OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

B623/01

GATEWAY SCIENCE

ADDITIONAL SCIENCE B

Unit 1 Modules B3 C3 P3 (Foundation Tier)

WEDNESDAY 21 MAY 2008

Afternoon
Time: 1 hour

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

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

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 **60**.
*   A list of physics equations is printed on page two.
*   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.

2

EQUATIONS

$$\text{speed} = \frac{\text{distance}}{\text{time taken}}$$

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

$$\text{force} = \text{mass} \times \text{acceleration}$$

$$\text{work done} = \text{force} \times \text{distance}$$

$$\text{power} = \frac{\text{work done}}{\text{time}}$$

$$\text{resistance} = \frac{\text{voltage}}{\text{current}}$$

3

Answer **all** the questions.

Section A – Module B3

1 **(a)** The diagram shows a fertilised egg cell.
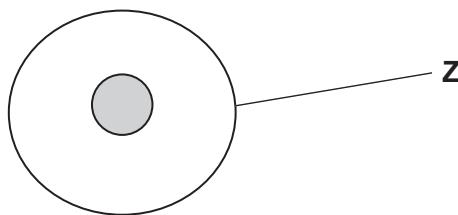
(i) Which part of the cell contains chromosomes?

Show your answer by drawing an **X** on the diagram. [1]

(ii) What is the name of part **Z**?

Put a ring around the correct answer.

cell membrane

cell wall

chloroplast

cytoplasm

mitochondria

vacuole

[1]

(iii) The egg cell has been fertilised.

What does **fertilisation** mean?

....

.... [2]

[Turn over for the remainder of question 1

4

(b) Katy is 2 years old.

The table shows how her mass changed as she grew.

age in months	0	3	6	9	12	15	18	21	24
mass in kg	2.6	5.1	6.5	7.6	8.9	9.7	9.9	10.1	10.2

(i) Use the data in the table to complete the graph.

Finish the graph by drawing the best curve through the points.
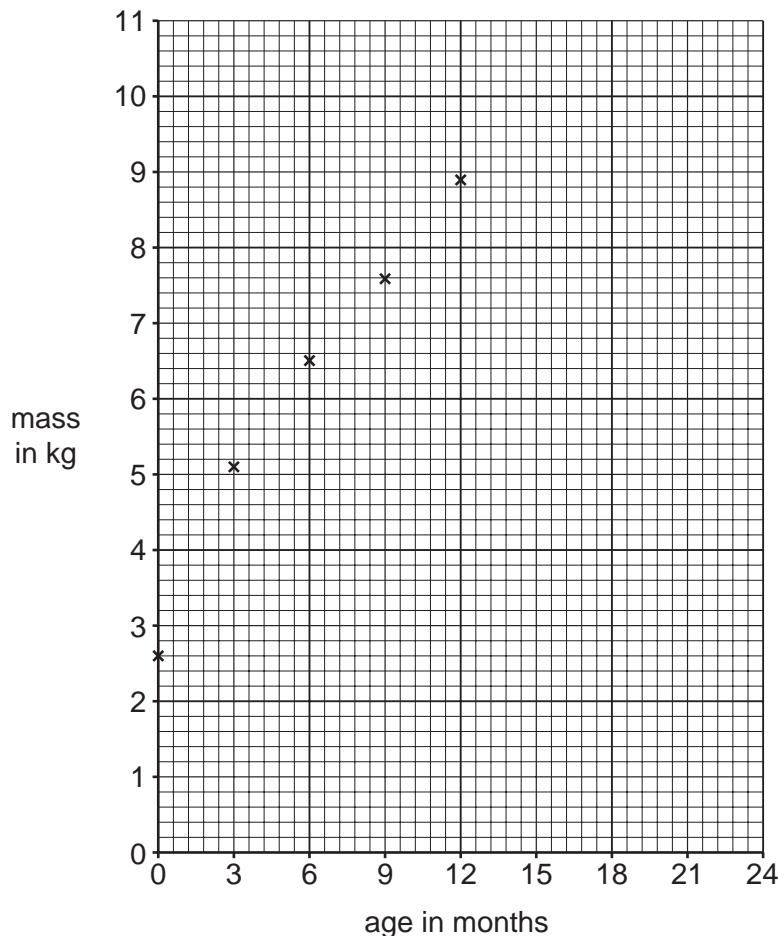
[2]

(ii) What phase of growth does the graph show?

Put a ring around the correct answer.

adolescence

childhood

infancy

maturity

old age

[1]

[Total: 7]

5

2   This question is about the blood system.

   (a) Complete the following sentences about some of the different substances blood carries around the body.

Oxygen enters the blood in the .... and leaves in the body tissues.

Food enters the blood in the .... and leaves in the body tissues.

                                                    [2]

   (b) The diagram shows the heart.
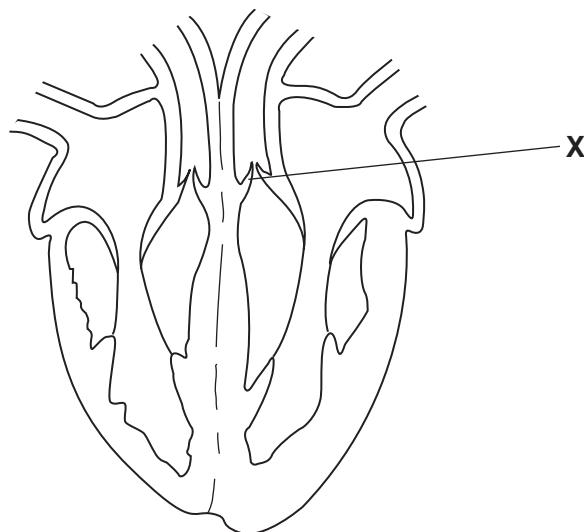
     (i) What is the job of the heart?

.... [1]

    (ii) Part **X** is a valve.

Write down the name of part **X**.

.... [1]

  (iii) Bob has a problem with his heart.
One of the valves is **not** working properly.

This affects how his heart works.
Suggest how.

....

.... [1]

  (iv) Suggest how doctors can cure Bob's heart problem.

.... [1]

[Total: 6]

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[Turn over

3 Doug grows strawberries.

The diagram shows one of his strawberry plants.

(a) When strawberry plants photosynthesise, carbon dioxide enters the plant.

   (i) Which part of the plant does carbon dioxide enter?

      Choose your answer from the diagram.

      .... [1]

   (ii) Write down the name of the process by which carbon dioxide enters the plant.

      .... [1]

(b) **(i)** Doug's strawberry plants can reproduce **asexually**.

      Describe how they do this.

      You may draw on and label the diagram to help you answer.

      ....

      ....

      .... [2]

   (ii) Doug can also grow new strawberry plants from seeds instead of letting them reproduce asexually.

      Suggest **one disadvantage** of growing new strawberry plants from seeds.

      ....

      .... [1]

7

(c) Strawberry plant roots grow downwards.

This is controlled by a plant hormone.

(i) Look at the list. Which one of the processes is also controlled by a plant hormone?

Put a tick (✓) in the box next to the correct answer.

disease resistance ☐

fruit ripening ☐

photosynthesis ☐

respiration ☐

[1]

(ii) Roots grow downwards.

What stimulus are they responding to?

Put a ⬭ring around the correct answer.

carbon dioxide

gravity

oxygen

low temperature

minerals

[1]

[Total: 7]

[Turn over

Section B – Module C3

4 This question is about the elements in the Periodic Table.

Look at the list of elements.

boron	**bromine**
carbon	**copper**
gold	**magnesium**
neon	**oxygen**
potassium	**sodium**

Answer the questions.

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

Each element can be used **once**, **more than once** or **not at all**.

The Periodic Table on the back page may help you.

(a) Write down the **name** of the element with an atomic number of 79.

.... [1]

(b) Write down the **name** of an element in Group 7.

.... [1]

(c) Copper carbonate has the formula $CuCO_3$.

Write down the **names** of the elements in copper carbonate.

.... [1]

(d) One element gives a yellow colour to the flame during a flame test.

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

.... [1]

(e) Write down the **name** of an element in the same **group** as aluminium.

.... [1]

(f) Write down the **name** of an element in the same **period** as aluminium.

.... [1]

[Total: 6]

5 This question is about the extraction of aluminium.

(a) Aluminium is extracted from a mineral.

What is the name of this mineral?

Choose from the list.

bauxite

haematite

limestone

rock salt

answer .... [1]

(b) Look at the diagram. It shows how aluminium is extracted using **electrolysis**.
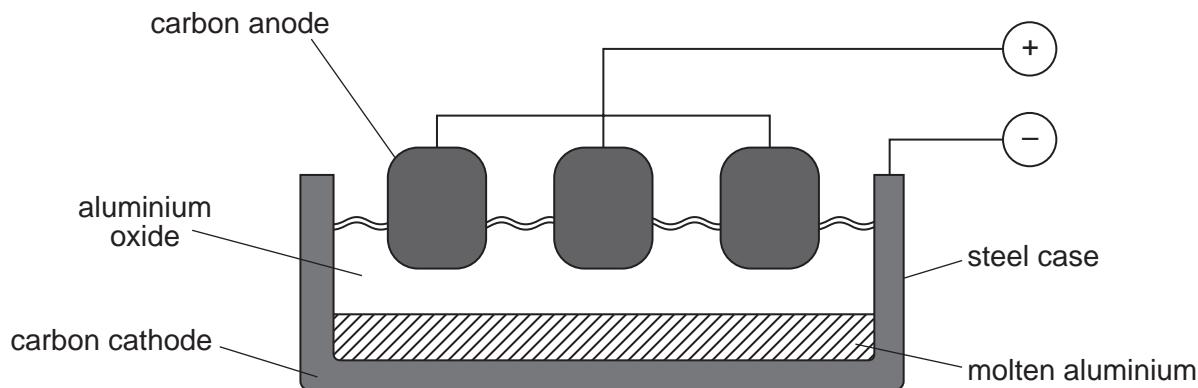
(i) Complete the sentence about electrolysis.

Electrolysis is the decomposition of a liquid using .... [1]

(ii) Complete the table to show what is made at the two electrodes.

electrode	product
anode (positive electrode)	oxygen
cathode (negative electrode)	....

[1]

(iii) The anodes are made of carbon.

They are gradually worn away.

Explain why.

....

.... [1]

[Total: 4]

[Turn over

6 This question is about metals.

Copper and iron are metals.

Metals are good conductors of electricity.

This is a physical property.

(a) Write about **other** physical properties of metals.

....

....

.... [2]

(b) Zoe is choosing a metal to make the bottom of a saucepan.

Write down **one** property a metal must have to be useful for making the bottom of a saucepan.

.... [1]

(c) Metals are good conductors of electricity.

Some metals can be **superconductors**.

Write down **one** advantage of using superconductors.

.... [1]

[Total: 4]

7 The formula for zinc carbonate is $ZnCO_3$.

(a) How many **elements** are combined together in zinc carbonate?

.... [1]

(b) How many **oxygen** atoms are there in the formula $ZnCO_3$?

.... [1]

[Total: 2]

8 This question is about transition elements.

(a) The compounds of the transition elements are often coloured.

Match each transition element to the usual colour of its compounds.

One has been done for you.

transition element	colour of compound
copper	orange/brown
iron(II)	blue
iron(III)	light green

[1]

(b) Roy is investigating the thermal decomposition of copper carbonate.

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

copper carbonate
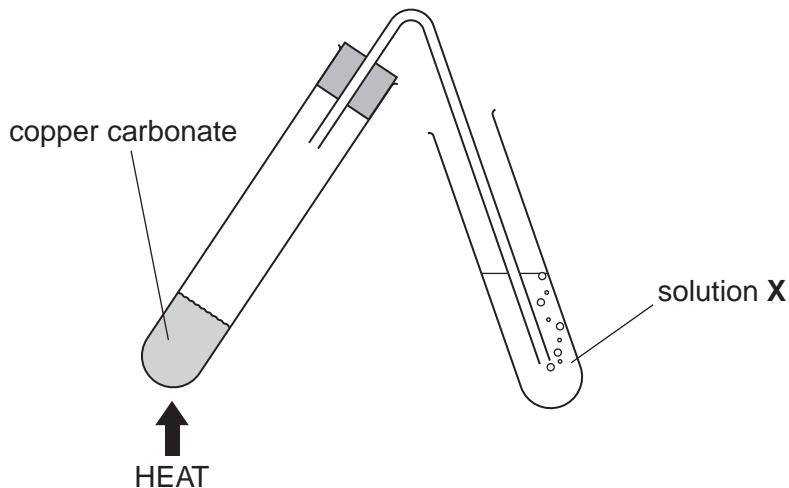
solution **X**

HEAT

(i) Solution **X** is used to test for carbon dioxide.

Write about how Roy tests for carbon dioxide.

....

....

.... [2]

**(ii)** When copper carbonate is heated, copper oxide and carbon dioxide are made.

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

.... [1]

[Total: 4]

[Turn over

12

Section C – Module P3

9 We use **fossil fuels** to power our cars.
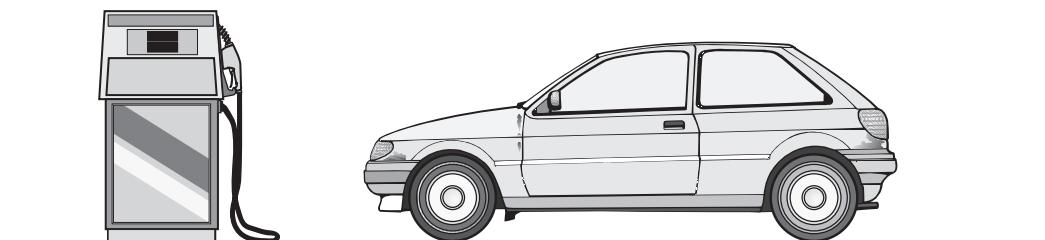
(a) What are the two main fossil fuels used in cars?

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

(b) Look at the information on fuel consumption.

vehicle	fuel consumption in kilometres per litre
A	6
B	10
C	5
D	8

Which vehicle has the **best** fuel consumption?

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

answer .... [1]

(c) We can use **electric** powered cars.

Electric cars do not have a fuel tank to store energy.

How do electric cars store energy?

....

... [1]

[Total: 4]

10 Look at the distance-time graphs for the four cars.
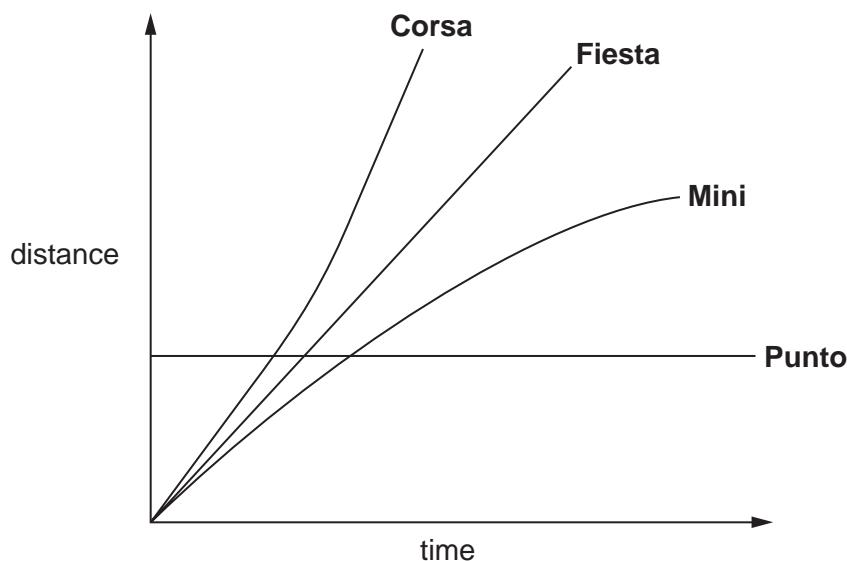
(a) Which car is **stationary**?

Choose from the list.

        Corsa   **Fiesta**   **Mini**   **Punto**

answer .... [1]

(b) Which car moves at a **steady speed**?

Choose from the list.

        Corsa   **Fiesta**   **Mini**   **Punto**

answer .... [1]

(c) Which car has the **highest speed**?

Choose from the list.

        Corsa   **Fiesta**   **Mini**   **Punto**

answer .... [1]

[Total: 3]

[Turn over

11 This question is about force and motion.

(a) Look at the information in the diagrams.

The cars have the **same** mass.

They have **different** driving forces.

400 N ← **A**

500 N ← **B**

600 N ← **C**
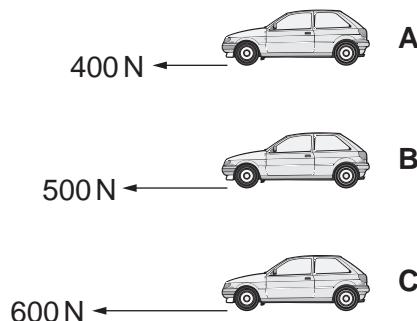
Which car has the **highest** acceleration?

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

answer .... [1]

(b) Look at the information in the diagrams.

The vehicles have the **same** driving force.

They have **different** masses.

400 N ← **900 kg Ford**

400 N ← **600 kg Citroen**
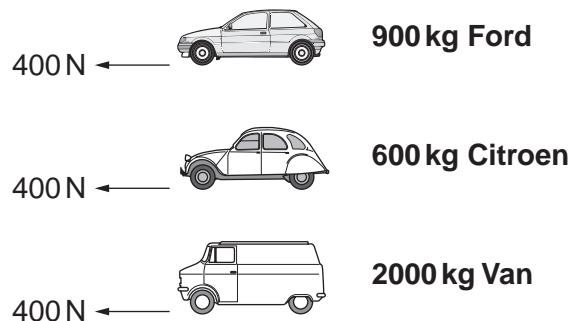
400 N ← **2000 kg Van**

Which vehicle has the **highest** acceleration?

Choose from the list.

900 kg Ford   **600 kg Citroen**   **2000 kg Van**

answer .... [1]

15

(c) Look at the information in the diagram.
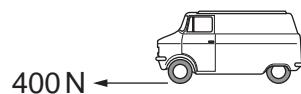
400 N ←

The van moves a distance of 125 m.

The force on the van is 400 N.

Calculate the work done on the van.

The equations on page 2 may help you.

....

....

answer .... J   [2]

[Total: 4]

12 Look at the information on stopping distance.

| thinking distance 21 m | braking distance 75 m |
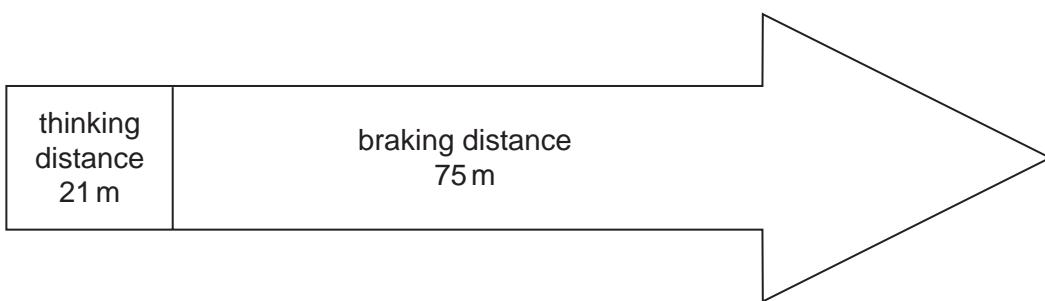
(a) Calculate the total **stopping distance** at this speed.

....

answer .... m [1]

(b) The **thinking distance** at this speed is 21 m.

(i) What does thinking distance mean?

....

....

.... [2]

(ii) Write down **two** things that can **increase** thinking distance.

1 ....

2 .... [2]

(c) Bald tyres and poor brakes can increase **braking distance**.

Write down **one** other thing that can increase **braking distance**.

.... [1]

[Total: 6]

13 Jane has a parachute.

She jumps from an aeroplane.

(a) Her speed increases.
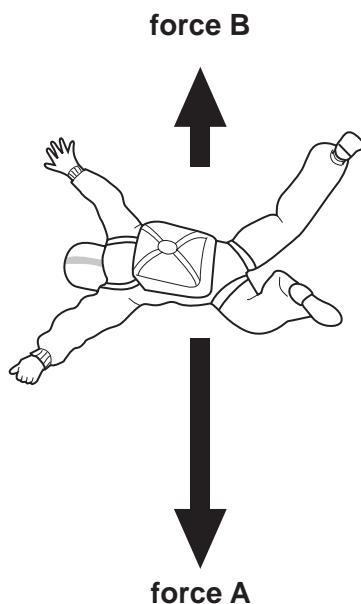
force B

force A

   (i) **Force A** pulls her down towards the Earth.

   What is the name of this force?

   .... [1]

   (ii) An upward **force B** slows her down.

   What is the name of this force?

   .... [1]

[Turn over for the remainder of question 13

(b) Jane opens her parachute. Her speed reduces quickly.
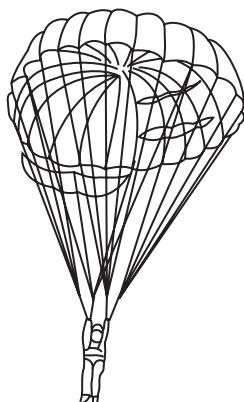
Parachutes would **not** work on the **Moon**.

Explain why.

....

.... [1]

[Total: 3]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE

The Periodic Table of the Elements

20

Key

| relative atomic mass |
| atomic symbol |
| name |
| atomic (proton) number |

Example:
- 1
- H
- hydrogen
- 1

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

* 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.

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