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Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice (Core) **February/March 2020**

45 minutes

You must answer on the multiple choice answer sheet.

* 1 5 1 4 7 2 9 2 4 0 *

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.

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1 Four biological processes are listed.

1 egestion

2 excretion

3 nutrition

4 respiration

Which processes are characteristics of all living organisms?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 2 and 4 only

D 2, 3 and 4 only

2 Which row shows the features of a plant cell?

	cell membrane surrounding the cell wall	cell wall surrounding the cell membrane	vacuole present
A	✓	✗	✓
B	✗	✓	✓
C	✓	✗	✗
D	✗	✓	✗

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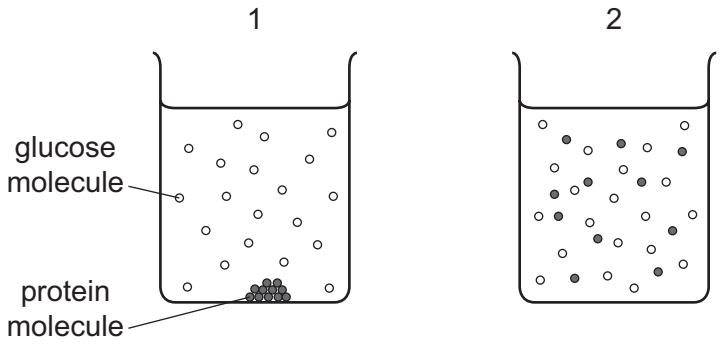
3 Diagram 1 represents a solution of glucose which has had some protein molecules added.

Diagram 2 represents the result after four hours.



Which process is responsible for this result?

A absorption

B diffusion

C digestion

D osmosis

4 Which smaller molecule is used to make proteins?

A amino acid

B fatty acid

C glucose

D glycerol

5 When an apple is cut, the cut surface quickly turns brown. This is due to enzyme action.

Which action destroys the enzyme?

A brushing the cut surface with a strong sugar solution

B cutting the apple into smaller pieces

C placing the cut apple in boiling water

D placing the cut apple in cold water

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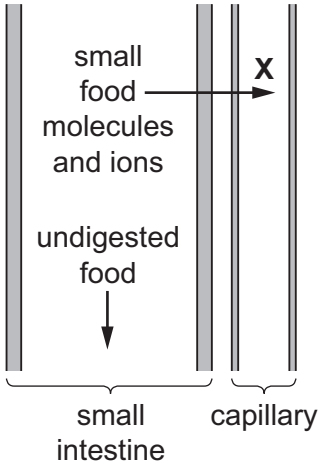
6 The diagram shows the arrangement of part of the small intestine and a capillary.



What does arrow **X** represent?

A absorption

B digestion

C ingestion

D osmosis

7 Which chemical can be identified using limewater?

A carbon dioxide

B glucose

C oxygen

D water

8 What is the equation for aerobic respiration?

A carbon dioxide + water → glucose + oxygen

B glucose + oxygen → carbon dioxide + water

C glucose + water → carbon dioxide + oxygen

D oxygen + water → carbon dioxide + glucose

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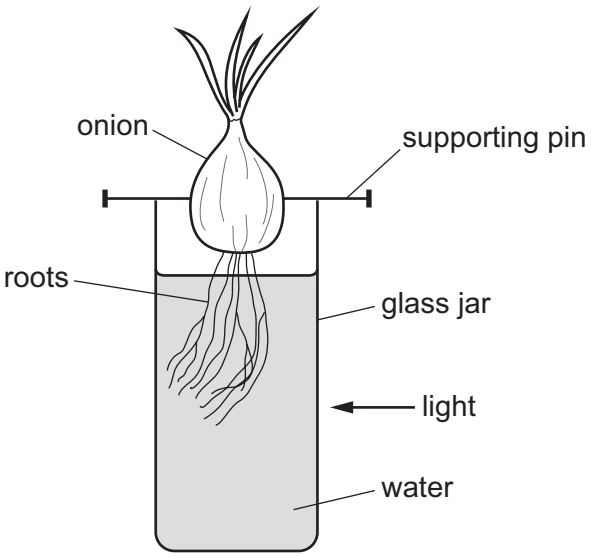
9 When an athlete prepares for the start of a sprint race, excitement causes the concentration of adrenaline in the blood to increase.

What effects does adrenaline have on the blood glucose concentration and the heart rate of the athlete?

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

10 The diagram shows an onion bulb supported above water in a glass jar.

Light is shone onto one side of the jar only. The bulb has been left for a few days in a laboratory.



Which tropic responses have caused the roots to grow as they now appear?

	gravitropism causes the roots to grow	phototropism causes the roots to grow
A	away from gravity	away from light
B	away from gravity	towards light
C	towards gravity	away from light
D	towards gravity	towards light

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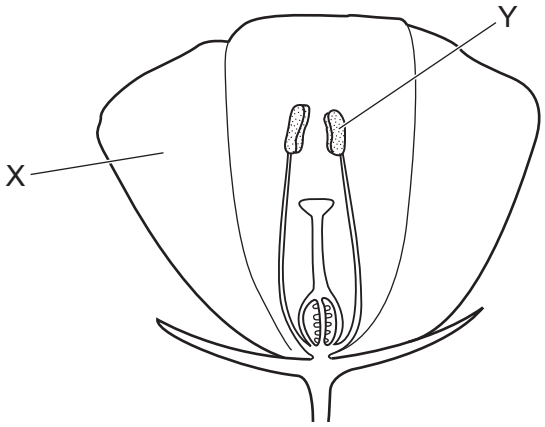
11 The diagram shows a section through a flower.

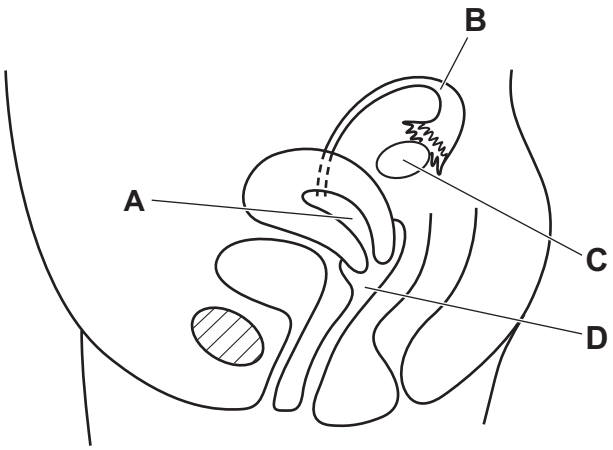


What are the correct labels and functions for parts X and Y of the flower?

	X		Y	
	label	function	label	function
A	petal	attracts insects	anther	produces pollen grains
B	petal	protects flower	ovary	produces pollen grains
C	sepal	attracts insects	anther	contains egg cells
D	sepal	protects flower	ovary	contains egg cells

12 The diagram shows the female reproductive system.

In which structure does fertilisation normally happen?



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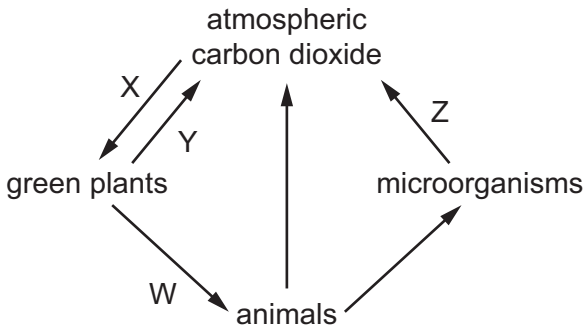
13 The diagram shows part of the carbon cycle.



Which two labelled arrows represent respiration?

A W and X **B** X and Y **C** Y and Z **D** Z and W

14 Which method is used to separate an insoluble salt from a mixture of the salt and water?

A crystallisation

B distillation

C filtration

D fractional distillation

15 Some information about a sodium ion is shown.

particle	proton number	nucleon number	number of protons	number of neutrons	number of electrons
Na^+	11	23	11	X	Y

What are the values of X and Y?

	X	Y
A	11	10
B	11	11
C	12	10
D	12	11

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16 Potassium carbonate reacts with dilute hydrochloric acid.

What are the products of this reaction?

A potassium chloride and hydrogen

B potassium chloride, water and carbon dioxide

C potassium oxide, carbon dioxide and chlorine

D potassium oxide, hydrogen and chlorine

17 During electrolysis, which electrode does **not** produce a gas?

A the anode during the electrolysis of concentrated aqueous sodium chloride

B the anode during the electrolysis of molten lead(II) bromide

C the cathode during the electrolysis of concentrated aqueous sodium chloride

D the cathode during the electrolysis of molten lead bromide

18 What happens during **all** endothermic changes?

A A gas is produced.

B Solids melt.

C The temperature decreases.

D There is a colour change.

19 The equation for the reaction of iron(III) oxide with aluminium is shown.

$$Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$$

What is oxidised during this reaction?

A aluminium

B aluminium oxide

C iron

D iron(III) oxide

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20 Universal indicator is placed into a colourless liquid. The colour change of the universal indicator shows that the pH of the liquid is 6.

Which statement about the colourless liquid is correct?

A It is an acid which turned the universal indicator red.

B It is an acid which turned the universal indicator yellow.

C It is an alkali which turned the universal indicator blue.

D It is neutral liquid which turned the universal indicator green.

21 A solution of compound X produces a dark green precipitate when aqueous sodium hydroxide is added.

What is X?

A copper(II) chloride

B copper(II) sulfate

C iron(II) sulfate

D iron(III) chloride

22 Which statement about the Periodic Table is correct?

A Elements change from metals to non-metals across a period.

B Elements in Group II are non-metals.

C Elements in the same period have similar chemical properties.

D Lithium, sodium and potassium are soft metals in the same period.

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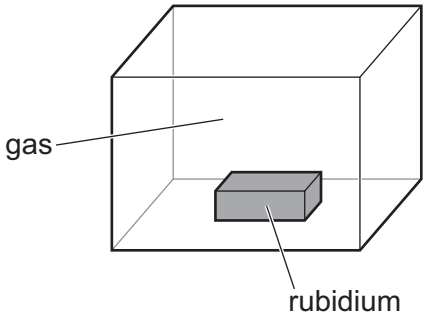
23 Rubidium is a very reactive Group I metal.

It is kept in a sealed box surrounded by a gas.



Which gas does **not** react with rubidium?

A chlorine

B neon

C oxygen

D water vapour

24 Why is carbon used to extract some metals from their oxide ores?

A It oxidises the ore by removing oxygen.

B It prevents the oxygen of the air reacting with the ore.

C It reacts with impurities in the ore.

D It reduces the ore by removing oxygen.

25 A water supply contains small insoluble impurities. It also contains bacteria.

Which statement describes how the insoluble impurities are removed and how the bacteria are killed?

A The water supply is filtered.

B The water supply is filtered and treated with chloride ions.

C The water supply is filtered and treated with chlorine.

D The water supply is treated with chlorine and chloride ions.

26 Which gases damage buildings?

A carbon dioxide and carbon monoxide

B carbon dioxide and sulfur dioxide

C carbon monoxide and nitrogen dioxide

D nitrogen dioxide and sulfur dioxide

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27 What is formed during the complete combustion of a hydrocarbon?

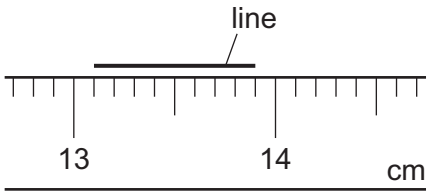
A carbon dioxide and water

B carbon dioxide and hydrogen

C carbon monoxide and carbon dioxide

D carbon monoxide and water

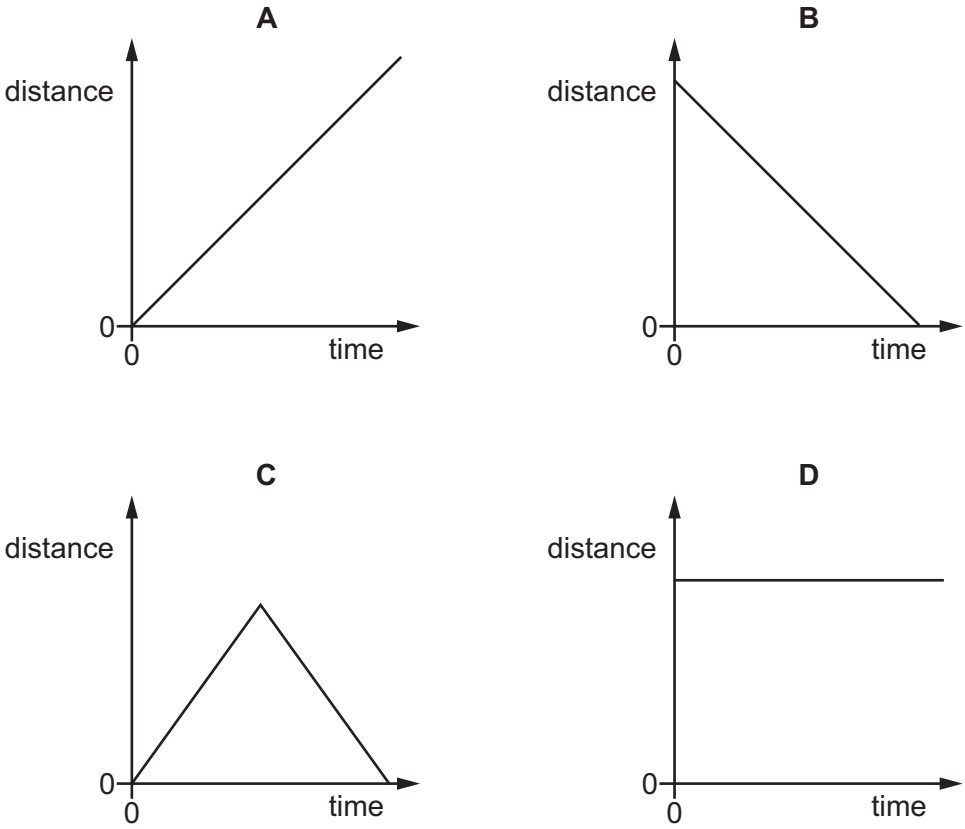
28 A student measures the length of a line using a rule.



What is the length of the line?

A 0.8 cm **B** 0.9 cm **C** 1.0 cm **D** 1.2 cm

29 Which distance–time graph represents an object at rest?



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30 The weight W and mass m of an object are related by the equation shown.

$$W = m \times g$$

What is the meaning of the quantity g and in which unit is it measured?

	meaning of g	unit
A	gravitational force on 1.0 kg	N / kg
B	gravitational force on the object	N
C	gravitational force on 1.0 kg	N
D	gravitational force on the object	N / kg

31 A solid cube has sides of length 2.0 cm.

The mass of the cube is 16 g.

What is the density of the cube?

A $0.50\,g/cm^3$ **B** $2.0\,g/cm^3$ **C** $4.0\,g/cm^3$ **D** $32\,g/cm^3$

32 A toy car rolls from rest down a slope and on to a horizontal bench.

The car stops before it reaches the end of the bench.

What energy changes take place during this journey?

A gravitational potential → kinetic → elastic potential

B gravitational potential → kinetic → thermal and sound

C kinetic → gravitational potential → elastic potential

D kinetic → gravitational potential → thermal and sound

33 Which row gives the melting point and the boiling point of water?

	melting point / °C	boiling point / °C
A	-10	100
B	-10	110
C	0	100
D	0	110

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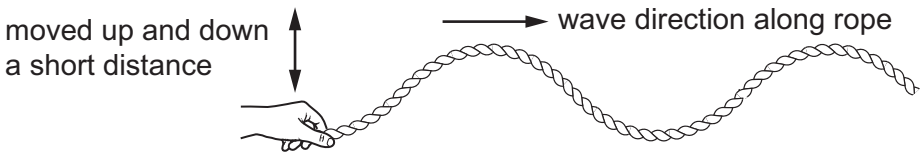
34 A student moves one end of a long rope up and down through a short distance. A wave travels along the rope in the direction shown.



The student now moves the rope up and down through a larger distance. He also moves it up and down more times in each minute.

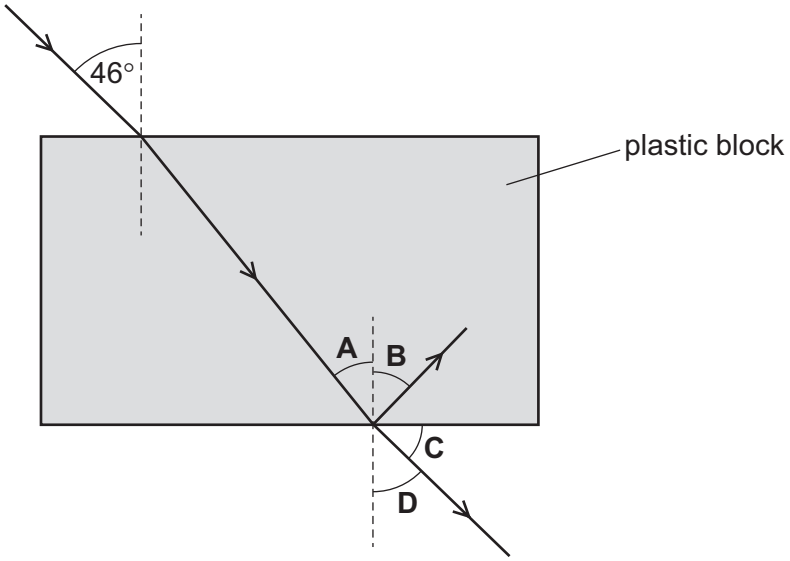
Which row shows the effects of these two changes?

	amplitude of the wave	frequency of the wave
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

35 A ray of light strikes one face of a parallel-sided plastic block. The angle of incidence is 46°.

At the opposite face, part of the ray is reflected and part is refracted into the air.

Which other labelled angle has a value of 46°?



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36 A student determines the speed of sound in air. She measures the time between making a sound and hearing the echo from a cliff.

She uses the equation: speed = $\frac{\text{distance}}{\text{time}}$.

Which type of sound does she make and which distance does she use in her calculation?

	type of sound	distance used
A	continuous sound	2 × distance to cliff
B	continuous sound	$\frac{1}{2}$ × distance to cliff
C	short, sharp sound	2 × distance to cliff
D	short, sharp sound	$\frac{1}{2}$ × distance to cliff

37 A polythene rod is rubbed with a cloth. The rod becomes positively charged.

What has happened to the rod?

A It has gained electrons.

B It has gained protons.

C It has lost electrons.

D It has lost protons.

38 A student records a current of 12 A in a resistor and a potential difference (p.d.) of 6.0 V across it.

What is the resistance of the resistor?

A 0.50 Ω **B** 2.0 Ω **C** 18 Ω **D** 72 Ω

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39 A 3.0 Ω resistor and a 6.0 Ω resistor are connected in series.

What is their combined resistance?

A less than 3.0 Ω

B between 3.0 Ω and 6.0 Ω

C exactly 9.0 Ω

D exactly 18 Ω

40 An electric oven is connected to the mains supply using insulated copper wires. The wires become very warm.

Which change reduces the amount of heat produced in the connecting wires?

A Use thicker copper wires.

B Use thinner copper wires.

C Use thicker insulation.

D Use thinner insulation.

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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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