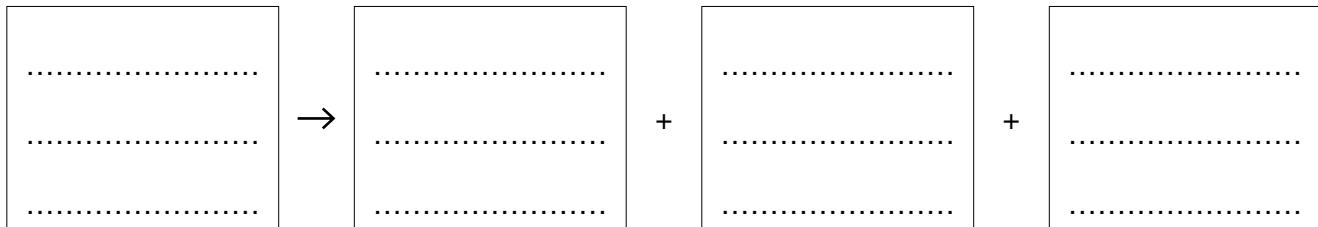
(b) Baking powder is added to a cake mixture before it is put in the oven.

Baking powder contains sodium hydrogencarbonate.

Sodium hydrogencarbonate breaks down when heated.

It makes sodium carbonate, carbon dioxide and water.

(i) Write down the **word** equation for the breakdown of sodium hydrogencarbonate.



[1]

(ii) Why is baking powder added to a cake mixture?

.....

[1]

(iii) Write down how you would test for carbon dioxide gas.

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

[2]

**[Total: 5]**

2 Terri's nails are covered with nail varnish.



She wants to remove the nail varnish.

She uses nail varnish remover.

(a) Complete the following sentences.

Choose words from the list.

**dissolve**

**soluble**

**solution**

**solvent**

**insoluble**

**solute**

Nail varnish is ..... in water.

Nail varnish remover contains a ..... which dissolves the nail varnish.  
[2]

(b) Cosmetic products, like nail varnish, have to be thoroughly tested before they can be used by people.

Explain why.

.....  
.....

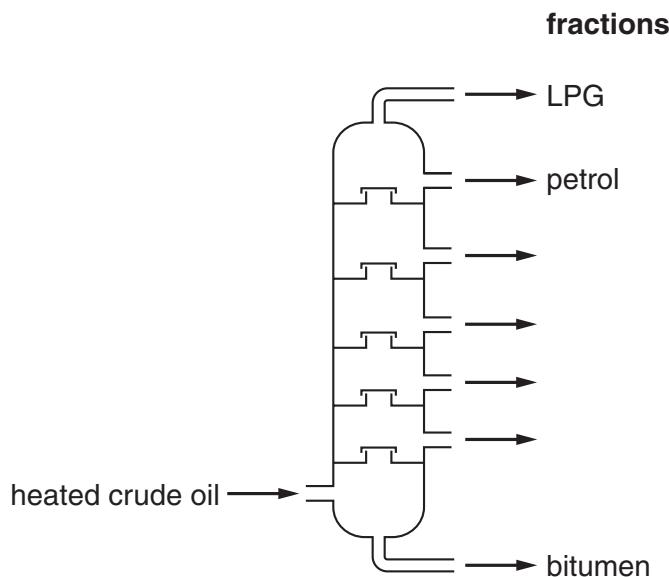
[1]

[Total: 3]

3 Petrol is separated from crude oil by fractional distillation.

Look at the diagram.

It shows a fractionating column.



(a) Look at the diagram.

LPG, petrol and bitumen are fractions made from crude oil.

Write down the name of **one** other fraction.

..... [1]

(b) Complete the sentence.

Petrol separates from other fractions when crude oil is heated.

This is because petrol has a different .....

[1]

(c) Fractional distillation does not produce enough petrol.

More petrol needs to be made.

What is the name of the chemical reaction which makes more petrol?

Put a **(ring)** around the correct answer.

**combustion**

**cracking**

**decomposition**

**neutralisation**

**polymerisation**

[1]

(d) Look at the table.

It gives information about the amount of energy released when some fuels burn.

fuel	energy released by one gram of fuel in kJ
biofuels (ethanol)	44.3
hydrogen	143.0
methane	55.6
methanol	22.3
petrol	48.3

One gram of each fuel is burnt.

Which fuel releases the **most** energy?

Use the information in the table.

..... [1]

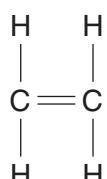
(e) One factor to think about in choosing a fuel is the energy released.

Write down **one** other factor.

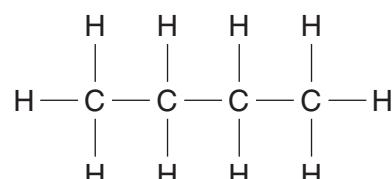
..... [1]

[Total: 5]

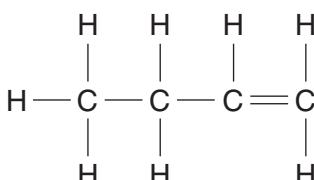
4 Look at the displayed formulas of some compounds.



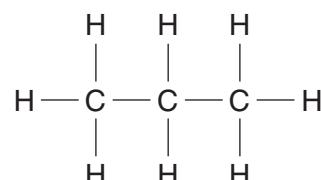
compound A



compound B



compound C



compound D

(a) One of the compounds has a molecule with 11 atoms.

Which one?

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

answer .....

[1]

(b) One of the compounds has the molecular formula  $\text{C}_4\text{H}_8$ .

Which one?

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

answer .....

[1]

(c) **A**, **B**, **C** and **D** are hydrocarbons.

Write down the **names** of the two elements in hydrocarbons.

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

[Total: 3]

5 This question is about polymers.

(a) Look at the table.

The table lists some monomers and polymers.

Complete the table.

Write the name of the monomer or polymer in the space provided.

monomer	polymer
ethene	poly(ethene)
.....	poly(propene)
chloroethene	.....
styrene	poly(styrene)

[2]

(b) Poly(ethene) is made from ethene in a reaction called polymerisation.

Write about **polymerisation**.

Your answer should include:

- what happens to the ethene molecules
- the conditions needed for polymerisation.

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

[2]

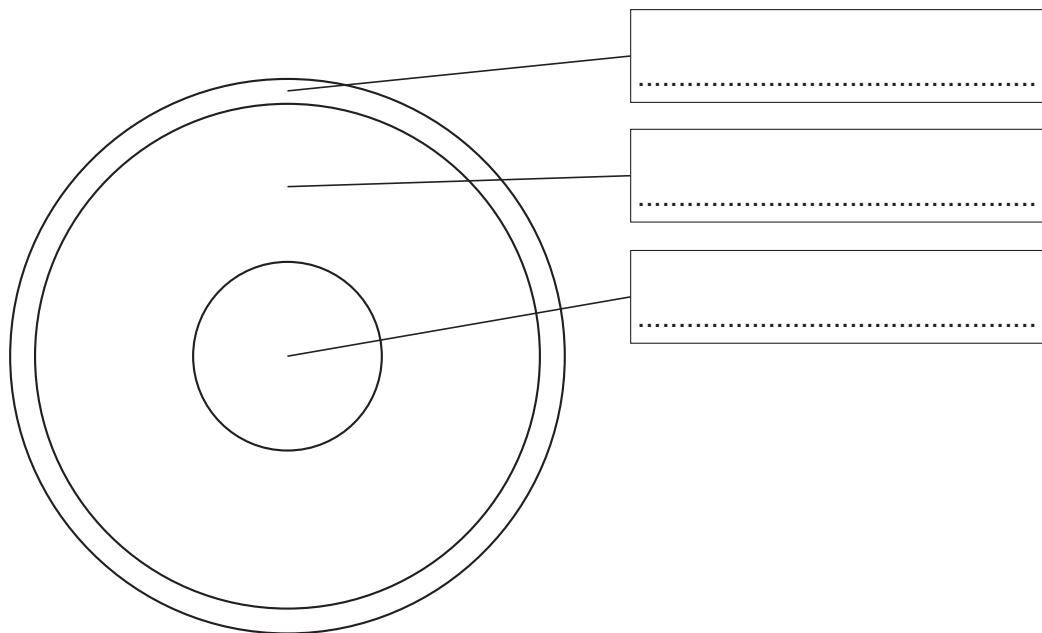
[Total: 4]

## Section B – Module C2

6 This question is about the Earth.

(a) Look at the diagram.

It shows the structure of the Earth.



Complete the diagram by writing in the correct layers of the Earth.

Choose from the list.

**core**

**crust**

**limestone**

**mantle**

**marble**

[3]

(b) Volcanoes erupt when molten rock escapes through the Earth's surface.

(i) This molten rock is called lava when it is on the Earth's surface.

What is molten rock called when it is **below** the Earth's surface?

..... [1]

(ii) It can be very dangerous living near a volcano.

Suggest **one** reason why people **choose** to live near a volcano.

..... [1]

**[Total: 5]**

7 This question is about metals and alloys.

(a) Steel and solder are examples of alloys.

What is an alloy?

.....  
.....

[1]

(b) Write down the names of the **two** main metals in **solder**.

..... and .....

[2]

(c) (i) Describe an important use of amalgam.

.....

[1]

(ii) Describe an important use of brass.

.....

[1]

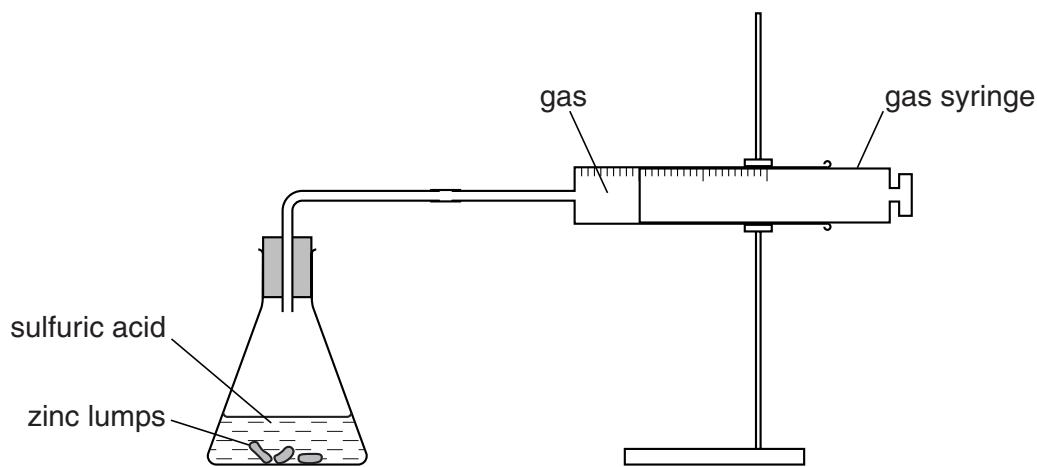
**[Total: 5]**

10

8 Paul investigates the reaction between sulfuric acid and zinc metal.

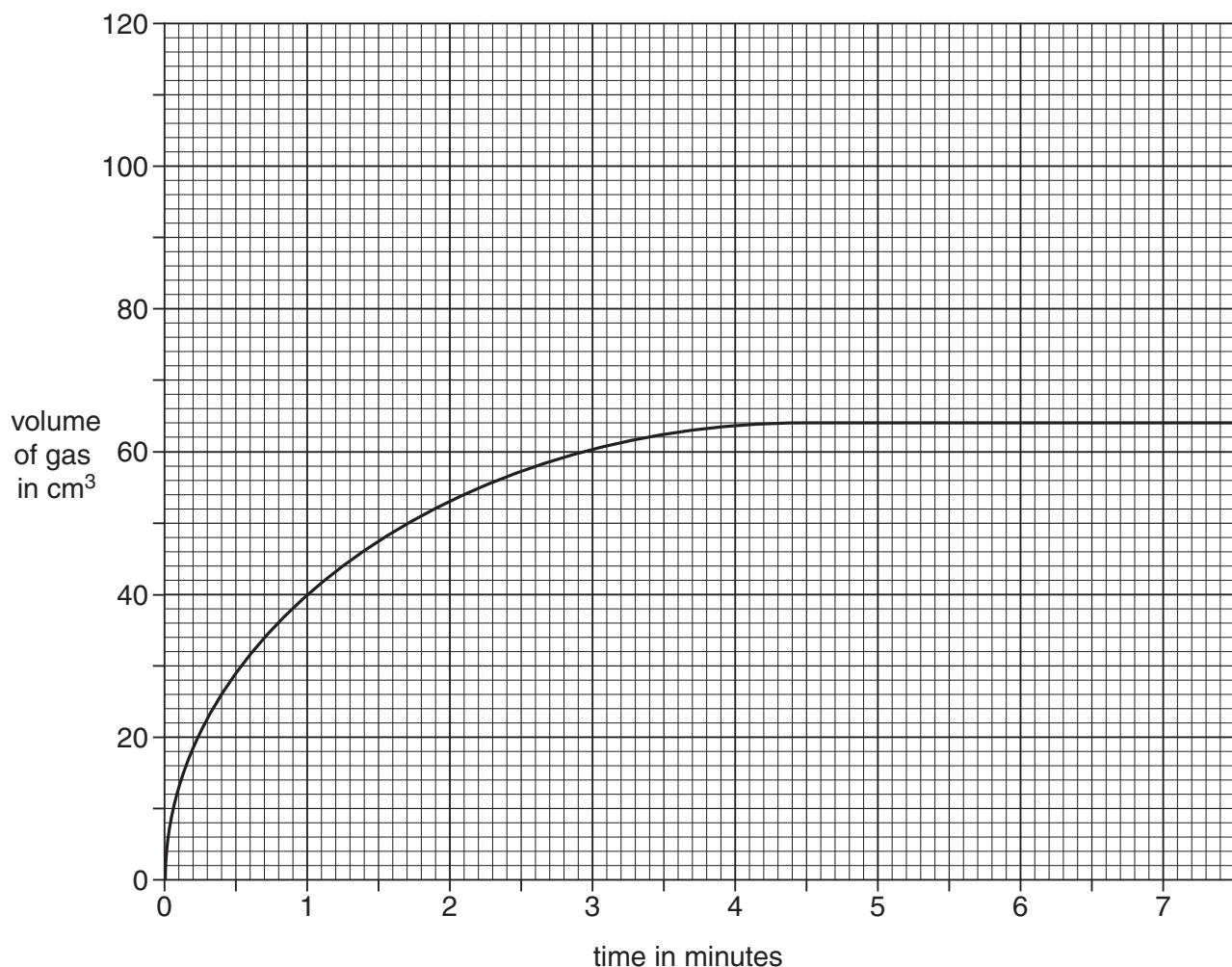
Hydrogen gas and zinc sulfate are made.

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



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

Look at the graph. It shows his results.



(a) At what time did the reaction finish?

..... minutes

[1]

(b) Paul uses a catalyst to speed up the reaction.

He does not change anything else.

Sketch **on the graph** what his new results may look like.

[2]

(c) This reaction can also be speeded up by using zinc **powder** instead of zinc **lumps**.

Explain why.

.....

[1]

(d) Paul wants to make the reaction go faster.

This time he does **not** want to use a catalyst or zinc powder.

Describe one **other** way he can make the reaction go faster.

.....

[1]

**[Total: 5]**

9 This question is about paints.

(a) Write about some of the reasons why we use paint.

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

[2]

(b) Scientists can now make special paints.

Some paints glow in the dark.

Some paints change colour when heated.

Look at the list.

**dyes**

**pigments**

**phosphorescent**

**thermochromic**

Complete these sentences.

Choose words from the list.

(i) Paints that glow in the dark are .....

[1]

(ii) Paints that change colour when heated are .....

[1]

(c) Most paints contain a solvent.

What does the solvent do?

.....

[1]

**[Total: 5]**

## Section C – Module C3

10 Substances have different physical properties.

Draw a straight line to join each **substance** to its correct **physical properties**.

substance	physical properties
carbon dioxide	a grey solid with a high melting point and a good conductor of heat
iron	a colourless gas with a low melting point
sodium chloride	a colourless liquid with a low melting point
water	a white solid that dissolves in water and has a high melting point

[3]

[Total: 3]

11 This question is about the elements in Group 7.

Elements in Group 7 are called halogens.

Chlorine and iodine are two of the elements in Group 7.

(a) Write down the name or symbol of **one other** element in Group 7.

Use the Periodic Table on the back page to help you.

..... [1]

(b) One of the halogens is an orange liquid at room temperature.

Which one?

..... [1]

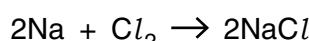
(c) One of the halogens is used to sterilise cuts and wounds.

Which one?

..... [1]

(d) Look at the balanced symbol equation.

It shows the reaction between sodium and chlorine.



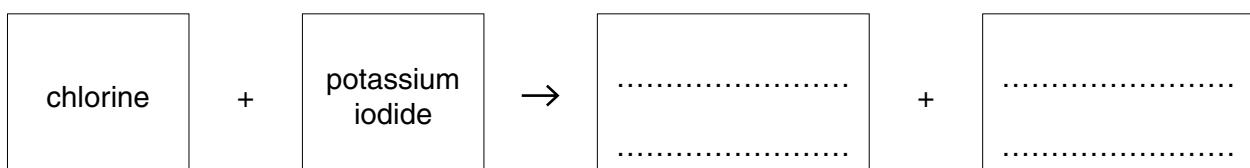
Write down the **name** of the **product** of this reaction.

..... [1]

(e) Chlorine will react with a solution of potassium iodide to make potassium chloride.

This is a displacement reaction.

Complete the **word** equation for this displacement reaction.



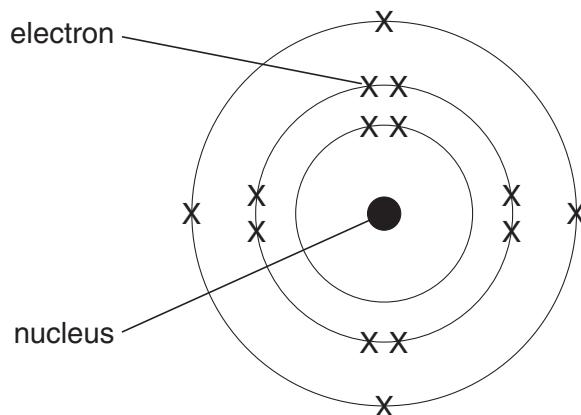
[1]

**[Total: 5]**

12 This question is about atomic structure.

Look at the diagram.

It shows the electronic structure of an atom.



(a) Atoms contain electrons.

(i) How many electrons are there in this atom?

..... [1]

(ii) What is the electrical charge on an electron?

Choose from:

**negative**

**neutral**

**positive**

answer ..... [1]

(b) The nucleus contains **two** types of particles.

(i) What are the names of these **two** particles?

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

(ii) What is the electrical charge on the nucleus?

..... [1]

(c) Look at the diagram of the electronic structure of an atom.

An element contains atoms with this electronic structure.

Which **group** of the Periodic Table is this element in?

..... [1]

**[Total: 5]**

## 13 Metals have useful properties.

Look at the table.

It shows some of the properties of five metals.

metal	density in g/cm <sup>3</sup>	melting point in °C	relative hardness	relative electrical conductivity	relative thermal conductivity
chromium	7.2	1857	8.5	0.8	0.9
cobalt	8.9	1495	5.0	1.7	1.0
copper	9.0	1085	3.0	6.0	4.1
nickel	8.9	1453	4.0	1.4	0.9
zinc	7.1	420	2.5	1.7	1.2

(a) Which metal has the **lowest** density?

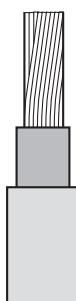
Choose from the table.

..... [1]

(b) What is the relative thermal conductivity of **cobalt**?

..... [1]

(c) Look at the diagram. It shows an electrical wire.



Copper is the most suitable metal from the table to make electrical wires.

Explain why.

Use information from the table.

..... [1]

[Total: 3]

17

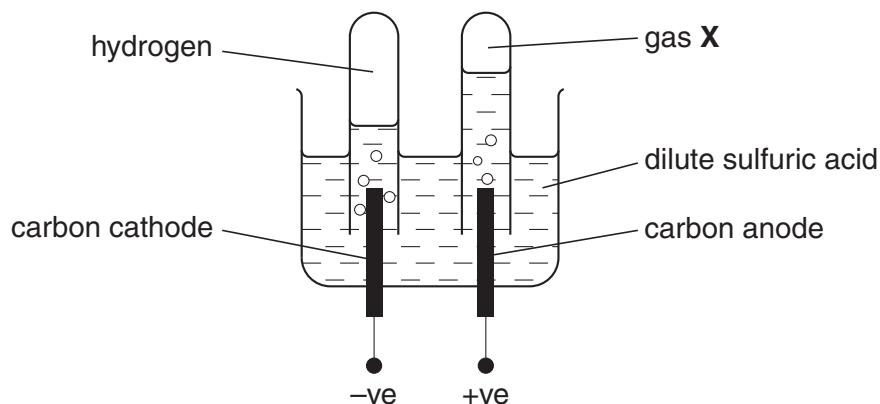
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**Question 14 begins on page 18.**

**PLEASE DO NOT WRITE ON THIS PAGE**

14 Alwin investigates the electrolysis of dilute sulfuric acid.

Look at the apparatus he uses.



(a) Look at the list. It shows the particles in dilute sulfuric acid.



Choose a particle which is an anion and attracted to the carbon anode.

Choose from the list.

answer .....

[1]

19

(b) The electrolysis of sulfuric acid makes two gases.

One gas is hydrogen. The other is gas **X**.

Write about how you can test for these two gases.

Include in your answer

- the name of gas **X**
- how you would test for hydrogen and for gas **X**.

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

[3]

[Total: 4]

**END OF QUESTION PAPER**

# The Periodic Table of the Elements

1	2	3	4	5	6	7	0
7 <b>Li</b> lithium 3	9 <b>Be</b> beryllium 4	11 <b>B</b> boron 5	12 <b>C</b> carbon 6	14 <b>N</b> nitrogen 7	16 <b>O</b> oxygen 8	19 <b>F</b> fluorine 9	20 <b>Ne</b> neon 10
23 <b>Na</b> sodium 11	24 <b>Mg</b> magnesium 12	27 <b>Al</b> aluminum 13	28 <b>Si</b> silicon 14	31 <b>P</b> phosphorus 15	32 <b>S</b> sulfur 16	35.5 <b>Cl</b> chlorine 17	40 <b>Ar</b> argon 18
39 <b>K</b> potassium 19	40 <b>Ca</b> calcium 20	45 <b>Sc</b> scandium 21	48 <b>Ti</b> titanium 22	51 <b>V</b> vanadium 23	52 <b>Cr</b> chromium 24	55 <b>Mn</b> manganese 25	56 <b>Fe</b> iron 26
85 <b>Rb</b> rubidium 37	88 <b>Sr</b> strontium 38	89 <b>Y</b> yttrium 39	91 <b>Nb</b> niobium 41	93 <b>Zr</b> zirconium 40	96 <b>Mo</b> molybdenum 42	[98] <b>Tc</b> technetium 43	101 <b>Ru</b> ruthenium 44
133 <b>Cs</b> caesium 55	137 <b>Ba</b> barium 56	139 <b>La*</b> lanthanum 57	178 <b>Hf</b> hafnium 72	181 <b>Ta</b> tantalum 73	184 <b>W</b> tungsten 74	186 <b>Re</b> rhenium 75	190 <b>Os</b> osmium 76
[223] <b>Fr</b> francium 87	[226] <b>Ra</b> radium 88	[227] <b>Ac*</b> actinium 89	[261] <b>Rf</b> rutherfordium 104	[262] <b>Db</b> dubnium 105	[264] <b>Sg</b> seaborgium 106	[277] <b>Hs</b> hassium 107	[268] <b>Mt</b> meitnerium 109
						[271] <b>Ds</b> darmstadtium 110	[272] <b>Rg</b> roentgenium 111

Elements with atomic numbers 112-116 have been reported but not fully authenticated