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Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/11**

Paper 1 Multiple Choice (Core) **October/November 2022**

45 minutes

You must answer on the multiple choice answer sheet.

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

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

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.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

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1 What are characteristics of all living organisms?

A breathing, excretion, nutrition

B excretion, growth, nutrition

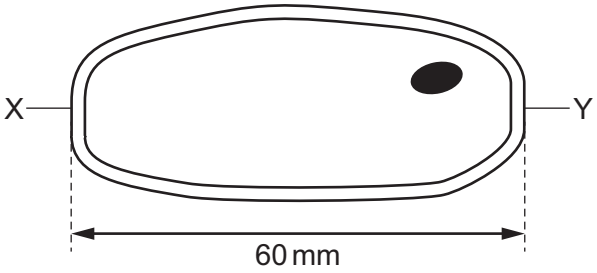
C reproduction, respiration, germination

D secretion, growth, sensitivity

2 A plant cell is observed using a microscope.

The size of the image is measured as 60 mm.

The actual size of the cell is 0.12 mm.



What is the magnification?

A ×7.2 **B** ×50 **C** ×72 **D** ×500

3 By which process do substances move into and out of cells?

A diffusion

B egestion

C evaporation

D transpiration

4 A student tests samples of four different foods.

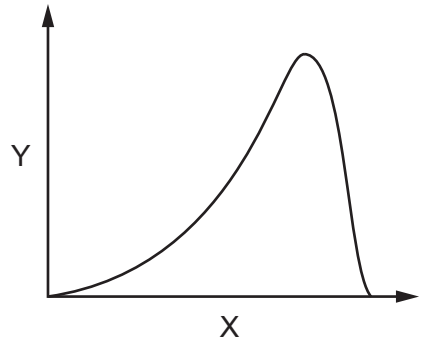
Which row is the correct result for a sample containing only fat and starch?

	Benedict's solution	biuret test	ethanol emulsion	iodine solution
A	blue	purple	clear	blue-black
B	blue	blue	cloudy	blue-black
C	red	purple	clear	brown
D	red	blue	cloudy	brown

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5 The graph shows the effect of one variable on amylase activity.



What are the labels X and Y?

	X	Y
A	amylase activity	pH
B	amylase activity	temperature
C	pH	amylase activity
D	temperature	amylase activity

6 Which statements about chemical digestion are correct?

1 It only occurs in the small intestine.

2 It produces molecules that can be absorbed.

3 It produces smaller soluble molecules.

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

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7 When at rest, a student measures his rate of breathing and the volume of air inspired.

number of breaths per minute	volume of air inspired per minute / dm^3
12	6.0

He then runs 400 m and immediately measures his breathing again.

Which set of results does he obtain?

	number of breaths per minute	volume of air inspired per minute / dm^3
A	12	6.0
B	12	12.5
C	30	6.0
D	30	12.5

8 What is the word equation for aerobic respiration?

A carbon dioxide + chlorophyll → glucose + oxygen

B carbon dioxide + glucose → oxygen + water

C glucose + oxygen → carbon dioxide + water

D oxygen + light energy → carbon dioxide + water

9 Adrenaline is secreted during 'fight or flight' situations.

Which combination of effects does adrenaline cause?

A decreased breathing rate and wider pupils

B decreased pulse rate and narrower pupils

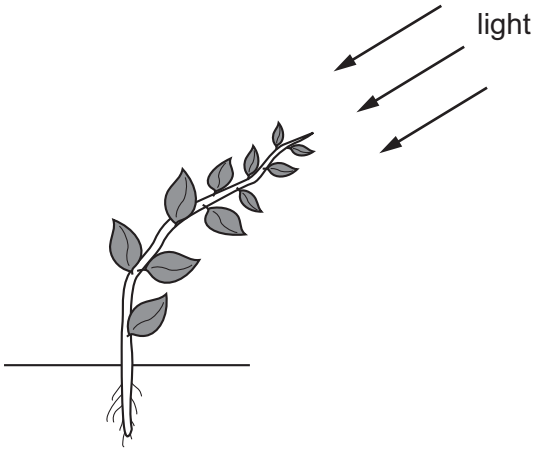
C increased breathing rate and decreased pulse rate

D increased pulse rate and wider pupils

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10 The diagram shows a plant, lit from one side.



Which tropic responses are shown by the shoot and root?

	shoot	root
A	gravitropism only	gravitropism and phototropism
B	phototropism only	gravitropism and phototropism
C	gravitropism and phototropism	gravitropism only
D	gravitropism and phototropism	phototropism only

11 Which environmental conditions are necessary for seeds to germinate?

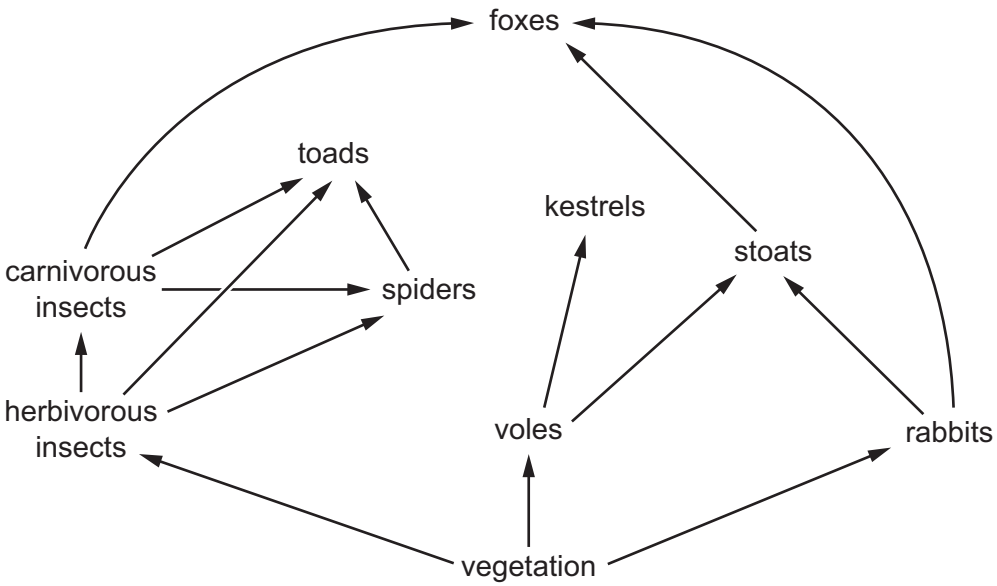
	oxygen	suitable temperature	sunlight	water
A	yes	yes	yes	no
B	yes	yes	no	yes
C	no	no	yes	yes
D	no	yes	no	yes

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12 The diagram shows a food web.



Which organisms in this food web are both secondary and tertiary consumers?

A foxes and toads

B foxes and stoats

C spiders and kestrels

D toads and carnivorous insects

13 Which gas increases in the atmosphere as a result of deforestation?

A carbon dioxide

B methane

C nitrogen

D oxygen

14 Which particles are present in the nuclei of hydrogen atoms, $^{1}_{1}H$?

A electrons and neutrons

B electrons only

C protons and neutrons

D protons only

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15 The equation for the reaction between sodium and water is shown.

$$w\text{Na} + x\text{H}_2\text{O} \rightarrow y\text{NaOH} + z\text{H}_2$$

Which values of *w*, *x*, *y* and *z* balance this equation?

	w	*x*	*y*	*z*
A	1	1	1	1
B	1	2	1	2
C	2	1	2	1
D	2	2	2	1

16 What are the products of the electrolysis of dilute sulfuric acid using inert electrodes?

	anode products	cathode products
A	hydrogen	oxygen
B	oxygen	hydrogen
C	sulfur	hydrogen
D	oxygen	sulfur

17 Two chemical reactions are carried out.

In reaction 1, the temperature of the reaction mixture increases.

In reaction 2, energy is released by the reaction mixture.

Which reactions are exothermic?

A both reaction 1 and reaction 2

B reaction 1 only

C reaction 2 only

D neither reaction 1 nor reaction 2

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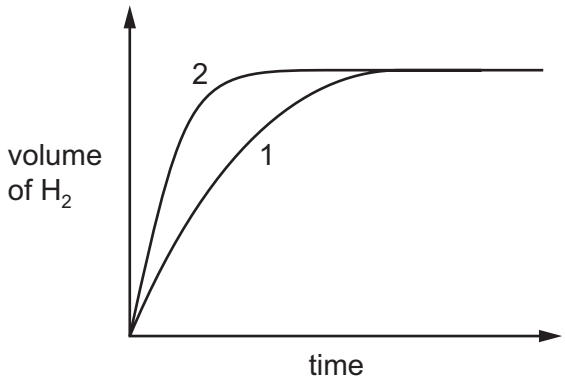
18 Zinc is reacted with dilute hydrochloric acid in two separate experiments.

In experiment 1, an excess of powdered zinc and 50 cm^3 of dilute hydrochloric acid is used.

In experiment 2, one change is made to the conditions in experiment 1.

The volume of hydrogen gas produced is measured over time.

A graph of the results is shown.



What is the change to the conditions in experiment 2?

A The volume of acid is changed to 100 cm^3.

B The concentration of acid is decreased.

C The temperature is increased.

D The powdered zinc is changed for the same mass of zinc pieces.

19 Iron oxide reacts with carbon monoxide.

The word equation for the reaction is shown.

$$\text{iron oxide} + \text{carbon monoxide} \rightarrow \text{iron} + \text{carbon dioxide}$$

Which statement about this reaction is **not** correct?

A Carbon monoxide is reduced.

B Carbon monoxide is oxidised.

C Iron oxide is reduced.

D It is a redox reaction.

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20 The word equation represents the reaction between substance J and hydrochloric acid.

substance J + hydrochloric acid → magnesium chloride + hydrogen

What is substance J?

A magnesium

B magnesium carbonate

C magnesium hydroxide

D magnesium oxide

21 Which pair of gases can be identified using damp litmus paper and limewater?

A carbon dioxide and hydrogen

B chlorine and carbon dioxide

C chlorine and oxygen

D hydrogen and chlorine

22 Which properties are shown by transition elements?

1 They form coloured compounds.

2 They have low melting points.

3 They have low densities.

4 They can act as catalysts.

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

23 The noble gases are in Group VIII of the Periodic Table.

Which statement is correct?

A Argon exists as non-bonded atoms.

B Krypton is very reactive.

C Neon burns in pure oxygen with a red flame.

D The chemical formula of helium is He_2.

24 Which method is used to extract aluminium from the ore bauxite?

A heating bauxite until it decomposes

B heating bauxite with carbon

C the electrolysis of aqueous bauxite

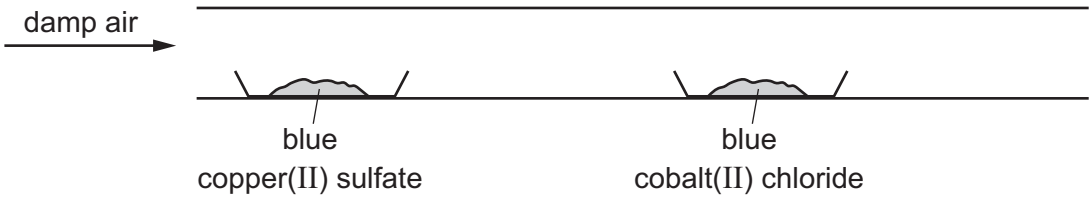
D the electrolysis of molten bauxite

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25 Damp air is passed through a tube containing blue copper(II) sulfate and blue cobalt(II) chloride.



What is observed?

	copper(II) sulfate	cobalt(II) chloride
A	turns white	turns pink
B	turns white	no change
C	no change	turns pink
D	no change	no change

26 Which row identifies the petroleum fractions used as a fuel for cooking, as chemical feedstock and for making road surfaces?

	fuel for cooking	chemical feedstock	road surfaces
A	diesel oil	naphtha	gasoline
B	gasoline	refinery gas	bitumen
C	refinery gas	diesel oil	naphtha
D	refinery gas	naphtha	bitumen

27 The formula of the hydrocarbon octane is C_8H_{18}.

What are the products of the complete combustion of octane?

A carbon and hydrogen

B carbon and water

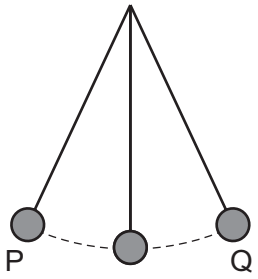
C carbon dioxide and water

D carbon monoxide and water

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28 A pendulum swings repeatedly from P to Q and back to P.



A stop-watch is used to find the period of the pendulum.

Which method gives the most accurate value for the period?

A timing how long it takes to go from P to Q

B timing how long it takes to go from P to Q to P

C timing how long it takes to go from P to Q to P 10 times, and dividing this time by 10

D timing how long it takes to go from P to Q to P 10 times, and multiplying this time by 10

29 An athlete starts from rest and runs 250 m in 50 s.

He then rests for 20 s before running a further 250 m in 50 s.

What is his average speed between starting and finishing his 500 m run?

A 0.20 m / s **B** 0.24 m / s **C** 4.2 m / s **D** 5.0 m / s

30 The table shows the masses and the weights of four different objects.

The gravitational field strength *g* is 10 N / kg.

Which row shows the mass of an object and its weight?

	mass / kg	weight / N
A	2.4	12.4
B	3.2	0.32
C	25	25
D	36	360

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31 A piece of scientific equipment is taken from the Earth to a distant planet.

Which row describes the properties of the equipment on the distant planet?

	mass	weight
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = the same as on Earth

✗ = different on each planet

32 For which energy resource is energy stored as gravitational potential energy?

A geothermal energy

B hydroelectric energy

C nuclear fission

D wind energy

33 During evaporation, molecules escape from a liquid.

Which molecules escape and what happens to the temperature of the liquid that remains?

	molecules that escape	temperature of liquid that remains
A	less energetic	decreases
B	less energetic	increases
C	more energetic	decreases
D	more energetic	increases

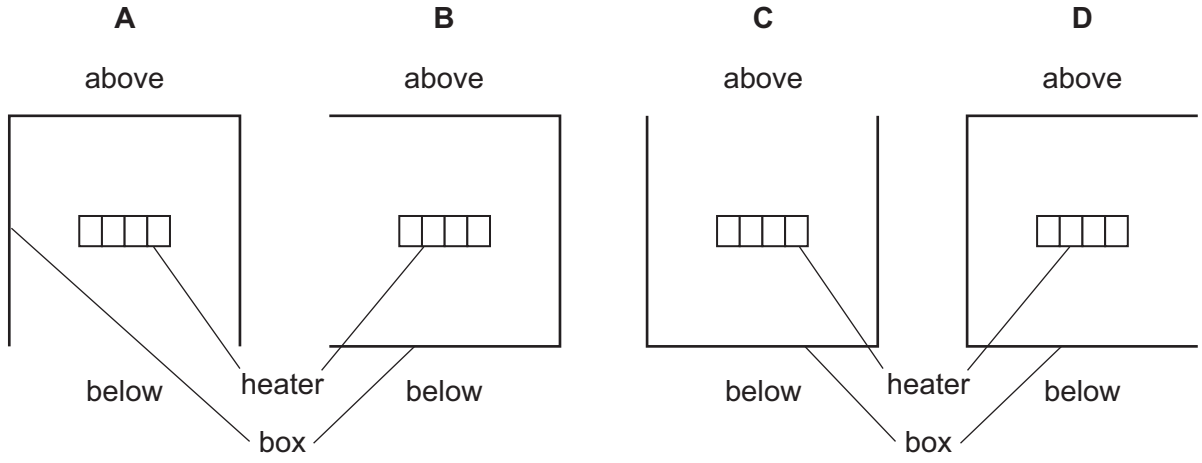
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34 An electric heater is placed inside a metal box which has one side open. The diagrams show four possible positions of the box.

The heater is switched on for several minutes.

In which position does the box become the hottest?



35 Which quantity is equal to the number of crests of a wave that pass a point in 1.0 s?

A amplitude

B frequency

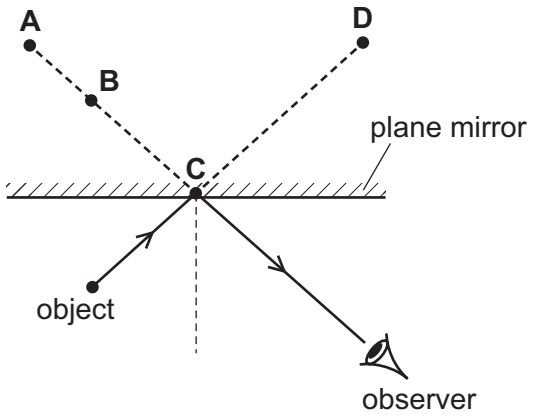
C speed

D wavelength

36 An observer sees an image of an object formed by a plane mirror.

The ray diagram shows a ray of light from the object reflecting off the mirror to the observer.

At which labelled point is the image?



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37 A plastic rod and a woollen cloth are both uncharged.

The plastic rod is rubbed with the woollen cloth. The rod becomes negatively charged.

What happens to the cloth?

A The cloth gains electrons and becomes negatively charged.

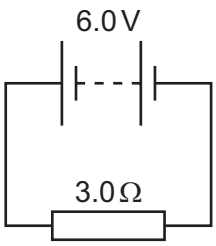
B The cloth gains electrons and becomes positively charged.

C The cloth loses electrons and becomes negatively charged.

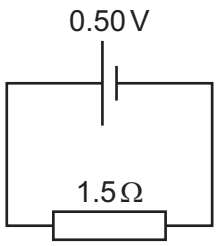
D The cloth loses electrons and becomes positively charged.

38 In which circuit is there a current of 2.0 A?

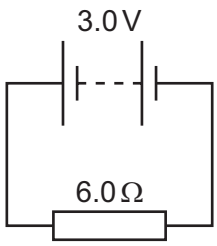
A



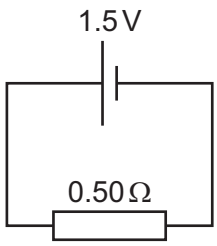
B



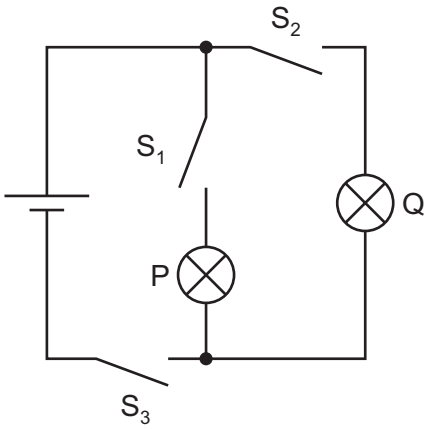
C



D



39 A circuit contains three switches S_1, S_2 and S_3 and two identical lamps P and Q.



Lamp Q is switched on but lamp P is **not** switched on.

Which switches are closed?

A S_1 and S_2 only

B S_2 only

C S_2 and S_3 only

D S_1, S_2 and S_3

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40 Why is the electricity supply to a mains circuit fitted with a fuse?

A to increase the current in the circuit

B to increase the resistance of the circuit

C to maintain a constant current in the circuit

D to prevent overheating of the cables in the circuit

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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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