



# Cambridge IGCSE™

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## COMBINED SCIENCE

0653/12

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)

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### 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.

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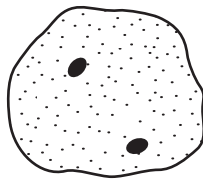
This document has **16** pages. Blank pages are indicated.



- 1 A plant is placed next to a window. After a few days, its leaves face the light.

Which characteristic is this displaying?

- A excretion
  - B nutrition
  - C respiration
  - D sensitivity
- 2 The diagram shows a cell from an animal's liver.



In what way does this cell differ from a typical animal cell?

- A It contains a central vacuole.
  - B It contains cytoplasm.
  - C It contains two nuclei.
  - D It has a cell wall.
- 3 Particles move from one area to another by diffusion.

Which row is correct about this movement?

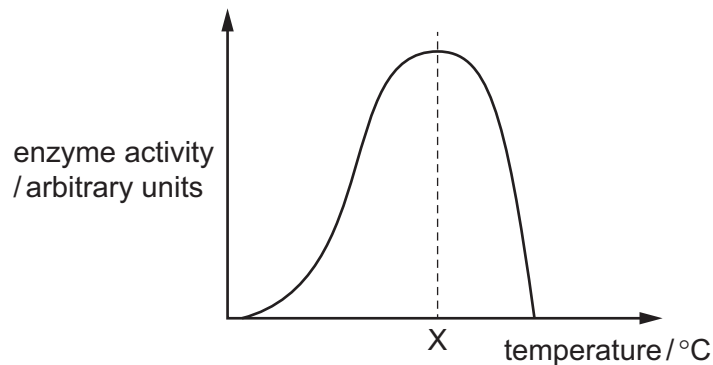
	concentration of particles in area <b>from</b> which they move	concentration of particles in area <b>to</b> which they move	movement of molecules
<b>A</b>	high	high	in a pattern
<b>B</b>	high	low	random
<b>C</b>	low	high	random
<b>D</b>	low	low	in a pattern

- 4 A student has samples of food and wants to test them for starch.

What should the student use to do this?

- A Benedict's solution
- B iodine solution
- C limewater
- D water and ethanol

- 5 The diagram shows how the activity of an enzyme changes with temperature.



This enzyme works in the human body.

What is the most likely value of temperature X?

- A 10°C
  - B 40°C
  - C 70°C
  - D 100°C
- 6 Corals are animals found in the sea. They can only survive if they live in a close relationship with algae. Algae can photosynthesise.

What do the algae produce that corals can use to survive?

	carbon dioxide	chlorophyll	glucose	oxygen
<b>A</b>	✓	✓	x	x
<b>B</b>	✓	x	x	✓
<b>C</b>	x	✓	✓	x
<b>D</b>	x	x	✓	✓

7 Some undigested food passes out of the digestive system as faeces.

What is this process?

- A absorption
- B digestion
- C egestion
- D ingestion

8 Which breakdown processes occur inside cells, and which occur outside cells?

	large molecules to small molecules for absorption	breakdown of glucose to release energy
<b>A</b>	inside	inside
<b>B</b>	inside	outside
<b>C</b>	outside	inside
<b>D</b>	outside	outside

9 Which blood vessel carries blood from the heart to the lungs?

- A aorta
- B pulmonary artery
- C pulmonary vein
- D vena cava

10 What are the effects of adrenaline on the human body?

	breathing rate	pulse rate
<b>A</b>	decreases	decreases
<b>B</b>	decreases	increases
<b>C</b>	increases	decreases
<b>D</b>	increases	increases

11 Which row describes asexual reproduction?

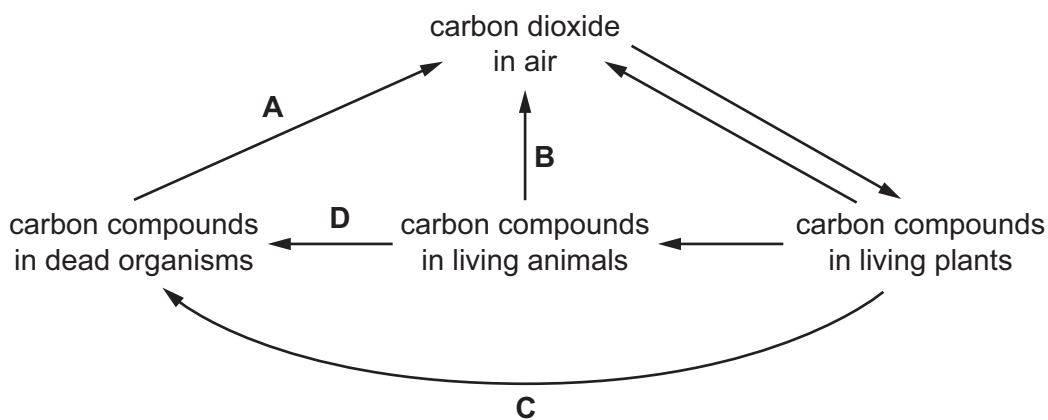
	number of parents	a zygote is produced	offspring identical to the parent
<b>A</b>	1	no	yes
<b>B</b>	1	yes	no
<b>C</b>	2	no	yes
<b>D</b>	2	yes	no

12 On which part of a flower is pollen deposited during pollination?

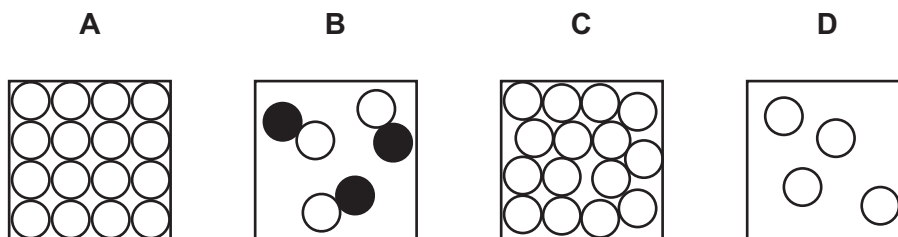
- A** ovary
- B** stamen
- C** stigma
- D** style

13 The diagram shows part of the carbon cycle.

Which arrow represents respiration by decomposers?

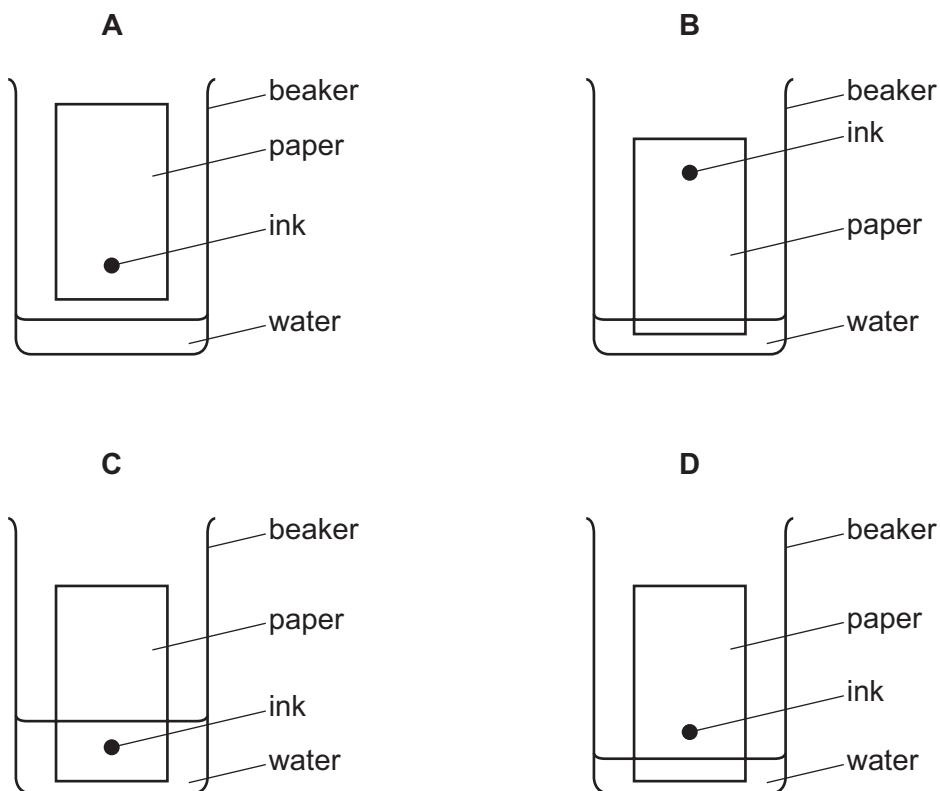


14 Which diagram represents particles in a gaseous element?



15 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



16 Which processes are physical changes?

- 1 burning methane gas
- 2 dissolving sugar in water
- 3 evaporating ethanol
- 4 melting an ice cube
- 5 rusting of iron

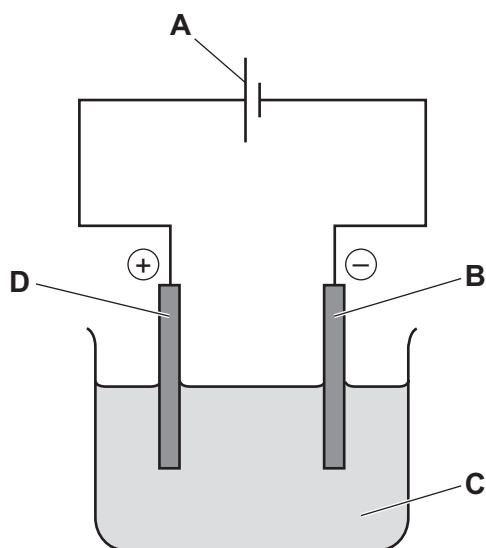
**A** 1, 3 and 4      **B** 1, 4 and 5      **C** 2, 3 and 4      **D** 2, 3 and 5

17 Which equation for the complete combustion of propane,  $C_3H_8$ , is correct?

- A**  $C_3H_8 + 2O_2 \rightarrow 3C + 4H_2O$
- B**  $2C_3H_8 + 3O_2 \rightarrow 6CO + 8H_2$
- C**  $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
- D**  $C_3H_8 + 3O_2 \rightarrow 3CO_2 + 4H_2$

18 The diagram shows the electrolysis of molten lead(II) bromide.

Which label shows the cathode?



19 Which temperature changes occur during exothermic and endothermic reactions?

	exothermic	endothermic
<b>A</b>	decreases	increases
<b>B</b>	decreases	no change
<b>C</b>	increases	decreases
<b>D</b>	increases	no change

20 Magnesium reacts with zinc oxide to form magnesium oxide and zinc.

Which substance is reduced in this reaction?

- A** magnesium
- B** magnesium oxide
- C** zinc
- D** zinc oxide

21 Dilute hydrochloric acid is tested with universal indicator and with calcium carbonate.

Which row shows the results?

	pH	reaction with calcium carbonate
<b>A</b>	2	a colourless gas is given off
<b>B</b>	2	no reaction
<b>C</b>	10	a colourless gas is given off
<b>D</b>	10	no reaction

22 Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

test	reagent(s) added	result
1	aqueous silver nitrate and nitric acid	white precipitate
2	aqueous sodium hydroxide	green precipitate

What are acid X and metal Y?

	acid	metal
<b>A</b>	hydrochloric	iron
<b>B</b>	hydrochloric	zinc
<b>C</b>	sulfuric	iron
<b>D</b>	sulfuric	zinc

23 Which row describes a Group I element?

	metal or non-metal	reaction with water
<b>A</b>	metal	fast reaction
<b>B</b>	metal	no reaction
<b>C</b>	non-metal	fast reaction
<b>D</b>	non-metal	no reaction



**24** Substance X is a coloured solid.

Substance X acts as a catalyst for the reaction between zinc and dilute sulfuric acid.

Molten X can be electrolysed.

What is X?

- A** a Group I compound
- B** a Group I metal
- C** a transition metal compound
- D** a transition metal

**25** Which method is used to extract copper from copper(II) oxide?

- A** dissolving copper(II) oxide in hydrochloric acid and then filtering
- B** dissolving copper(II) oxide in water and then filtering
- C** heating the copper(II) oxide
- D** heating the copper(II) oxide mixed with carbon

**26** Which processes are used in water treatment?

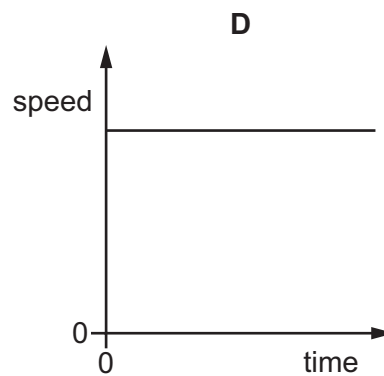
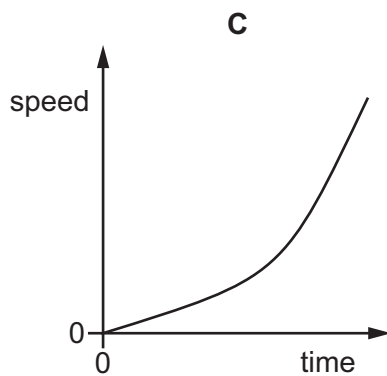
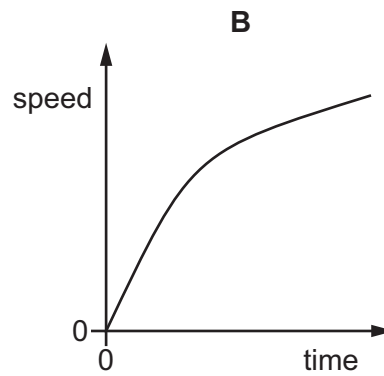
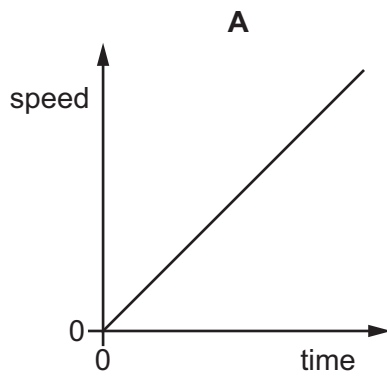
- 1 chlorination
- 2 cracking
- 3 filtration

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

**27** Which statement describes a hydrocarbon?

- A** a compound that burns to form carbon dioxide and hydrogen
- B** a compound that contains carbon and hydrogen only
- C** a compound that only contains ionic bonds
- D** a compound that reacts easily with metals

28 Which speed–time graph represents motion for which the acceleration is constant but **not** zero?



29 A solid metal cube of side 5.0 cm has a mass of 250 g.

What is the density of the metal?

- A** 0.50 g/cm<sup>3</sup>    **B** 2.0 g/cm<sup>3</sup>    **C** 10 g/cm<sup>3</sup>    **D** 50 g/cm<sup>3</sup>

30 A car powered by a petrol (gasoline) engine is driven along a horizontal road.

How is energy stored in the petrol and what form of energy does the car have because it is moving?

	energy in petrol	energy of moving car
<b>A</b>	chemical potential	gravitational potential
<b>B</b>	chemical potential	kinetic
<b>C</b>	electrical	gravitational potential
<b>D</b>	electrical	kinetic

31 The molecules of a liquid are close together.

What are other features of the molecules in a liquid?

- A They are arranged in a regular pattern but change positions with each other.
- B They are arranged in a regular pattern and vibrate about fixed positions.
- C They are arranged randomly and change positions with each other.
- D They are arranged randomly and vibrate about fixed positions.

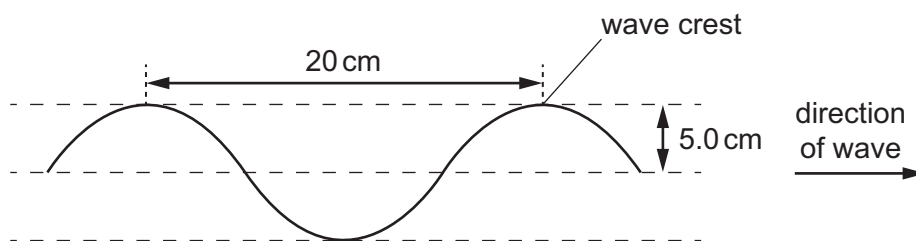
32 In which states of matter can convection occur?

	in a solid	in a liquid	in a gas
<b>A</b>	no	no	yes
<b>B</b>	no	yes	yes
<b>C</b>	yes	no	no
<b>D</b>	yes	yes	no

33 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.

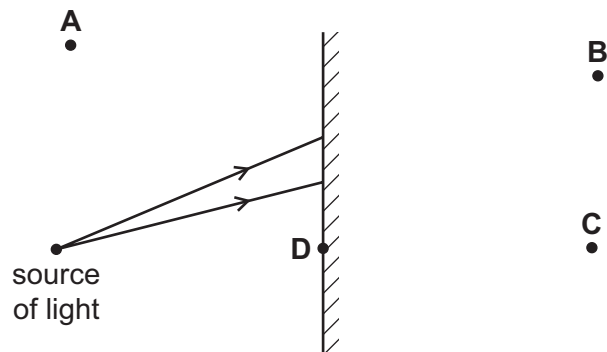


What is the speed of the wave?

- A 4.0 cm/s
- B 5.0 cm/s
- C 20 cm/s
- D 80 cm/s

- 34 A source of light is placed in front of a plane mirror.

Which labelled point shows the position of the image of the source?



- 35 Radio waves, visible light and X-rays all travel in a vacuum.

Which wave travels at the greatest speed?

- A radio waves
  - B visible light
  - C X-rays
  - D they all travel at the same speed
- 36 Which is **not** able to transmit sound waves?
- A a gas
  - B a liquid
  - C a solid
  - D a vacuum
- 37 A positively charged sphere hangs from an insulating thread.

A student brings a rod close to the sphere.

The sphere moves away from the rod.

Which conclusion can the student draw about the rod?

- A It is charged but it is not possible to know whether it is negatively or positively charged.
- B It is negatively charged.
- C It is not charged.
- D It is positively charged.

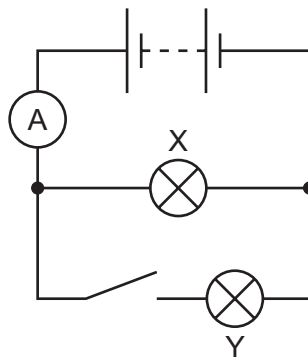
38 A power supply causes a current in a circuit.

The electromotive force (e.m.f.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

	e.m.f.	resistance
<b>A</b>	decreased	decreased
<b>B</b>	decreased	increased
<b>C</b>	increased	decreased
<b>D</b>	increased	increased

39 The diagram shows an electric circuit. The switch is closed and both lamps are lit.



Lamp Y is now switched off. Lamp X remains lit.

What happens to the reading on the ammeter?

- A** It decreases to zero.
- B** It decreases but to a value greater than zero.
- C** It stays the same.
- D** It increases.

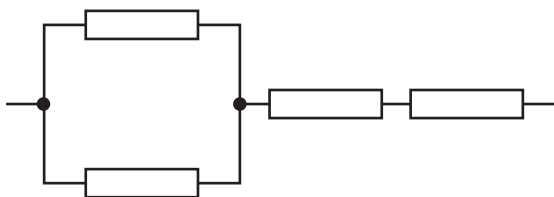
40 The diagrams show four identical resistors connected in different combinations.

Which combination has the greatest combined resistance?

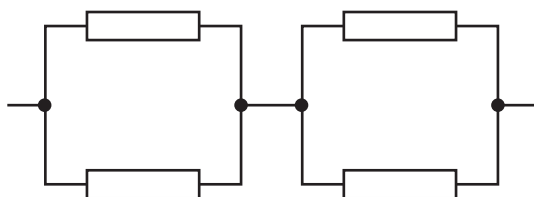
A



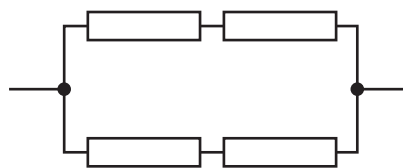
B



C



D



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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	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	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		
19 <b>K</b> potassium 39	20 <b>Ca</b> calcium 40	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	27 <b>Co</b> cobalt 59	28 <b>Ni</b> nickel 59
37 <b>Rb</b> rubidium 85	38 <b>Sr</b> strontium 88	39 <b>Y</b> yttrium 89	40 <b>Zr</b> zirconium 91	41 <b>Nb</b> niobium 93	42 <b>Mo</b> molybdenum 96	43 <b>Tc</b> technetium -	44 <b>Ru</b> ruthenium 101	45 <b>Rh</b> rhodium 103	46 <b>Pd</b> palladium 106
55 <b>Cs</b> caesium 133	56 <b>Ba</b> barium 137	57-71 lanthanoids	72 <b>Hf</b> hafnium 178	73 <b>Ta</b> tantalum 181	74 <b>W</b> tungsten 184	75 <b>Re</b> rhenium 186	76 <b>Os</b> osmium 190	77 <b>Ir</b> iridium 192	78 <b>Pt</b> platinum 195
87 <b>Fr</b> francium -	88 <b>Ra</b> radium -	89-103 actinoids	104 <b>Rf</b> rutherfordium -	105 <b>Db</b> dubnium -	106 <b>Sg</b> seaborgium -	107 <b>Bh</b> bohrium -	108 <b>Hs</b> hassium -	109 <b>Mt</b> meitnerium -	110 <b>Ds</b> darmstadtium -
		29 <b>Cu</b> copper 64	30 <b>Zn</b> zinc 65	47 <b>Ag</b> silver 108	48 <b>Cd</b> cadmium 112	79 <b>Hg</b> mercury 201	80 <b>Tl</b> thallium 204	81 <b>Pb</b> lead 207	82 <b>Bi</b> bismuth 209
		49 <b>In</b> indium 115	50 <b>Sn</b> tin 119	51 <b>Sb</b> antimony 122	52 <b>Te</b> tellurium 128	83 <b>Po</b> polonium -	84 <b>At</b> astatine -	85 <b>Lv</b> livermorium -	86 <b>Rn</b> radon -
		111 <b>Rg</b> roentgenium -	112 <b>Cn</b> copernicium -						

Key

atomic number
atomic symbol
name
relative atomic mass

		67 <b>Ho</b> holmium 165	68 <b>Er</b> erbitium 167	69 <b>Tm</b> thulium 169	70 <b>Yb</b> ytterbium 173	71 <b>Lu</b> lutetium 175
		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 -
		65 <b>Tb</b> terbium 159	66 <b>Dy</b> dysprosium 163	67 <b>Ho</b> holmium 165	68 <b>Er</b> erbitium 167	69 <b>Tm</b> thulium 169
		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 -
		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
		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 -
		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
		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 -
		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
		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 -
		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
		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 -

lanthanoids

actinoids

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