



# Cambridge IGCSE™

---

## PHYSICAL SCIENCE

0652/11

Paper 1 Multiple Choice (Core)

October/November 2020

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)

---

### 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

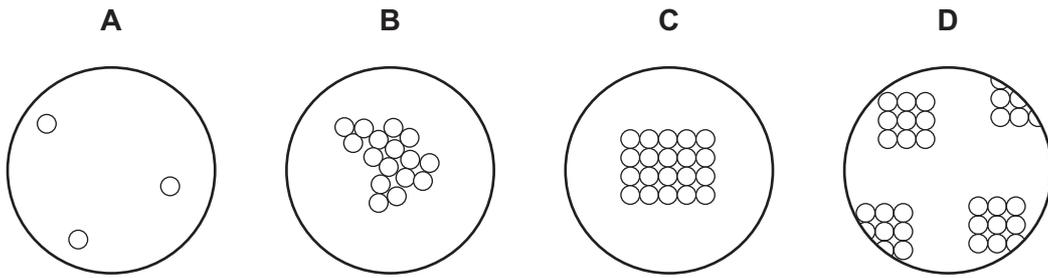
- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

---

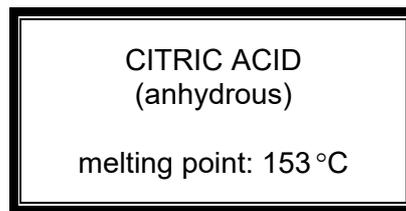
This document has **16** pages. Blank pages are indicated.



1 Which diagram represents the arrangement of particles in a liquid?



2 A bottle of a solid is labelled as shown.



The melting point of a sample from the bottle is measured.

The sample melts over a temperature range from 140 °C to 150 °C.

Which statement explains this observation?

- A The sample contains a mixture of citric acid and other solids.
  - B The sample is too large.
  - C The sample has a pH less than 7.
  - D The sample is too small.
- 3 Which statement describes a compound?
- A It is a mixture of two or more elements.
  - B It is a substance containing two or more elements chemically combined.
  - C It is a substance that can be easily separated by physical means.
  - D It is a substance that cannot be broken down by chemical means.

4 The element *moscovium* was first made in 2003.

An atom of the element moscovium is represented by the symbol  ${}_{115}^{287}\text{Mc}$ .

What is the total number of protons and neutrons in the nucleus of this atom?

- A 115
- B 172
- C 287
- D 402

- 5 Rubidium iodide is an ionic compound.

Which row describes what happens to the rubidium and iodine atoms when they form ions?

	rubidium atoms	iodine atoms
<b>A</b>	gain one electron	gain one electron
<b>B</b>	gain one electron	lose one electron
<b>C</b>	lose one electron	gain one electron
<b>D</b>	lose one electron	lose one electron

- 6 Which row describes the properties of an ionic compound?

	volatility	solubility in water
<b>A</b>	low	insoluble
<b>B</b>	low	soluble
<b>C</b>	high	insoluble
<b>D</b>	high	soluble

- 7 Which statement about the structures of diamond and graphite is correct?

- A** They are both macromolecules.  
**B** They both have a layered structure.  
**C** They both have delocalised electrons.  
**D** They both have each carbon atom joined to four others.

- 8 The formula of aluminium sulfate is  $Al_2(SO_4)_3$ .

Which row shows the number of atoms of each element in aluminium sulfate?

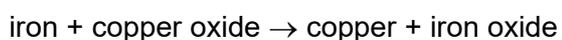
	Al	S	O
<b>A</b>	2	1	4
<b>B</b>	2	1	12
<b>C</b>	2	3	4
<b>D</b>	2	3	12

9 Magnesium reacts with acids to produce hydrogen gas.

Under which set of conditions is hydrogen produced most slowly?

	magnesium	acid	temperature / °C
<b>A</b>	ribbon	concentrated	40
<b>B</b>	ribbon	dilute	20
<b>C</b>	powder	concentrated	40
<b>D</b>	powder	dilute	20

10 Word equations for two reactions are shown.



Which statement about the two reactions is correct?

- A** Carbon and copper oxide have been oxidised.
- B** Carbon and iron have been reduced.
- C** Zinc oxide and copper oxide have been oxidised.
- D** Zinc oxide and copper oxide have been reduced.

11 Wasp stings contain an alkali.

The pH values of some substances are shown.

substance	pH value
saliva	7.4
lime	12.4
salt solution	7.0
vinegar	3.5

Which substance could be used to neutralise a wasp sting?

- A** lime
- B** saliva
- C** salt solution
- D** vinegar



15 Some properties of aluminium are listed.

- 1 low density
- 2 good conductor of electricity
- 3 strong
- 4 shiny

One use of aluminium is in aircraft parts.

Which properties of aluminium are needed for this use?

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

16 Which row shows a correct order of reactivity of metals?

	least reactive	—————→	most reactive
<b>A</b>	copper	calcium	magnesium
<b>B</b>	copper	magnesium	calcium
<b>C</b>	iron	magnesium	zinc
<b>D</b>	zinc	iron	calcium

17 Which of the statements about water are correct?

- 1 Water is used as a solvent.
- 2 Water is used to prevent iron from rusting.
- 3 Water is a compound that contains two parts of oxygen to one part of hydrogen.

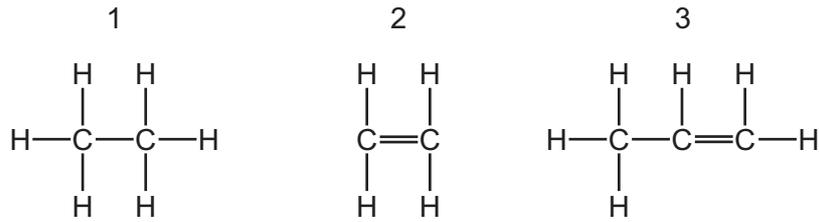
- A** 1 only      **B** 2 only      **C** 1 and 3      **D** 2 and 3

18 One member of the alkane homologous series is butane which is used as a fuel.

What are the products of combustion when butane is burned in excess air?

- A** carbon and water  
**B** carbon dioxide and hydrogen  
**C** carbon dioxide and water  
**D** carbon monoxide and water

19 The structures of three hydrocarbons are shown.



Which hydrocarbons decolourise bromine water?

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

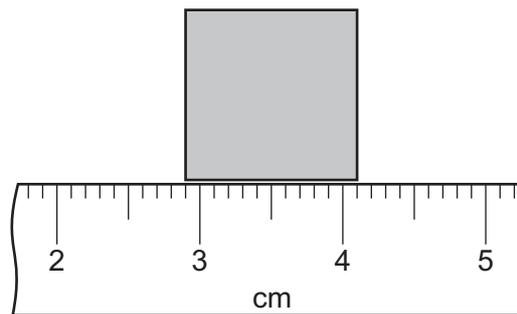
20 Liquid X has the properties shown.

- It is colourless.
- It is flammable.
- It can be made by the reaction of ethene with steam.
- The complete combustion of X produces carbon dioxide and water.

What is X?

- A** ethanol  
**B** methane  
**C** petrol  
**D** poly(ethene)

21 A metre rule is used to measure a side of a square.



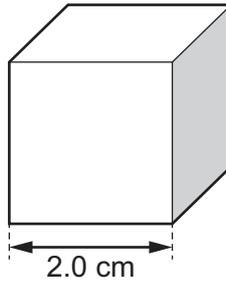
What is the length of the side of the square?

- A** 1.0 cm      **B** 1.2 cm      **C** 2.9 cm      **D** 4.1 cm

22 What does the gradient of a speed–time graph show?

- A acceleration
- B average speed
- C final speed
- D distance travelled

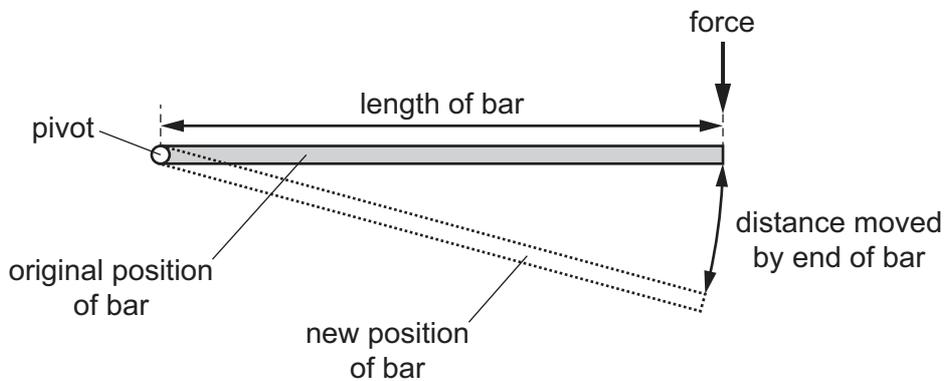
23 The diagram shows a solid cube of metal. Each side has a length of 2.0 cm. The mass of the cube is 72 g.



What is the density of the metal?

- A  $9.0\text{ g/cm}^3$
- B  $18\text{ g/cm}^3$
- C  $288\text{ g/cm}^3$
- D  $576\text{ g/cm}^3$

24 A bar has a pivot at one end. A force acts on the other end of the bar and makes the bar rotate about the pivot.

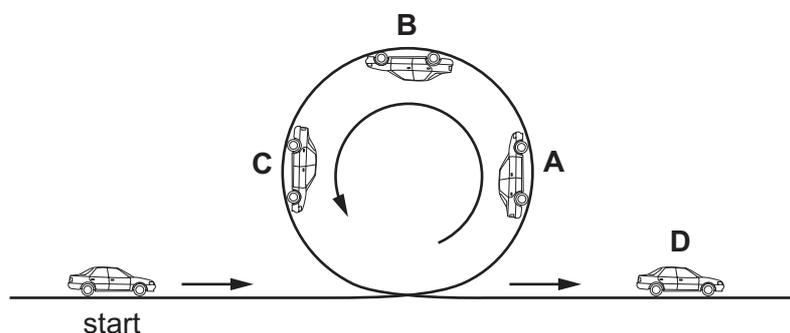


Which equation shows how the moment of the force is calculated?

- A  $\text{moment} = \frac{\text{force}}{\text{distance moved by end of bar}}$
- B  $\text{moment} = \frac{\text{force}}{\text{length of bar}}$
- C  $\text{moment} = \text{force} \times \text{distance moved by end of bar}$
- D  $\text{moment} = \text{force} \times \text{length of bar}$

25 A toy car without a motor is pushed, then follows the looped track shown.

At which labelled point on the track is the kinetic energy (energy of motion) of the car decreasing and the potential energy (energy of position) increasing?



26 A student measures his power output by lifting a load of weight  $W$  through a vertical height  $h$ . In time  $t$ , he lifts the load  $n$  times.

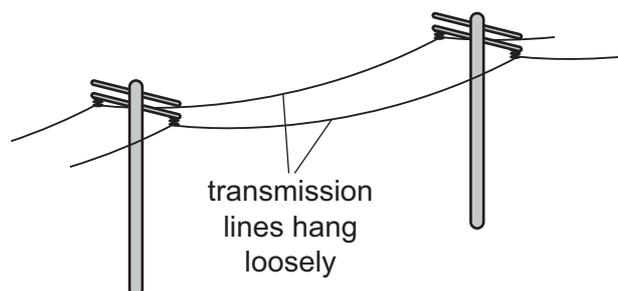
The student changes one of these variables to increase his power output.

Which change produces this increase?

- A decreasing  $h$
- B decreasing  $n$
- C decreasing  $t$
- D decreasing  $W$

27 When electricity transmission lines are suspended from poles, they are allowed to hang loosely instead of being tightly stretched.

The diagram shows the arrangement.



Why are the transmission lines allowed to hang loosely?

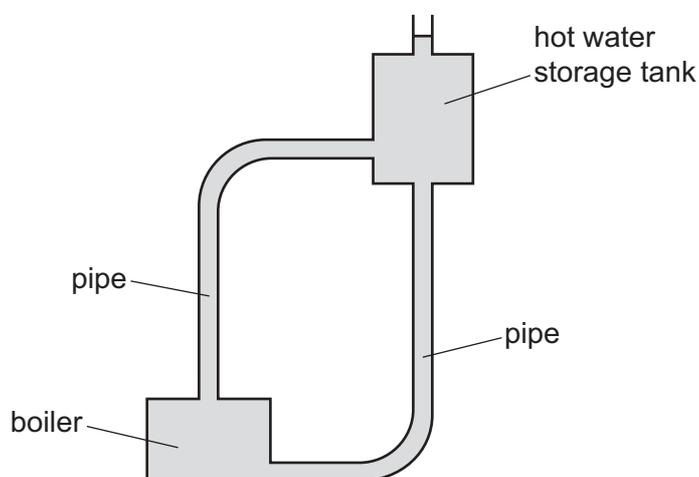
- A It prevents them from breaking when the temperature decreases.
- B It prevents them from breaking when the temperature increases.
- C It prevents them from touching the ground when the temperature decreases.
- D It prevents them from touching the ground when the temperature increases.

- 28 Which row shows what happens to the temperature of a solid as it melts, and to the temperature of a liquid as it boils?

	temperature of a solid as it melts	temperature of a liquid as it boils
<b>A</b>	increases	increases
<b>B</b>	no change	increases
<b>C</b>	increases	no change
<b>D</b>	no change	no change

- 29 The diagram shows part of the hot water system in a house.

Water is heated in the boiler and moves, without using a pump, up to the hot water storage tank.

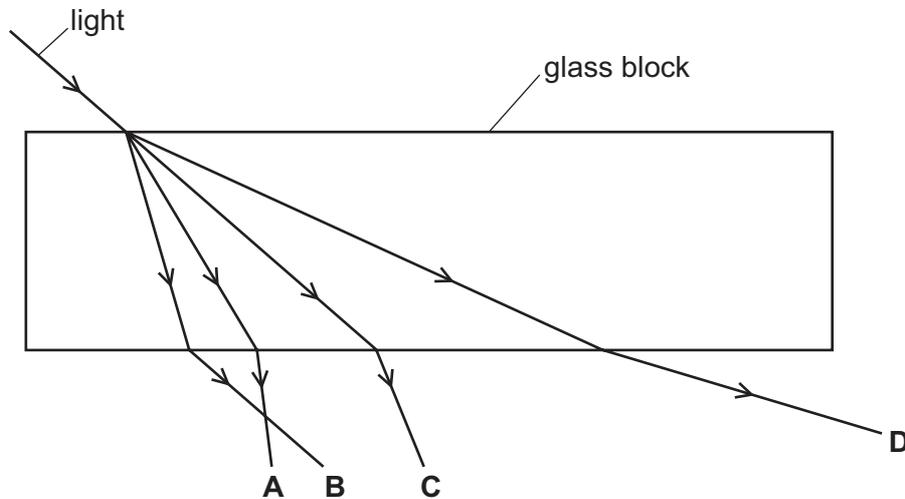


By which process does the heated water move up from the boiler to the hot water storage tank?

- A** conduction
  - B** convection
  - C** emission
  - D** radiation
- 30 A boy throws a small stone into a pond. A wave spreads out from where the stone hits the water. The boy notices that 8 wave crests reach the side of the pond every 5.0 s. What is the frequency of the wave?
- A** 0.20 Hz      **B** 0.63 Hz      **C** 1.6 Hz      **D** 40 Hz

31 The diagram shows light incident on a glass block.

Which labelled arrow shows the path of the light passing through and after it has passed through the block?



32 What is the approximate range of frequencies of sound that can be heard by the human ear?

- A 2 Hz to 2000 Hz
- B 2 kHz to 2000 kHz
- C 20 Hz to 20 000 Hz
- D 20 kHz to 20 000 kHz

33 An electric door lock contains a permanent magnet and an electromagnet.

What are suitable materials for the permanent magnet and for the core of the electromagnet?

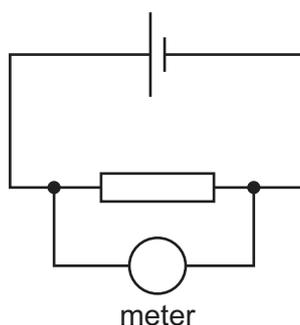
	permanent magnet	core of electromagnet
<b>A</b>	soft iron	soft iron
<b>B</b>	soft iron	steel
<b>C</b>	steel	soft iron
<b>D</b>	steel	steel

- 34 Two plastic rods are each rubbed with a cloth.

The rods are brought close to each other and they move apart.

Which statement explains this?

- A Like charges repel.
  - B Like poles repel.
  - C Unlike charges repel.
  - D Unlike poles repel.
- 35 A meter is connected across a resistor as shown.



Which row gives the quantity measured by the meter and the unit?

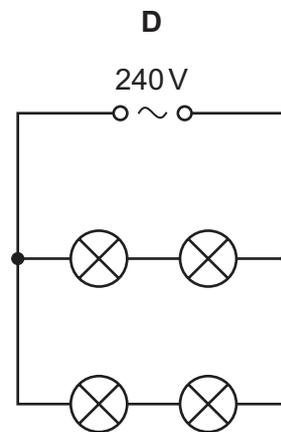
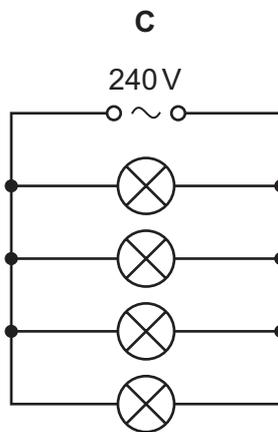
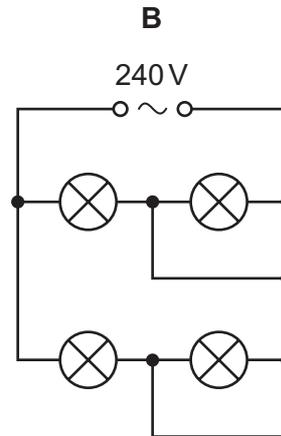
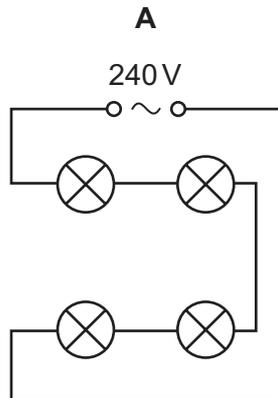
	quantity	unit
A	current	ampere
B	current	volt
C	potential difference	ampere
D	potential difference	volt

- 36 How does the resistance of a wire change when its length increases and when its diameter decreases?

	length increases	diameter decreases
A	resistance decreases	resistance decreases
B	resistance decreases	resistance increases
C	resistance increases	resistance decreases
D	resistance increases	resistance increases

37 Four 240 V lamps are to be powered by a 240 V supply.

Which circuit allows all four lamps to light at full brightness?



38 Overheating of a cable in an electric circuit is a safety hazard.

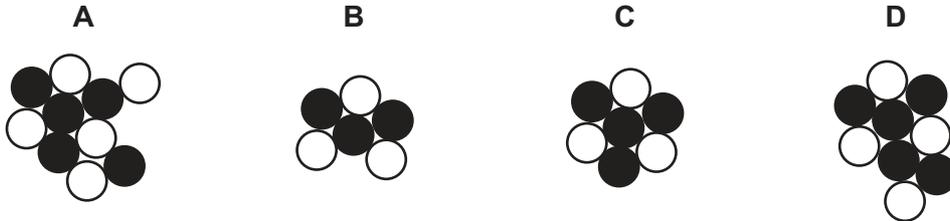
How can overheating of the cable be prevented?

- A** Do not switch off the circuit with damp hands.
- B** Make sure that the current does not become too large.
- C** Use thicker insulation on the cable.
- D** Use a thinner cable.

39 The diagram represents the nucleus of an atom.



Which diagram represents the nucleus of a different isotope of this atom?



40 A scientist measures the radiation emitted from a radioactive material every week for three weeks.

The results are shown but the reading for week 1 is missing.

time / weeks	number of emissions per minute
0	2000
1	missing reading
2	500
3	250

What is the most likely reading for week 1?

- A** 750 emissions per minute
- B** 1000 emissions per minute
- C** 1500 emissions per minute
- D** 1750 emissions per minute

**BLANK PAGE**

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cambridgeinternational.org](http://www.cambridgeinternational.org) after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

The Periodic Table of Elements

		Group																			
I	II	III	IV	V	VI	VII	VIII														
3 <b>Li</b> lithium 7	4 <b>Be</b> beryllium 9	1 <b>H</b> hydrogen 1	5 <b>B</b> boron 11	6 <b>C</b> carbon 12	7 <b>N</b> nitrogen 14	8 <b>O</b> oxygen 16	9 <b>F</b> fluorine 19	10 <b>Ne</b> neon 20													
11 <b>Na</b> sodium 23	12 <b>Mg</b> magnesium 24	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p><b>Key</b></p> <p>atomic number</p> <p>atomic symbol</p> <p>name</p> <p>relative atomic mass</p> </div>																			
19 <b>K</b> potassium 39	20 <b>Ca</b> calcium 40	13 <b>Al</b> aluminium 27	14 <b>Si</b> silicon 28	15 <b>P</b> phosphorus 31	16 <b>S</b> sulfur 32	17 <b>Cl</b> chlorine 35.5	18 <b>Ar</b> argon 40														
37 <b>Rb</b> rubidium 85	38 <b>Sr</b> strontium 88	29 <b>Cu</b> copper 64	30 <b>Zn</b> zinc 65	47 <b>Ag</b> silver 108	48 <b>Cd</b> cadmium 112	51 <b>Sb</b> antimony 122	52 <b>Te</b> tellurium 128	53 <b>I</b> iodine 127	54 <b>Xe</b> xenon 131												
55 <b>Cs</b> caesium 133	56 <b>Ba</b> barium 137	26 <b>Fe</b> iron 56	27 <b>Co</b> cobalt 59	28 <b>Ni</b> nickel 59	29 <b>Cu</b> copper 64	45 <b>Rh</b> rhodium 103	46 <b>Pd</b> palladium 106	77 <b>Ir</b> iridium 192	78 <b>Pt</b> platinum 195	79 <b>Au</b> gold 197	80 <b>Hg</b> mercury 201	81 <b>Tl</b> thallium 204	82 <b>Pb</b> lead 207	83 <b>Bi</b> bismuth 209	84 <b>Po</b> polonium —	85 <b>At</b> astatine —	86 <b>Rn</b> radon —				
87 <b>Fr</b> francium —	88 <b>Ra</b> radium —	21 <b>Sc</b> scandium 45	22 <b>Ti</b> titanium 48	23 <b>V</b> vanadium 51	24 <b>Cr</b> chromium 52	25 <b>Mn</b> manganese 55	26 <b>Fe</b> iron 56	43 <b>V</b> vanadium 51	44 <b>Cr</b> chromium 52	45 <b>Mn</b> manganese 55	46 <b>Ni</b> nickel 59	47 <b>Cu</b> copper 64	48 <b>Zn</b> zinc 65	75 <b>Rh</b> rhodium 103	76 <b>Pd</b> palladium 106	109 <b>Mt</b> meitnerium —	110 <b>Ds</b> darmstadtium —	111 <b>Rg</b> roentgenium —	112 <b>Cn</b> copernicium —	114 <b>Fl</b> flerovium —	116 <b>Lv</b> livermorium —
		57 <b>La</b> lanthanum 139	58 <b>Ce</b> cerium 140	59 <b>Pr</b> praseodymium 141	60 <b>Nd</b> neodymium 144	61 <b>Pm</b> promethium —	62 <b>Sm</b> samarium 150	63 <b>Eu</b> europium 152	64 <b>Gd</b> gadolinium 157	65 <b>Tb</b> terbium 159	66 <b>Dy</b> dysprosium 163	67 <b>Ho</b> holmium 165	68 <b>Er</b> erbium 167	69 <b>Tm</b> thulium 169	70 <b>Yb</b> ytterbium 173	71 <b>Lu</b> lutetium 175					
		89 <b>Ac</b> actinium —	90 <b>Th</b> thorium 232	91 <b>Pa</b> protactinium 231	92 <b>U</b> uranium 238	93 <b>Np</b> neptunium —	94 <b>Pu</b> plutonium —	95 <b>Am</b> americium —	96 <b>Cm</b> curium —	97 <b>Bk</b> berkelium —	98 <b>Cf</b> californium —	99 <b>Es</b> einsteinium —	100 <b>Fm</b> fermium —	101 <b>Md</b> mendelevium —	102 <b>No</b> nobelium —	103 <b>Lr</b> lawrencium —					

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

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