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Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/23**

Paper 1 Multiple Choice (Extended) **May/June 2019**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

8109103470

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 16.
Electronic calculators may be used.

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1 Which row has a correct structural adaptation for red blood cells and some of the cells lining the trachea?

	red blood cells	cells lining the trachea
A	nucleus absent	has cilia
B	nucleus present	has cilia
C	nucleus absent	large surface area
D	nucleus present	large surface area

2 A student is reading a text book. He finds the following definition about how substances move in and out of cells.

> The net movement of water molecules from a region of higher water potential to a region of lower water potential through a partially permeable membrane is called

The corner of the page has been torn.

What is the missing word at the end of the sentence?

A diffusion

B dissolving

C evaporation

D osmosis

3 The enzyme salivary amylase starts digesting starchy foods in the mouth.

This stops when the food reaches the stomach.

Why does this happen?

A The acid in the stomach slows down all reactions.

B The shape of the active site of the enzyme is altered by the low pH.

C The kinetic energy of molecules is reduced by acids.

D The shape of the substrate molecules is changed.

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4 Which condition is caused by a lack of vitamin C in the diet?

A breathlessness

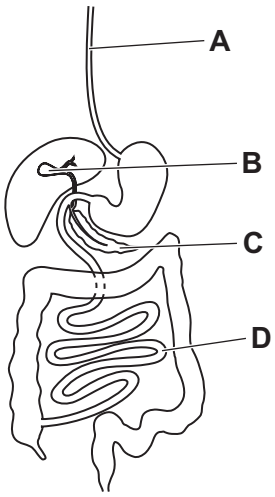
B rickets

C scurvy

D constipation

5 The diagram shows the alimentary canal and some associated organs.

In which structure is bile stored?



6 Physical activity affects our rate and depth of breathing.

What happens during **increased** physical activity?

	rate of breathing	depth of breathing
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

7 Which substances are used and produced during photosynthesis?

	substances used	substances produced
A	carbon dioxide and glucose	oxygen and water
B	carbon dioxide and water	glucose and oxygen
C	glucose and oxygen	carbon dioxide and water
D	oxygen and water	carbon dioxide and glucose

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8 How does adrenaline affect blood glucose concentration and pulse rate?

	blood glucose concentration	pulse rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

9 Diagram 1 shows a germinating bean seed placed horizontally.

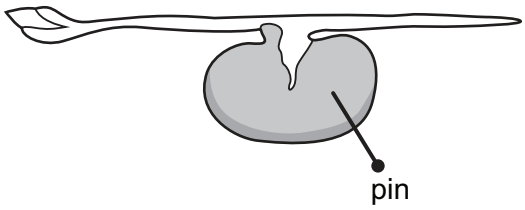

diagram 1

Diagram 2 shows the same seed after three days. The shoot has grown upwards because of the action of an auxin.

Where is the auxin produced?

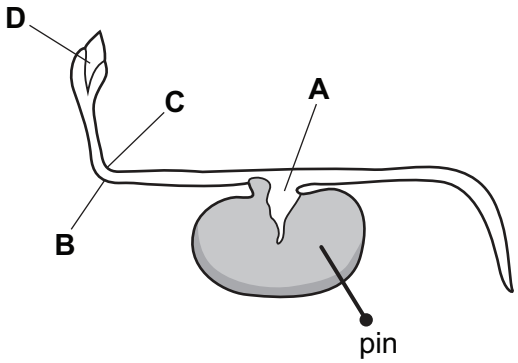

diagram 2

10 What are the features of sexual reproduction?

	fusion of nuclei	nature of offspring
A	no	genetically dissimilar
B	yes	genetically identical
C	no	genetically identical
D	yes	genetically dissimilar

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11 Which process is the transfer of pollen grains from the anther to the stigma?

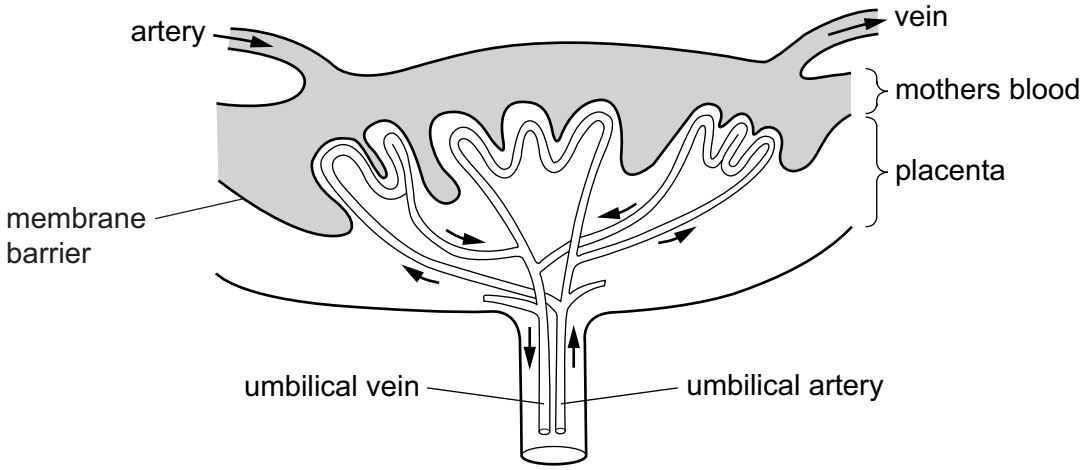
A fertilisation

B germination

C pollination

D transpiration

12 The diagram shows part of a placenta.



Why do nutrients in the mother's blood enter the blood in the umbilical vein?

A A net movement of nutrient particles occurs from a region of high concentration to a lower concentration.

B Nutrients move from a region of higher water potential to a region of lower water potential.

C Pressure in the maternal blood forces nutrients into the umbilical vein.

D The nutrients travel into the umbilical vein, across a partially permeable membrane by osmosis.

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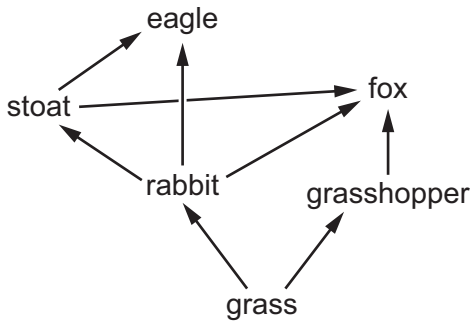
13 The diagram shows a food web.



Which type of organism is **not** represented in this food web?

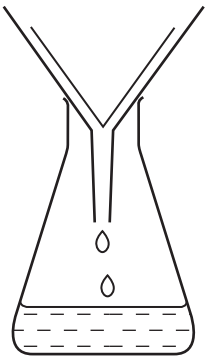
A carnivore

B consumer

C decomposer

D herbivore

14 The diagram shows apparatus used for filtration.



Why can sugar and salt **not** be separated by using this apparatus?

A They are both compounds.

B They are both white.

C They both dissolve in water.

D They both have the same size particles.

15 Which description of the named substance is correct?

	substance	element or mixture
A	air	mixture
B	brass	element
C	carbon dioxide	element
D	hydrogen chloride	mixture

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16 Which statement explains why sodium chloride has a much higher melting point than carbon dioxide?

A Ionic bonding is weaker than covalent bonding.

B Ionic bonding is stronger than covalent bonding.

C The attractive forces between ions are stronger than the attractive forces between molecules.

D The attractive forces between ions are weaker than the attractive forces between molecules.

17 Molten sodium chloride is electrolysed.

What are the products at the electrodes?

	product at anode	product at cathode
A	chlorine	hydrogen
B	chlorine	sodium
C	hydrogen	chlorine
D	sodium	chlorine

18 Zinc reacts with excess dilute sulfuric acid to form hydrogen gas.

Copper sulfate can act as a catalyst for this reaction.

Which statement is **not** correct?

A If more concentrated sulfuric acid is used the rate of the reaction increases.

B If the temperature is increased it takes less time for the zinc to react completely.

C Larger pieces of zinc produce more hydrogen every ten seconds than the same mass of powdered zinc.

D When copper sulfate is added to the mixture more hydrogen is formed every second.

19 Magnesium reacts with zinc oxide to make magnesium oxide and zinc.

Which substance is the oxidising agent in this reaction?

A magnesium

B magnesium oxide

C zinc

D zinc oxide

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20 Which aqueous ion gives a white precipitate with aqueous sodium hydroxide and with aqueous ammonia?

A Cu^{2+} **B** Fe^{2+} **C** Fe^{3+} **D** Zn^{2+}

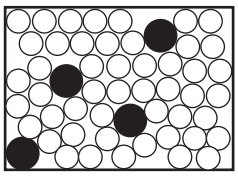
21 An element has the electronic structure 2,8,1.

Which row describes this element?

	group number in the Periodic Table	metal / non-metal
A	I	metal
B	I	non-metal
C	II	metal
D	II	non-metal

22 Which diagram represents an alloy?

A



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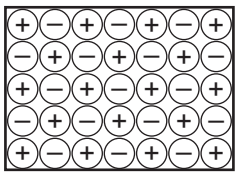

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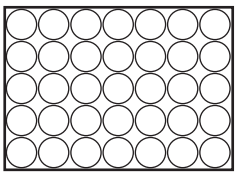

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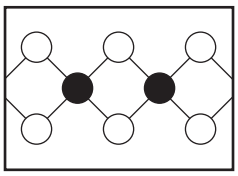

23 In which mixture does the metal displace the aqueous metal ion?

A copper and magnesium sulfate solution

B iron and zinc sulfate solution

C magnesium and copper sulfate solution

D zinc and magnesium sulfate solution

24 Which statement about water is **not** correct?

A A water molecule consists of three atoms covalently bonded together.

B The water supply is treated with chlorine to kill the bacteria in it.

C Water changes the colour of cobalt chloride paper from blue to pink.

D Water has a low melting point because covalent bonds are weak.

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25 Which statement shows that petroleum is a mixture?

A Petroleum can be burned as a fuel.

B Petroleum can be separated into fractions by distillation.

C Petroleum is a fossil fuel formed over millions of years.

D Petroleum is a thick, black liquid.

26 Which substances react together?

1 ethene and methane

2 ethene and bromine

3 ethene and oxygen

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

27 Which statement about cracking is **not** correct?

A A high temperature and a catalyst are used.

B Alkenes are made.

C Hydrogen can be made.

D Larger alkanes are made from smaller alkanes.

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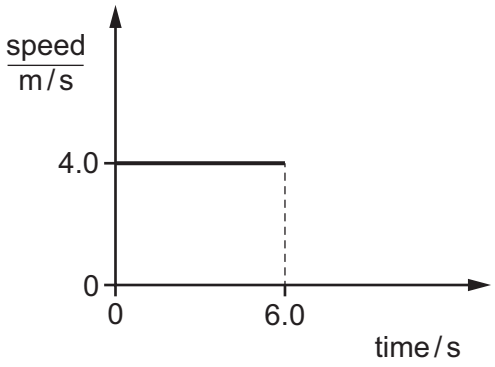
28 Which speed–time graph represents the motion of an object that travels a distance of 24 m?

A



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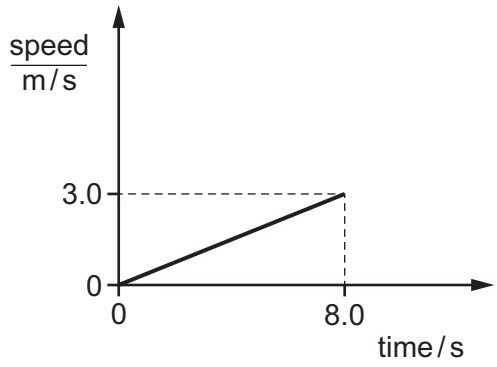

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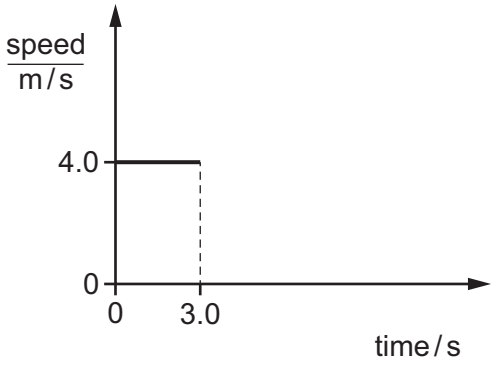

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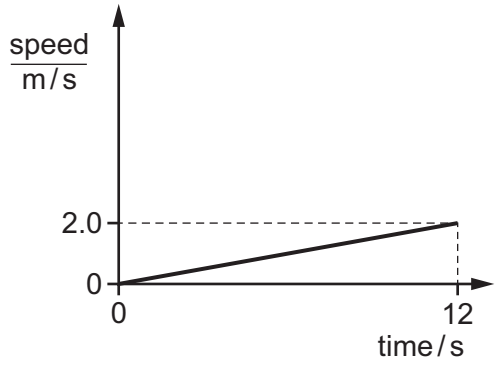

29 Which property of a body is the effect of a gravitational field acting on the mass of the body?

A density

B surface area

C volume

D weight

30 What is the expression for density?

A $\frac{\text{mass}}{\text{volume}}$ **B** $\frac{\text{volume}}{\text{mass}}$ **C** $\frac{\text{volume}}{\text{weight}}$ **D** $\frac{\text{weight}}{\text{volume}}$

31 A body moving with a speed of 2.0 m / s has a kinetic energy of 8.0 J.

What is the mass of the body?

A 1.0 kg **B** 2.0 kg **C** 4.0 kg **D** 8.0 kg

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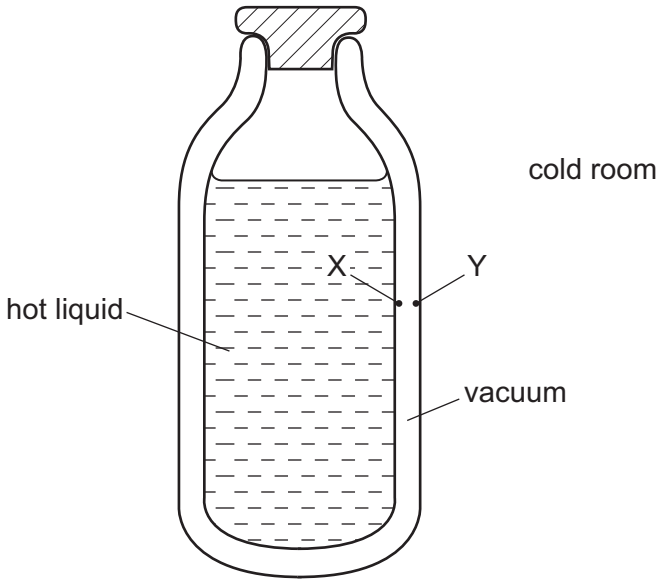
32 The diagram shows a vacuum flask containing a hot liquid in a cold room.

X and Y are points on the inside surfaces of the walls of the flask.



How is thermal energy transferred through the vacuum between X and Y?

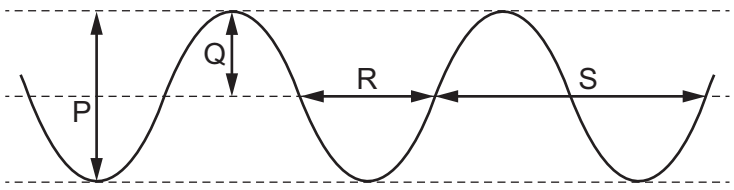
A by conduction and convection

B by conduction only

C by radiation and convection

D by radiation only

33 The diagram represents a wave at one moment.



Which labelled arrows represent the amplitude and the wavelength of the wave?

	amplitude	wavelength
A	P	R
B	P	S
C	Q	R
D	Q	S

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34 Which electromagnetic radiation has the lowest frequency?

A gamma

B infrared

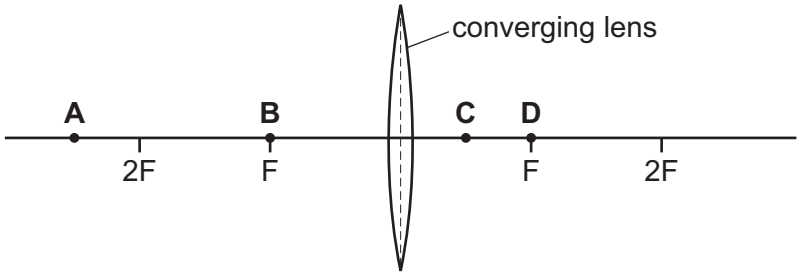
C radio

D ultraviolet

35 A converging lens is placed in the position shown in the diagram.

Each principal focus is marked F, and two points that are two focal lengths from the lens are marked 2F.

At which labelled point is an object placed so that the lens acts as a magnifying glass?



36 Where does sound travel at the greatest speed?

A in a gas

B in a liquid

C in a solid

D in a vacuum

37 There is a current of 2.0 A in a resistor. The power produced in the resistor is 8.0 W.

What is the potential difference across the resistor?

A 0.25 V **B** 4.0 V **C** 10 V **D** 16 V

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38 How is the resistance R of a wire related to its length l and to its cross-sectional area A?

($\propto$ means *proportional to*)

A $R \propto \frac{1}{l}$ and $R \propto A$

B $R \propto \frac{1}{l}$ and $R \propto \frac{1}{A}$

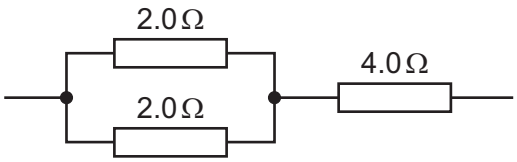
C $R \propto l$ and $R \propto A$

D $R \propto l$ and $R \propto \frac{1}{A}$

39 Three resistors, one of resistance 4.0 Ω and two of resistance 2.0 Ω, are connected in different arrangements.

Which arrangement has a total resistance of 5.0 Ω?

A



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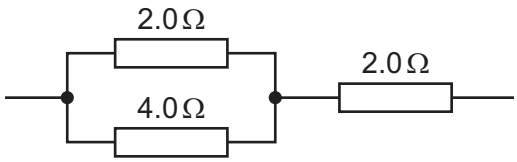

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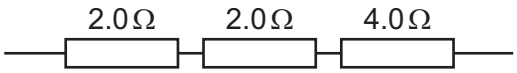

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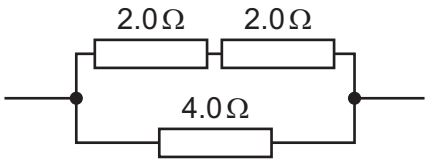

40 A mains circuit can safely supply a current of up to 40 A.

The current in a hairdryer is 2 A when it is operating normally. The hairdryer is connected to the mains by a lead which can safely carry up to 5 A.

What is the correct fuse to protect the hairdryer?

A 1 A fuse

B 3 A fuse

C 10 A fuse

D 50 A fuse

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							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 –		114 Fl flerovium –		116 Lv livermorium –		

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 –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

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