Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Monday 19 May 2025

Morning (Time: 1 hour 10 minutes)

Paper reference **1SC0/1CF**

Combined Science

PAPER 2

Foundation Tier

You must have:
Calculator, ruler, Periodic Table (enclosed)

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution**.

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- In questions marked with an **asterisk** (*), marks will be awarded for your ability to structure your answer logically, showing how the points that you make are related or follow on from each other where appropriate.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 7 5 5 1 2 R R A 0 1 2 0

Pearson

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 A student investigates the reaction that occurs when zinc carbonate is heated.

Figure 1 shows the apparatus the student uses.

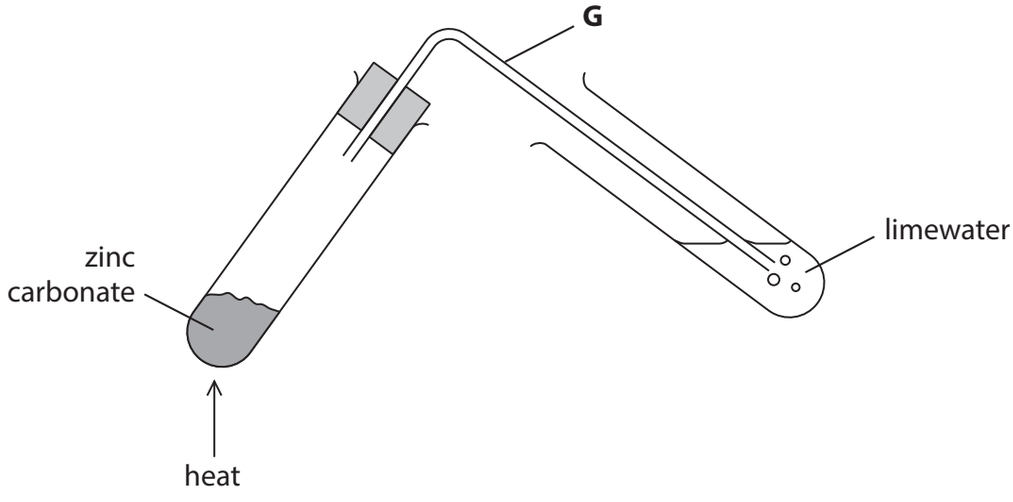

Figure 1

(a) What is the name of the piece of apparatus labelled **G** in Figure 1?

(1)

☒ **A** testing tube

☒ **B** heating tube

☒ **C** delivery tube

☒ **D** boiling tube

(b) State what apparatus should be used to heat the zinc carbonate in Figure 1.

(1)

.....

(c) The word equation for the reaction that occurs when zinc carbonate is heated is

zinc carbonate → zinc oxide + carbon dioxide

The carbon dioxide bubbles through the limewater.

State what is seen when carbon dioxide bubbles through the limewater.

(1)

.....

(d) Another student investigates the change in mass that takes place when zinc carbonate is heated.

(i) Figure 2 shows the results the student records at the start of the investigation.

mass of empty test tube	14.62 g
mass of test tube + zinc carbonate	17.83 g

Figure 2

Using the results in Figure 2, calculate the mass of zinc carbonate in the test tube.

(1)

.....

mass of zinc carbonate = ... g

(ii) The student then

- heats the test tube containing the zinc carbonate for five minutes
- places the hot test tube on a bench mat to cool
- finds the mass of the test tube and contents.

Describe what the student should do next to make sure that all the zinc carbonate has reacted completely.

(2)

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(Total for Question 1 = 6 marks)

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2 (a) Figure 3 shows the changes of state between ice, water and steam.

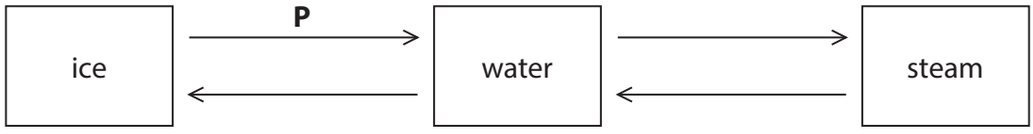


Figure 3

(i) What is the name of the change of state labelled **P** in Figure 3?

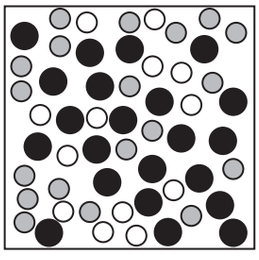
(1)

- ☒ **A** evaporating
- ☒ **B** freezing
- ☒ **C** melting
- ☒ **D** subliming

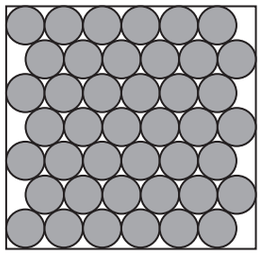
(ii) Which of the following shows the arrangement of particles in ice?

(1)

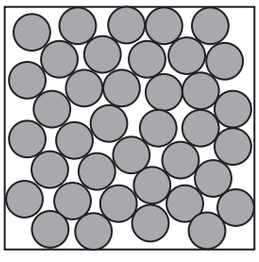
☒ **A**



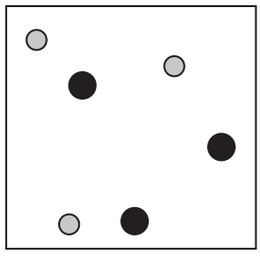
☒ **B**



☒ **C**



☒ **D**



(b) Figure 4 shows the apparatus that can be used to separate a mixture of ethanol and water by fractional distillation.

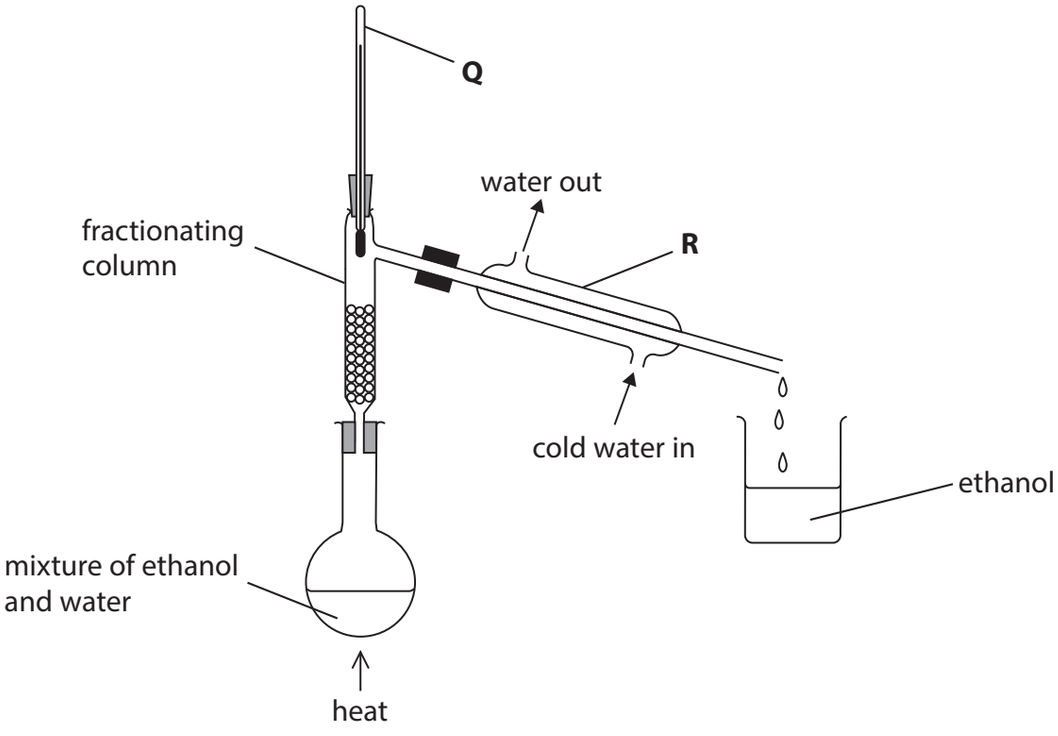


Figure 4

(i) Name the piece of apparatus labelled **R** in Figure 4.

(1)

.....

(ii) Explain the purpose of the piece of apparatus labelled **Q** in Figure 4.

(2)

.....

.....

.....

.....

(c) A student investigates the food dyes used to make the colours **W**, **X**, **Y** and **Z** in four different sweets.

Figure 5 shows the chromatogram produced.

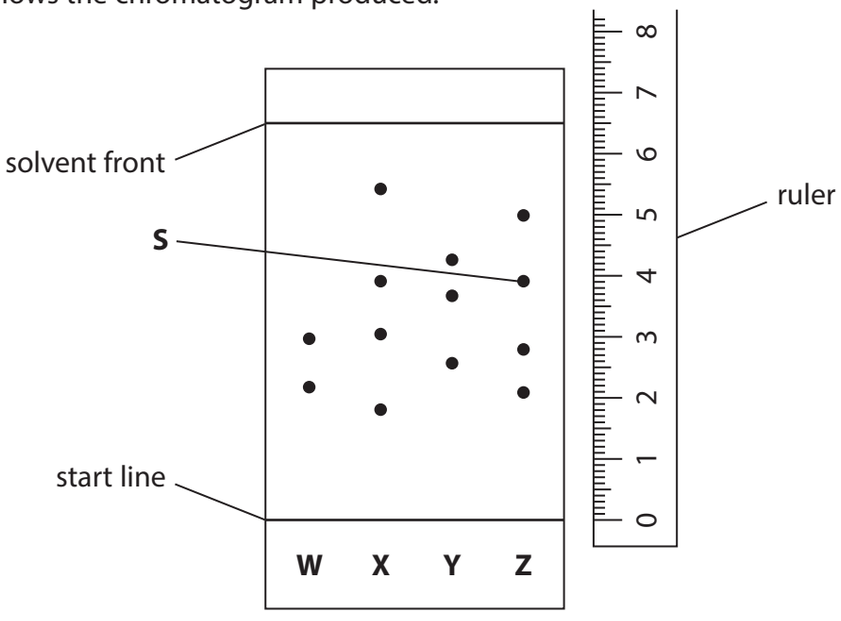


Figure 5

The solvent front shows how far the solvent moves during the investigation.

(i) Using the information in Figure 5, state which colour is made of only two food dyes.

(1)

.....

(ii) The R_f value of a spot on the chromatogram can be calculated using the equation

$$R_f = \frac{\text{distance moved by the food dye}}{\text{distance moved by solvent front}}$$

Using the information in Figure 5, calculate the R_f value of the food dye labelled **S**.

Give your answer to 2 decimal places.

(3)

.....

.....

.....

.....

R_f value of food dye **S** = ...

(Total for Question 2 = 9 marks)

3 This question is about metals and their reactions with acids.

(a) Place ticks (✓) in boxes to show which elements in the table are metals.

Use the periodic table to help you answer this question.

(2)

element	(✓)
phosphorus, P	
rubidium, Rb	
rhodium, Rh	
strontium, Sr	
tellurium, Te	

(b) Three equal sized pieces of the metals **E**, **F**, **G** and **H** are put into separate test tubes containing equal volumes of dilute sulfuric acid.

The results in Figure 6 show the test tubes after half a minute.

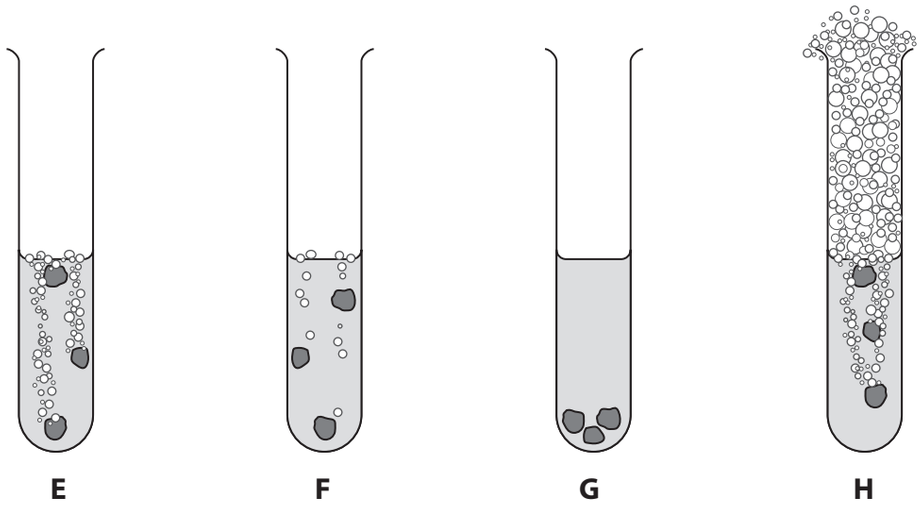


Figure 6

(i) Arrange the metals **E**, **F**, **G** and **H** in order of reactivity.

(2)

metal	
	most reactive
	least reactive

(ii) The bubbles that form are hydrogen.

Which row of the table shows the test and result that confirm the gas is hydrogen?

(1)

		test	result
☒	**A**	put a glowing splint into the gas	the splint relights
☒	**B**	put a lighted splint into the gas	the gas ignites with a squeaky pop
☒	**C**	test the gas with damp litmus paper	the litmus paper turns pink
☒	**D**	test the gas with damp litmus paper	the litmus paper turns white

(c) When zinc reacts with very dilute nitric acid, zinc nitrate is formed.

(i) The formula of zinc nitrate is $Zn(NO_3)_2$

Calculate the relative formula mass of zinc nitrate, $Zn(NO_3)_2$

(relative atomic masses: Zn = 65, N = 14, O = 16)

(2)

.....

.....

.....

relative formula mass = ...

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(ii) A student investigates the reaction between a metal and a dilute acid using the apparatus shown in Figure 7.

Cotton wool is placed in the top of the apparatus as shown, to stop any acid from spraying out.

The total mass of the apparatus is shown at the start of the reaction and after the reaction has ended.

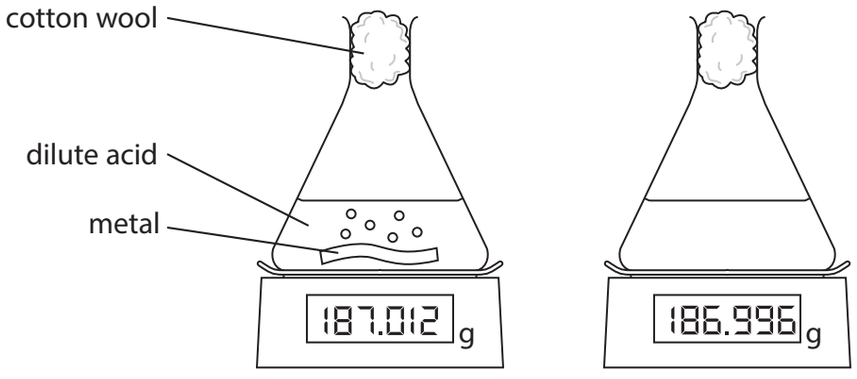

Figure 7

State **two** ways the student would know that the reaction has ended.

(2)

1 .....

.....

2 .....

.....

(Total for Question 3 = 9 marks)

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4 Figure 8 shows part of the reactivity series of metals.

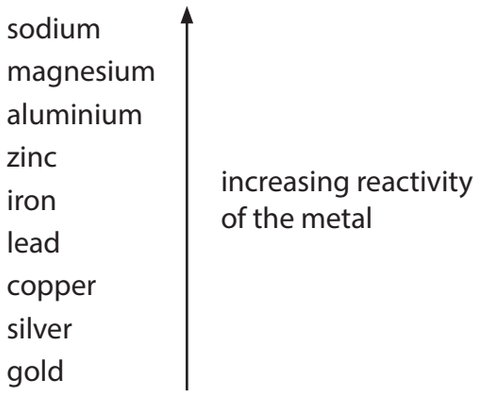

Figure 8

(a) The method used to extract a metal from its ore is related to the metal's position in the reactivity series.

(i) Which metal is found in the Earth's crust as an uncombined element?

(1)

- ☒ **A** aluminium
- ☒ **B** gold
- ☒ **C** lead
- ☒ **D** sodium

(ii) Name **one** metal in Figure 8 that is normally extracted by electrolysis.

(1)

.....

(b) 25 000 kg of an ore of iron was found to contain 10 050 kg of iron.

Calculate the percentage of iron in this ore of iron.

$$\text{percentage of metal} = \frac{\text{mass of metal}}{\text{mass of metal ore}} \times 100$$

(2)

.....

.....

percentage of iron in ore = ...

(c) When copper oxide is heated with carbon, the products are copper and carbon dioxide.

(i) Write the word equation for this reaction.

(1)

.....

(ii) In this reaction, copper oxide loses oxygen.

State the type of reaction when copper oxide loses oxygen.

(1)

.....

(iii) In one reaction, 159.0 g of copper oxide was heated with excess carbon to produce 127.0 g of copper.

Use this information to calculate the mass of copper formed, in g, when 238.5 g of copper oxide is reacted with excess carbon.

(2)

.....

.....

mass of copper = ... g

(iv) State why this reaction with copper oxide uses excess carbon.

(1)

.....

.....

(d) A solution of zinc sulfate was made by dissolving 23.8 g of the compound in water and was made up to a total volume of 250 cm^3 with water.

Calculate the concentration of this solution in g dm^{-3}.

$$\text{concentration (g dm}^{-3}\text{)} = \frac{\text{mass of solid (g)}}{\text{volume of solution (dm}^3\text{)}}$$

Give your answer to 2 significant figures.

(3)

.....

.....

concentration = ... g dm^{-3}

(Total for Question 4 = 12 marks)

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5 (a) Atoms of neon are made up of subatomic particles.

(i) Figure 9 shows some information about the subatomic particles in neon atoms.

Complete Figure 9 with the missing information.

(3)

subatomic particle	relative charge	relative mass
proton	.....	1
neutron	0	.....
electron	.....	negligible

Figure 9

(ii) All atoms of neon have an atomic number of 10.

Describe what information about the number of subatomic particles can be obtained from the atomic number of neon.

(2)

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.....

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.....

(iii) Explain why atoms of neon are electrically neutral.

(2)

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*(b) The structure of the periodic table and the position of the elements in the periodic table are linked to the electronic configuration of the elements.

Figure 10 shows the structure of the periodic table and the first 12 elements with their atomic numbers.

group

1	2											3	4	5	6	7	0
				H 1													He 2
Li 3	Be 4											B 5	C 6	N 7	O 8	F 9	Ne 10
Na 11	Mg 12											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr

Figure 10

Use the first 12 elements shown in Figure 10 to explain

- how the structure of the periodic table is linked to the electronic configuration of the atoms of the elements
- how the arrangement of the elements is linked to their electronic configuration.

(6)

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(Total for Question 5 = 13 marks)

6 Silver nitrate and potassium chloride are ionic compounds that are soluble in water.

(a) When potassium chloride solution is added to a solution of silver nitrate, a white precipitate forms.

(i) Complete the equation for this reaction, including the missing state symbol.

(2)

$AgNO_3(aq) + KCl(.....) \rightarrow AgCl(s) + ... (aq)$

(ii) Give the name of the white precipitate that forms.

(1)

.....

(iii) State and explain how the white precipitate can be separated from the reaction mixture.

(3)

.....

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.....

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.....

(b) Silver nitrate solution conducts electricity.
Solid silver also conducts electricity.

Describe how silver nitrate solution conducts electricity and how solid silver conducts electricity.

(3)

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.....

(c) A bottle containing an unknown solution is labelled with the two hazard symbols shown in Figure 11.

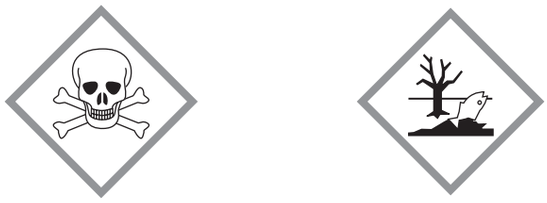

Figure 11

(i) What are the meanings of these two symbols?

(1)

- ☒ **A** flammable and toxic
- ☒ **B** harmful and dangerous to the environment
- ☒ **C** toxic and dangerous to the environment
- ☒ **D** toxic and harmful

(ii) State a safety step that should be taken when using the unknown solution.

(1)

.....

.....

(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS

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Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Monday 19 May 2025

Paper reference 1SC0/1CF

Combined Science

PAPER 2

Foundation Tier

Periodic Table Insert
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P 7 5 5 1 2 R R A

Pearson

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

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

* The elements with atomic numbers from 58 to 71 are omitted from this part of the periodic table.

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