UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/01**

Paper 1 Multiple Choice

October/November 2006

45 minutes

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

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, 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.

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.

IB06 11_0653_01/6RP

UNIVERSITY of CAMBRIDGE International Examinations

[Turn over

1 Living and dead plant cells are placed in a dilute solution of red dye. After a few minutes the cells are observed using a microscope. Only the dead cells are stained red.

Which part of the living cells stops the uptake of the red dye?

A cell membrane

B cell wall

C cytoplasm

D nucleus

2 Which type of chemical is the enzyme catalase?

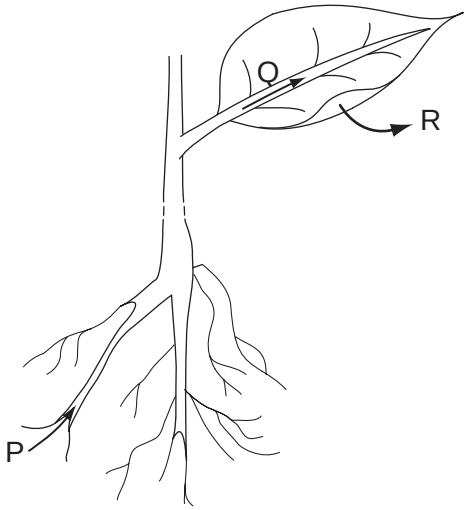
A fat

B protein

C starch

D sugar

3 The diagram shows the pathway taken by water as it passes through a plant.



In which state is the water at positions P, Q and R?

	P	Q	R
A	liquid	liquid	liquid
B	liquid	liquid	vapour
C	liquid	vapour	vapour
D	vapour	vapour	vapour

4 Four foods are each tested separately with Benedict's, biuret and iodine solutions.

Which food contains starch and reducing sugar?

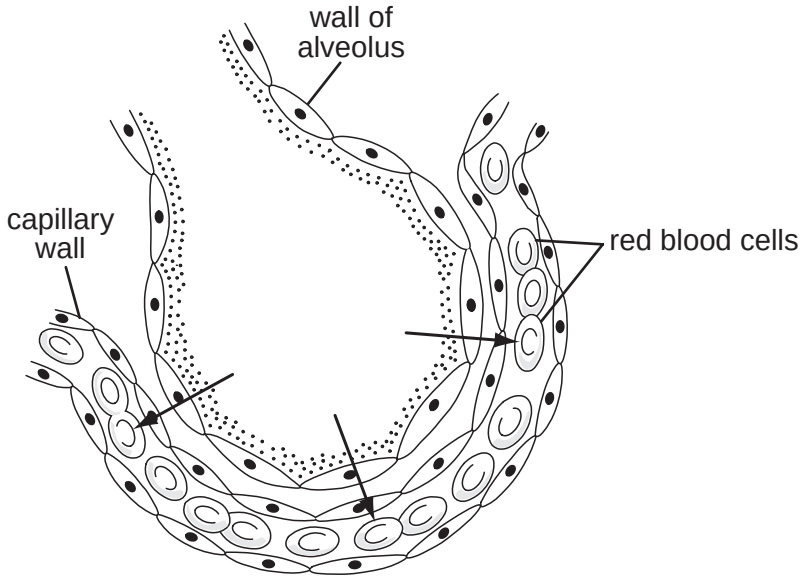
food	Benedict's test	biuret test	iodine test
A	✓	✓	✗
B	✓	✗	✓
C	✗	✗	✓
D	✗	✓	✗

key

✓ = positive result

✗ = negative result

5 The diagram shows an alveolus and one of its capillaries.



What moves in the direction shown by the arrows?

A carbon dioxide

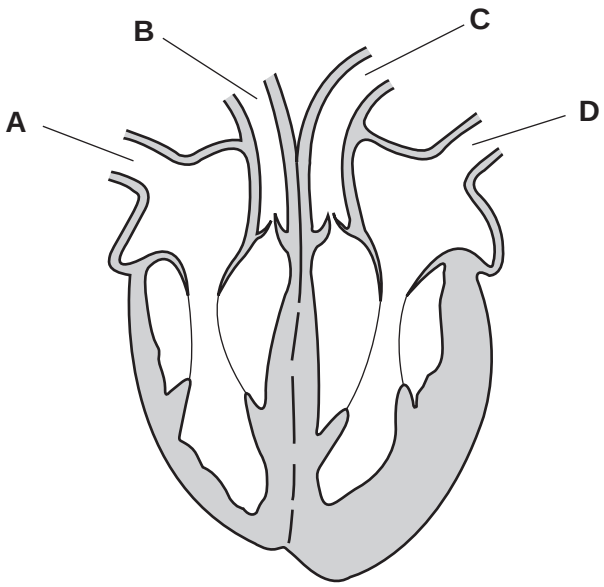
B hydrogen

C oxygen

D water

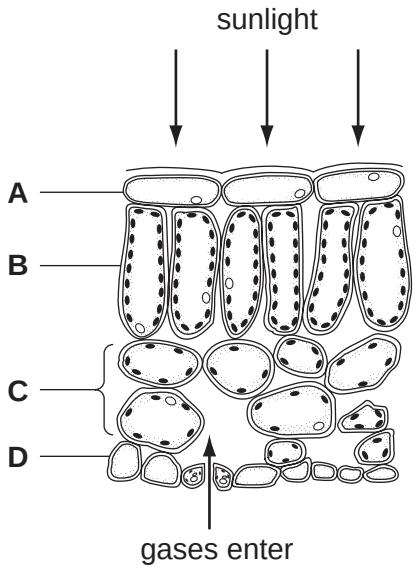
6 The diagram shows a section through the human heart.

Which vessel is a vein containing oxygenated blood?



7 The diagram shows some cells in a leaf of a green plant.

In which layer of cells does most photosynthesis occur?



8 In a healthy person, which shows the correct relationship between blood sugar level, insulin level in the blood, and liver activity?

	blood sugar level	insulin level	liver activity
A	high	high	removes glucose from the blood
B	high	low	releases glucose into the blood
C	low	high	releases glucose into the blood
D	low	low	removes glucose from the blood

9 A variety of potato plant produces red tubers ('potatoes') that grow into new potato plants which then produce red 'potatoes' the following year.

Why is this?

A Asexual reproduction produces identical potato plants.

B Asexual reproduction results in different coloured 'potatoes'.

C Sexual reproduction requires the potato plant to produce flowers.

D Sexual reproduction produces only red coloured 'potatoes'.

10 After it has been fertilised, which part of a flower develops into a seed?

A egg

B ovary

C ovule

D pollen

11 Which pairs of human features are inherited and **not** affected by the environment?

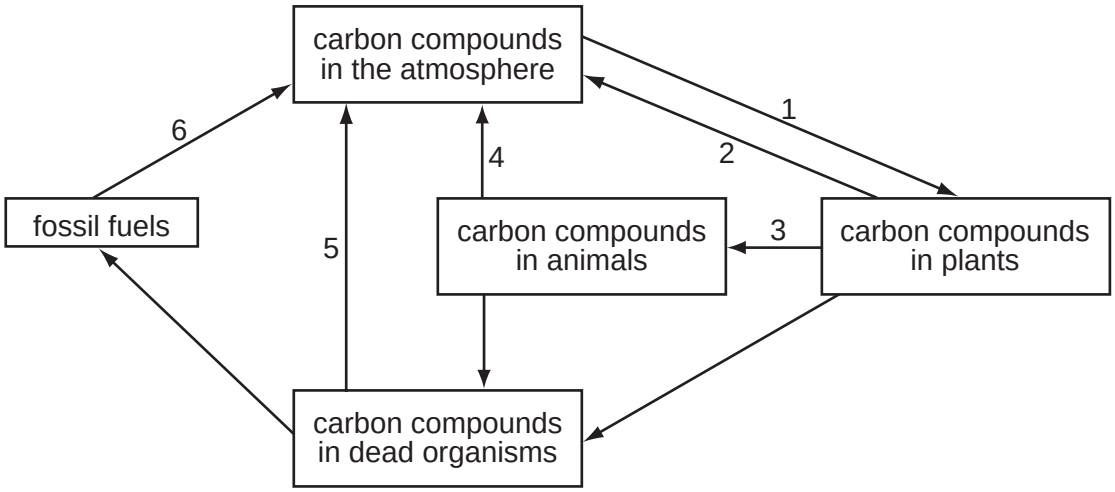
A blood group and body mass

B blood group and sex

C hair colour and height

D sex and body mass

12 The diagram shows the carbon cycle.



Which of the numbered processes represent respiration and photosynthesis?

	respiration	photosynthesis
A	3	1
B	4	1
C	5	2
D	6	3

13 Which statement describes species diversity?

A the number of different types of habitat in which species are found

B the total number of habitats in which a species is found

C the number of species in a community

D the number of variations within a species

14 Which substance is an element?

A air

B brass

C iron

D water

15 Atoms of four different elements are shown.

Which atom contains six neutrons?

A $^{4}_{2}He$ **B** $^{6}_{3}Li$ **C** $^{11}_{5}B$ **D** $^{14}_{6}C$

16 Which substance is an ionic compound?

	melting point	electrical conductivity when melted
A	high	high
B	high	low
C	low	high
D	low	low

17 Which property of an element **cannot** be predicted from its position in the Periodic Table?

A the charge on its ion

B the melting point of the element

C the metallic / non-metallic character of the element

D the number of protons in its nucleus

18 The diagram shows some elements in Groups III, IV and V of the Periodic Table.

III	IV	V
A*l*	Si	P
Ga	Ge	As
In	Sn	Sb
T*l*	Pb	Bi

Which two elements would be expected to form an oxide of the type XO_2?

	In and Sn	Sn and Pb
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

19 Which element, present in fossil fuels, is responsible for causing 'acid rain'?

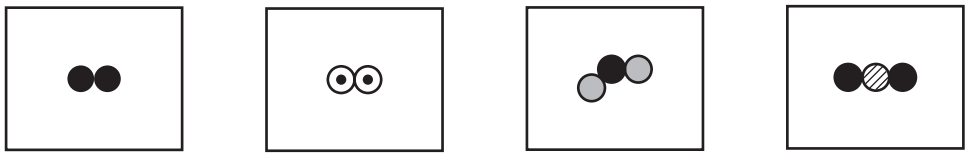
A carbon

B hydrogen

C oxygen

D sulphur

20 The diagrams show some molecules of substances present in air. Different circles represent atoms of different elements.



Which elements could be shown as ⊙ and ●?

	⊙ = nitrogen	● = oxygen
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

21 Three metals are listed.

copper

magnesium

zinc

Which of these metals react with dilute sulphuric acid?

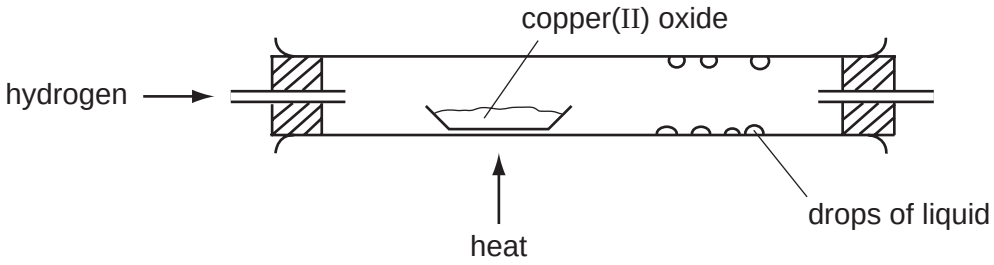
A copper and magnesium only

B copper and zinc only

C magnesium and zinc only

D copper, magnesium and zinc

22 Hydrogen is passed over heated copper(II) oxide as shown.



The copper(II) oxide is reduced.

Which other statement also describes a change that occurs during the reaction?

A Copper is distilled.

B Copper(II) oxide is thermally decomposed.

C Hydrogen is condensed.

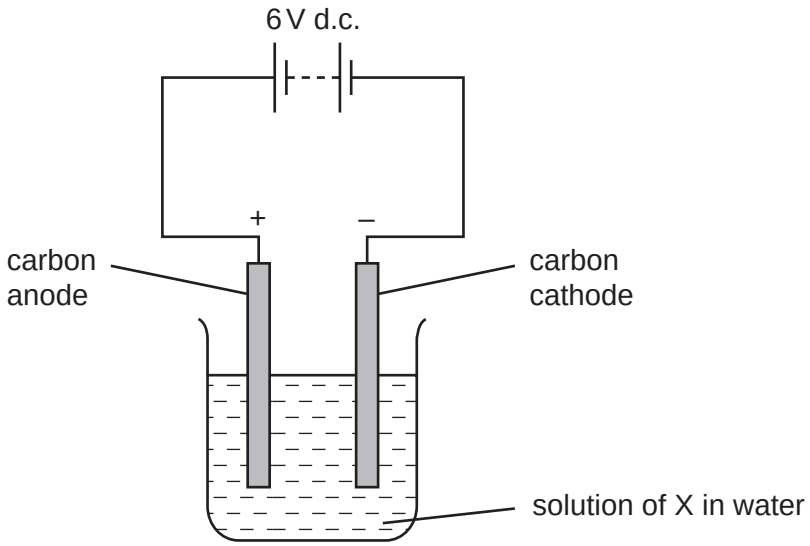
D Hydrogen is oxidised.

23 Sodium chloride is an ionic salt that is used industrially as an electrolyte.

Under which conditions does sodium chloride behave as an electrolyte?

	solid	molten	in aqueous solution
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

24 A substance, X, is dissolved in water and electrolysed as shown.



A yellow-green gas is given off at the anode and the cathode becomes brown.

What is X?

A copper(II) chloride

B lead(II) bromide

C sodium bromide

D sodium chloride

25 Which fuel burns to form only one product?

A coal

B hydrogen

C methane

D petrol

26 Why is water often used to extinguish fires?

A Water is a compound.

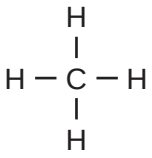
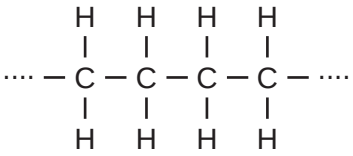
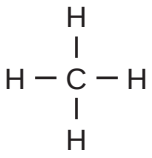
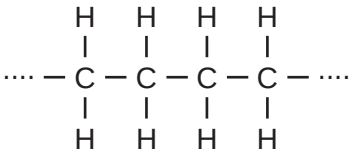
B Water is neutral.

C Water reacts with most fuels.

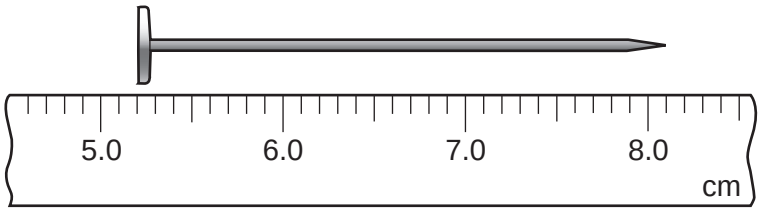
D Water removes heat from the fire.

27 Some man-made plastics are made from small molecules which join together by covalent bonds.

What is the main source of these small molecules and what is the structure of the plastics?

	source of small molecules	*structure*
A	coal	
B	coal	
C	oil	
D	oil	

28 A ruler is used to measure the length of a nail.



What is the length of the nail?

A 1.3 cm **B** 2.9 cm **C** 5.2 cm **D** 8.1 cm

29 A newton is a unit of force.

Which quantity is measured in newtons?

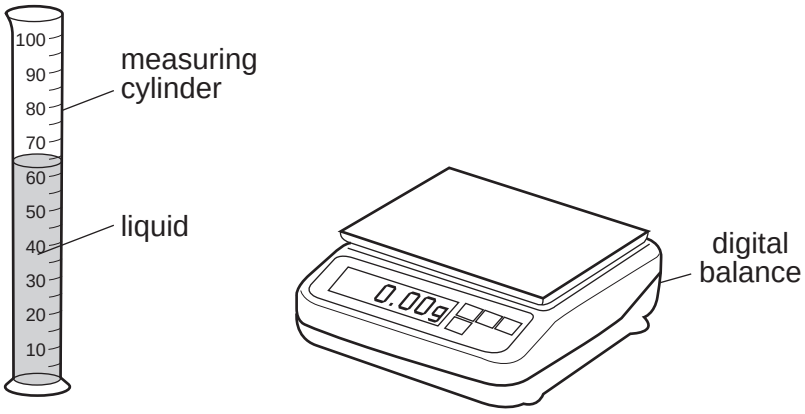
A acceleration

B density

C mass

D weight

30 A student pours liquid into a measuring cylinder.



The student records the volume of the liquid from the scale on the measuring cylinder. He then puts the measuring cylinder containing the liquid on a balance and records the mass.

What else needs to be measured before the density of the liquid can be calculated?

A the depth of the liquid in the measuring cylinder

B the mass of the empty measuring cylinder

C the temperature of the liquid in the measuring cylinder

D the volume of the empty measuring cylinder

31 Which source of energy uses the production of steam to generate electricity?

A hydroelectric

B nuclear

C tides

D waves

32 A cyclist travels down a hill from rest at point X without pedalling.

The cyclist applies his brakes and the cycle stops at point Y.

Which energy changes have taken place between X and Y?

A kinetic → heat → potential

B kinetic → potential → heat

C potential → heat → kinetic

D potential → kinetic → heat

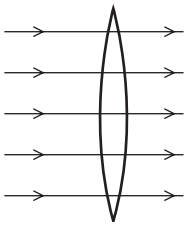
33 Which line in the table is correct about conduction and convection?

	conduction	convection
A	can happen in a solid	can happen in a solid
B	can happen in a solid	only happens in fluids
C	only happens in fluids	can happen in a solid
D	only happens in fluids	only happens in fluids

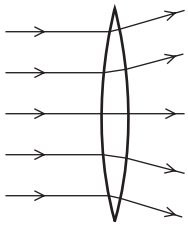
34 A parallel beam of light falls on a converging lens.

Which diagram shows what happens to the beam of light?

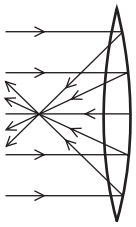
A



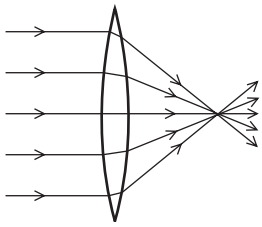
B



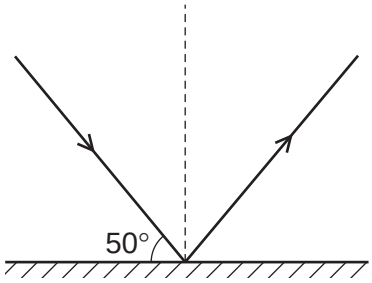
C



D



35 The diagram shows a ray of light striking a plane mirror.



What is the angle of reflection?

A 40° **B** 50° **C** 80° **D** 130°

36 When electricity is transmitted over long distances energy is wasted.

How can the wasted energy be kept as small as possible?

A Keep the current in the transmission lines as large as possible.

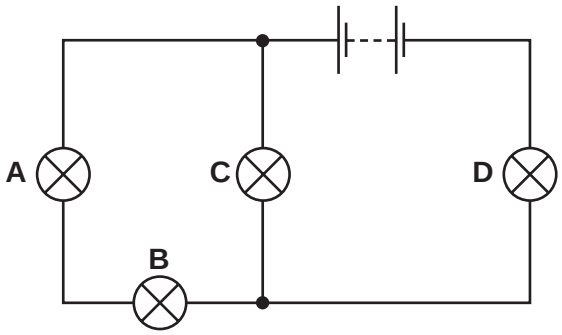
B Keep the power supplied to the transmission lines as large as possible.

C Keep the resistance of the transmission lines as large as possible.

D Keep the voltage supplied to the transmission lines as large as possible.

37 In the circuit below, one of the lamps breaks, causing all the other lamps to go out.

Which lamp breaks?



38 An electric heater is connected to the mains using insulated copper wires. The wires become very warm.

What can be done to prevent so much heat being produced in the connecting wires?

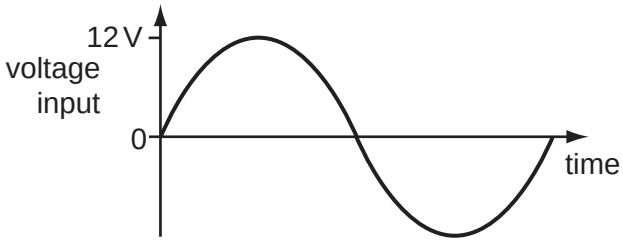
A Use thicker copper wires.

B Use thinner copper wires.

C Use thicker insulation.

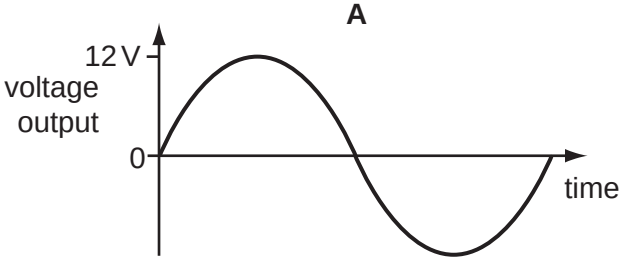
D Use thinner insulation.

39 The graph shows the voltage input to a step-down transformer.

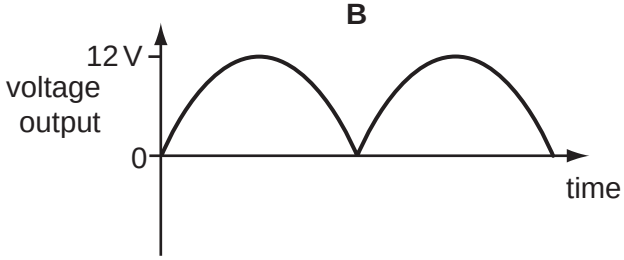


Which diagram shows the voltage output from the transformer?

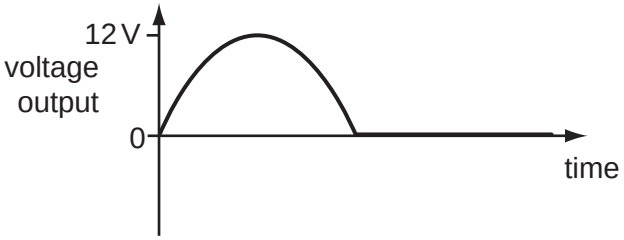
A



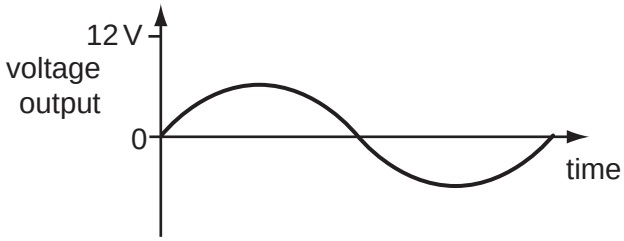
B



C



D



40 Which line in the table describes the nature of an alpha-particle and of a gamma-ray?

	alpha-particle	gamma-ray
A	helium nucleus	electromagnetic radiation
B	helium nucleus	electron
C	proton	electromagnetic radiation
D	proton	electron

DATA SHEET
The Periodic Table of the Elements

Group																		
I	II										III	IV	V	VI	VII	0
																4 **He** Helium 2
					1 **H** Hydrogen 1											
7 **Li** Lithium 3	9 **Be** Beryllium 4										11 **B** Boron 5	12 **C** Carbon 6	14 **N** Nitrogen 7	16 **O** Oxygen 8	19 **F** Fluorine 9	20 **Ne** Neon 10
23 **Na** Sodium 11	24 **Mg** Magnesium 12										27 **Al** Aluminium 13	28 **Si** Silicon 14	31 **P** Phosphorus 15	32 **S** Sulphur 16	35.5 **Cl** Chlorine 17	40 **Ar** Argon 18
39 **K** Potassium 19	40 **Ca** Calcium 20	45 **Sc** Scandium 21	48 **Ti** Titanium 22	51 **V** Vanadium 23	52 **Cr** Chromium 24	55 **Mn** Manganese 25	56 **Fe** Iron 26	59 **Co** Cobalt 27	59 **Ni** Nickel 28	64 **Cu** Copper 29	65 **Zn** Zinc 30	70 **Ga** Gallium 31	75 **As** Arsenic 33	79 **Se** Selenium 34	80 **Br** Bromine 35	84 **Kr** Krypton 36
85 **Rb** Rubidium 37	88 **Sr** Strontium 38	89 **Y** Yttrium 39	91 **Zr** Zirconium 40	93 **Nb** Niobium 41	96 **Mo** Molybdenum 42	**Tc** Technetium 43	101 **Ru** Ruthenium 44	103 **Rh** Rhodium 45	106 **Pd** Palladium 46	108 **Ag** Silver 47	112 **Cd** Cadmium 48	115 **In** Indium 49	119 **Sn** Tin 50	122 **Sb** Antimony 51	128 **Te** Tellurium 52	127 **I** Iodine 53	131 **Xe** Xenon 54
133 **Cs** Caesium 55	137 **Ba** Barium 56	139 **La** Lanthanum 57 *	178 **Hf** Hafnium 72	181 **Ta** Tantalum 73	184 **W** Tungsten 74	186 **Re** Rhenium 75	190 **Os** Osmium 76	192 **Ir** Iridium 77	195 **Pt** Platinum 78	197 **Au** Gold 79	201 **Hg** Mercury 80	204 **Tl** Thallium 81	207 **Pb** Lead 82	209 **Bi** Bismuth 83	**Po** Polonium 84	**At** Astatine 85	**Rn** Radon 86
Fr Francium 87	226 **Ra** Radium 88	227 **Ac** Actinium 89 †															

140 **Ce** Cerium 58	141 **Pr** Praseodymium 59	144 **Nd** Neodymium 60	**Pm** Promethium 61	150 **Sm** Samarium 62	152 **Eu** Europium 63	157 **Gd** Gadolinium 64	159 **Tb** Terbium 65	162 **Dy** Dysprosium 66	165 **Ho** Holmium 67	167 **Er** Erbium 68	169 **Tm** Thulium 69	173 **Yb** Ytterbium 70	175 **Lu** Lutetium 71
232 **Th** Thorium 90	**Pa** Protactinium 91	238 **U** Uranium 92	**Np** Neptunium 93	**Pu** Plutonium 94	**Am** Americium 95	**Cm** Curium 96	**Bk** Berkelium 97	**Cf** Californium 98	**Es** Einsteinium 99	**Fm** Fermium 100	**Md** Mendelevium 101	**No** Nobelium 102	**Lr** Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

Key

a
X
b

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

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