Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

9309334159

SCIENCE **0893/02**

Paper 2 **October 2023**

45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

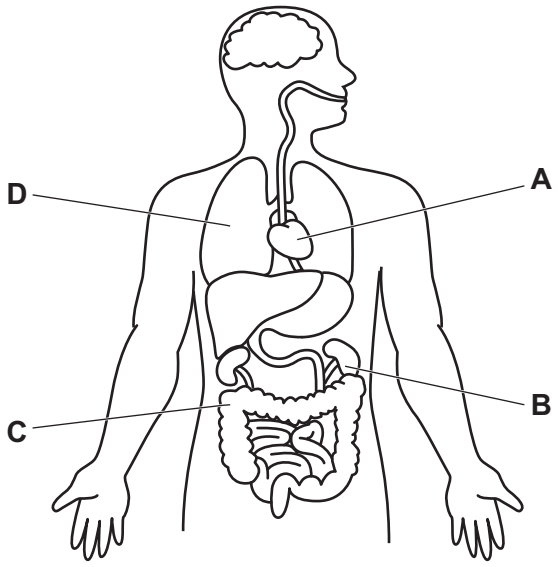
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should show all your working in the booklet.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

1 The diagram shows the position of some organs in the human body.



(a) Circle the letter of the organ that is part of the human excretory (renal) system.

A **B** **C** **D** [1]

(b) Complete these sentences about the human excretory (renal) system.

The function of the human excretory (renal) system is to ..... the blood to remove urea.

The urea is then excreted in a liquid called .....

[2]

(c) Organs are made of cells.

Cells contain chromosomes.

Name the chemical from which chromosomes are made.

..... [1]

2 Look at the elements in Group 1 from the Periodic Table.

The elements are in the same order as the Periodic Table.

element
lithium
sodium
potassium
rubidium
caesium
francium

(a) Describe how the melting points of the Group 1 elements change down the group.

.....

[1]

(b) Name the **most** reactive element in Group 1.

.....

[1]

(c) An element in Group 1 reacts with dilute hydrochloric acid.

Circle the gas made in this reaction.

carbon dioxide

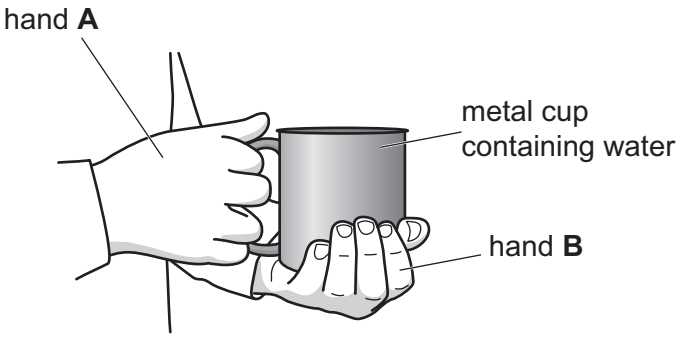
chlorine

hydrogen

oxygen

[1]

3 Mike holds a metal cup containing water.



(a) The water in the metal cup is at a higher temperature than both of his hands.

Describe what happens to the thermal energy in the water.

.....

..... [1]

(b) Mike pours the water out of the metal cup.

He adds ice and water to the metal cup.

Describe what Mike feels with hand **B** compared to hand **A**.

.....

..... [1]

4 The atoms in a molecule of water are joined together by covalent bonds.

(a) What is a covalent bond?

.....

.....

..... [2]

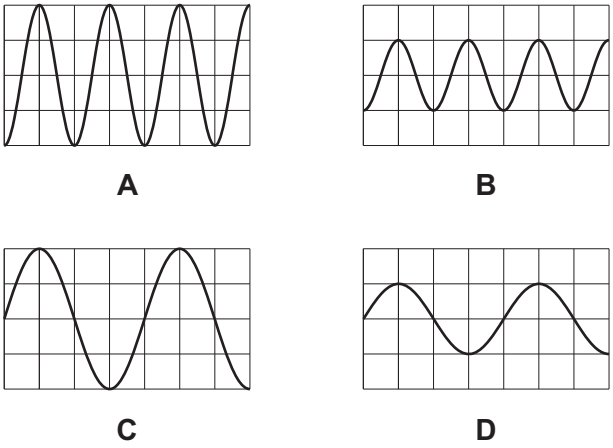
(b) The formula for a molecule of ethane is C_2H_6.

How many atoms are bonded together in one molecule of ethane?

..... [1]

5 Priya compares different sound waveforms.

All the waveforms are drawn to the same scale.



(a) Which **two** waveforms have the **lowest** amplitude?

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

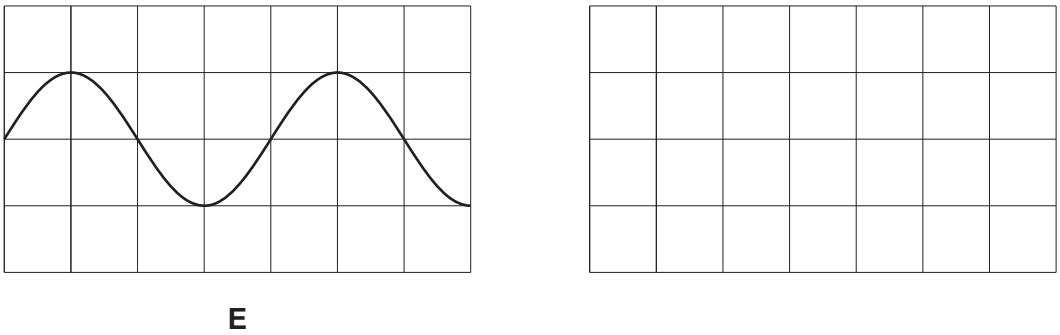
(b) Which **two** waveforms have the **lowest** frequency?

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

(c) Which **two** waveforms have the **highest** pitch?

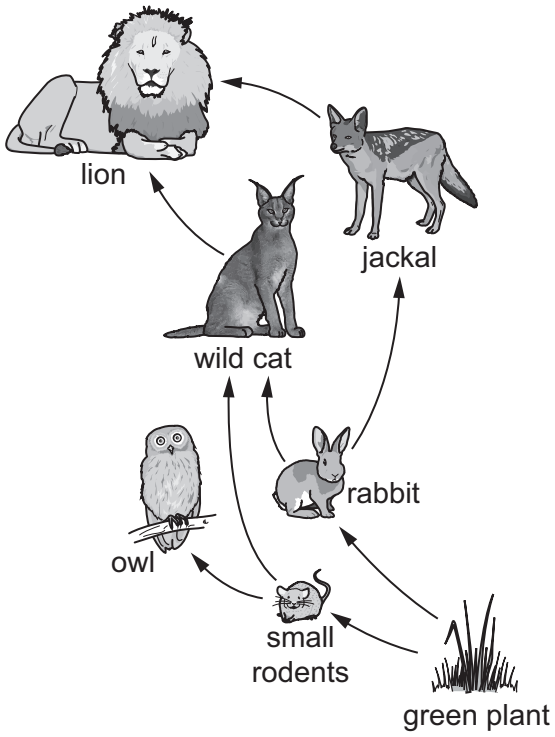
..... and ..... [1]

(d) Draw a waveform on the grid with a **greater** loudness than waveform **E**.



[1]

6 Look at the food web for a habitat.



NOT TO SCALE

(a) A disease decreases the number of small rodents in the habitat.

The number of owls decreases but the number of wild cats stays the same.

Complete the sentences to explain why.

The number of owls decreases because .....

.....

The number of wild cats stays the same because .....

.....

[2]

(b) Explain why green plants need the Sun to survive.

.....

.....

..... [3]

7 An object has volume, mass and density.

The object has a volume of 28 cm^3.

The mass of the object is 222 g.

Calculate the density of the object.

..... g/cm^3 [2]

8 The diagram shows part of the Periodic Table.

1 H							2 He
3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 A*l*	14 Si	15 P	16 S	17 C*l*	18 Ar
19 K	20 Ca						

(a) Which element in the table has the lowest number of protons in its atom?

..... [1]

(b) Identify **two** elements from the table that are in the same period as the element Mg.

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

(c) Name **one** element from the table that has the same chemical properties as the element Ar.

..... [1]

9 Mia is learning about tectonic plates.

She knows that:

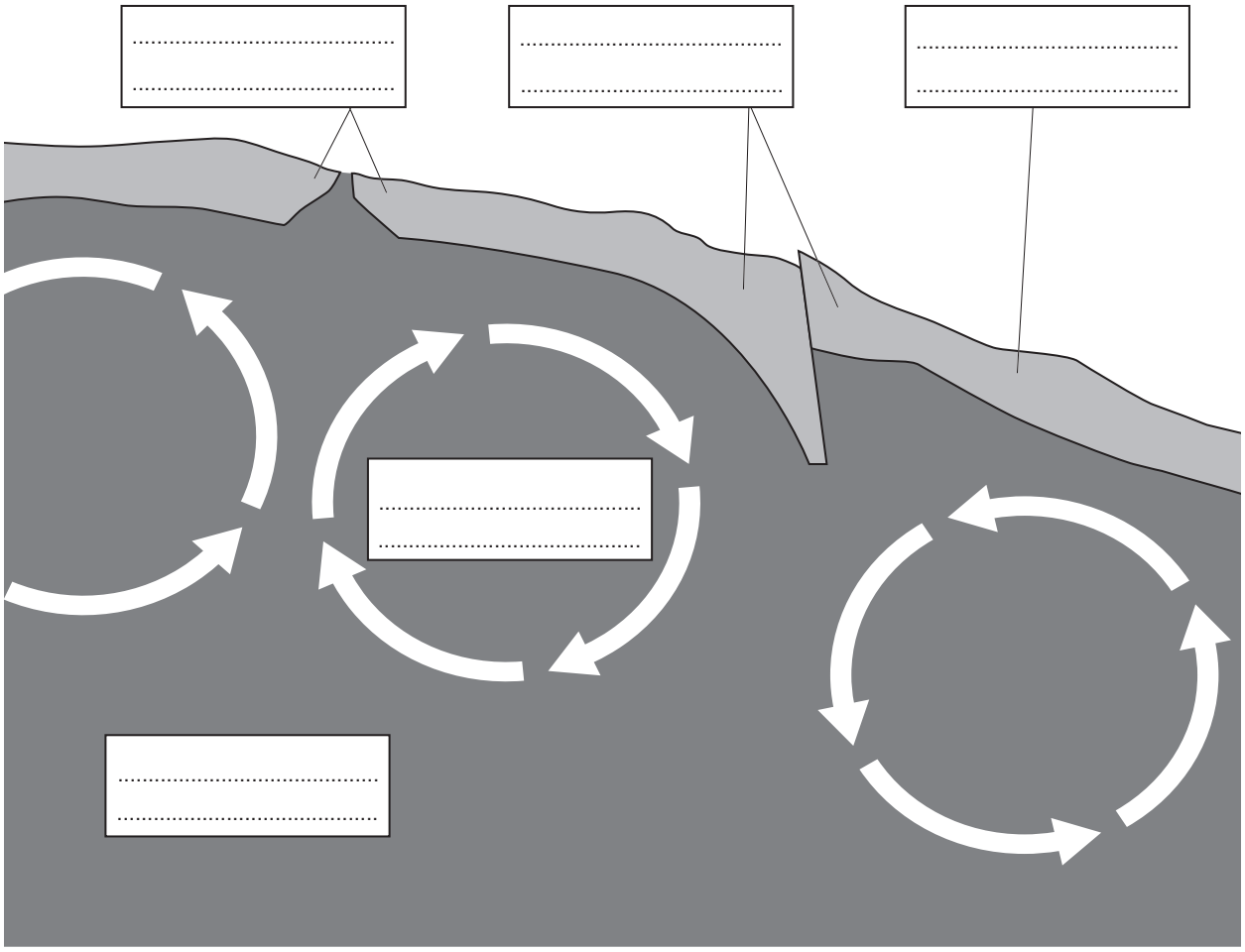
- diverging tectonic plates move away from each other
- converging tectonic plates move towards each other.

(a) Label the diagram.

Choose words from the list.

diverging plates **convection currents** **converging plates**

crust **mantle**



[2]

(b) Mia joins a map of South America to Africa.

Explain why the appearance of the continental coasts is evidence for tectonic plates.

.....

.....

..... [2]

(c) Write down **one other** piece of evidence for tectonic plates.

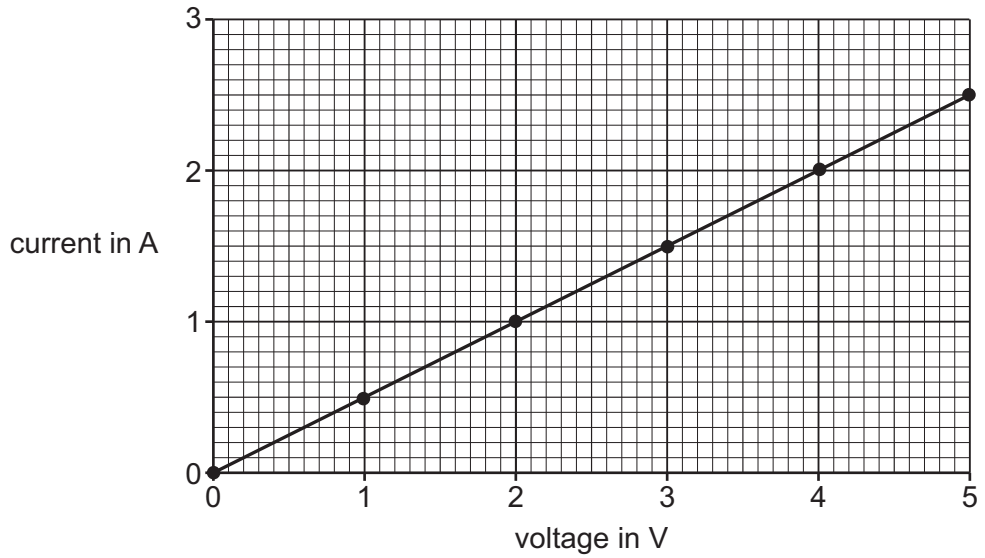
.....

..... [1]

10 Oliver connects a resistor in an electrical circuit.

He measures the current as he increases the voltage across the resistor.

Oliver draws a graph.



(a) Current is measured in A (amps) and voltage is measured in V (volts).

Write down the unit of resistance.

..... [1]

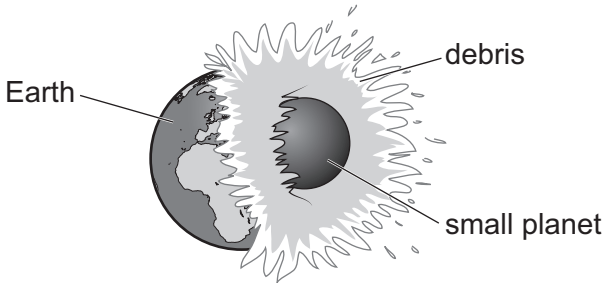
(b) Calculate the resistance of the resistor.

Include the equation used to calculate resistance in your answer.

resistance = ... [2]

11 Scientists believe that the Moon was formed after a collision between the Earth and another small planet.

This is called the collision theory for the formation of the Moon.



The debris from the collision collected to form the Moon.

(a) Chen collects information about the elements found on the Earth and on the Moon.

element	percentage of element found on the	
	Earth	**Moon**
oxygen	45.3	44.7
silicon	22.0	22.5
magnesium	2.6	2.3
iron	6.0	8.3
calcium	3.6	3.1

(i) Most of the information supports the collision theory.

Explain how most of this information supports the collision theory.

.....

..... [1]

(ii) There is a comparison of one element that does **not** support the collision theory.

Write down the name of this element.

..... [1]

(b) Suggest **two other** pieces of evidence Chen collects to support the collision theory.

1 .....

.....

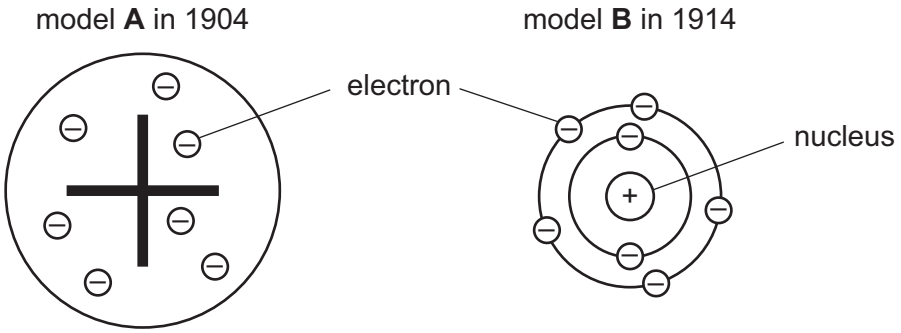
2 .....

.....

[2]

12 Theories about the structure of the atom have developed over time.

Look at the models of an atom of nitrogen.



(a) Describe **one similarity** between model **A** and model **B**.

.....

..... [1]

(b) Describe **one difference** between model **A** and model **B**.

.....

..... [1]

(c) Model **B** is still used today.

Suggest **one strength** and **one limitation** of using model **B**.

strength .....

.....

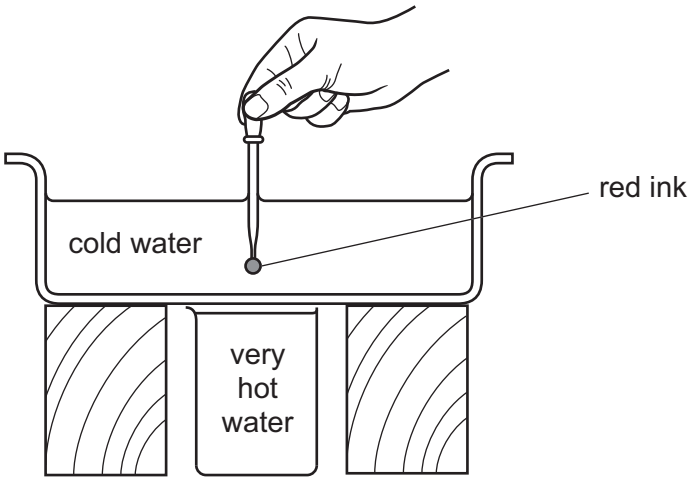
limitation .....

.....

[2]

13 Yuri investigates convection.

He adds a drop of red ink to the cold water as shown in the diagram.



(a) Complete the sentence to suggest a testable hypothesis for **this** investigation.

I predict that the red ink will move .....

because ..... .

[1]

(b) Complete the table about **safety risks** and the **control of risks** in this investigation.

safety risk	control of risk
very hot water may burn skin	....
red ink may irritate skin	....
....	use plastic beaker instead of glass beaker

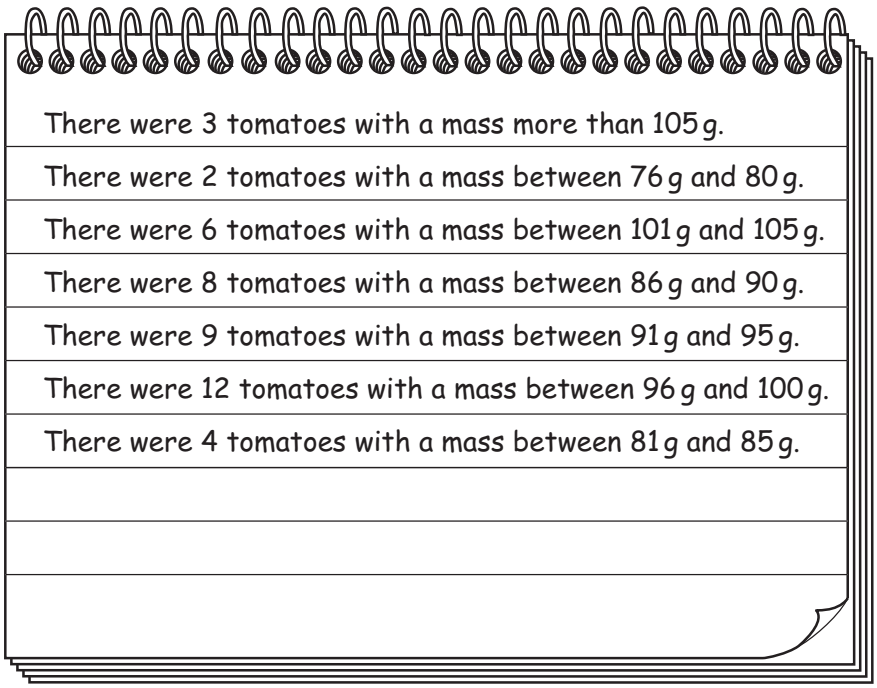
[3]

14 Lily investigates variation in tomatoes.

Lily:

- measures the mass of different tomatoes to the nearest whole gram
- classifies the tomatoes into different groups based on their masses.

Lily writes about her results.



(a) (i) Complete the table of results by writing the:

- unit for the mass range
- number of tomatoes in each mass range.

mass range in …….	**number of tomatoes in mass range**
76 – 80	**…….**
81 – 85	**…….**
86 – 90	**…….**
91 – 95	**…….**
96 – 100	**…….**
101 – 105	**…….**
more than 105	**…….**

[2]

(ii) What is the best way to present the data in the table?

.....

[1]

(b) Gardeners add nitrates to the soil to help tomato plants grow.

The nitrates are used by the plants to make a substance needed for growth.

Name this type of substance.

.....

[1]

The Periodic Table of Elements

Group																	
1	2											3	4	5	6	7	8
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –