UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/11**

Paper 1 Multiple Choice **May/June 2011**

45 minutes

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

9255019208

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.

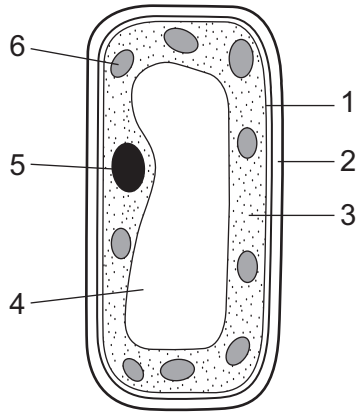
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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.

This document consists of **15** printed pages and **1** blank page.

1 The diagram shows a palisade cell.



Which parts are found in plant cells and **not** in animal cells?

	1	2	3	4	5	6
A	✓	✗	✓	✓	✗	✗
B	✓	✗	✓	✗	✓	✗
C	✗	✓	✗	✓	✗	✓
D	✗	✓	✗	✗	✓	✓

key

✓ = found in plant cells only

✗ = not found in plant cells only

2 Which list shows substances each of which can diffuse into and out of cells?

A amino acids, glucose and oxygen

B carbon dioxide, cellulose and glucose

C carbon dioxide, oxygen and starch

D carbon monoxide, oxygen and protein

3 Where does most of the water enter a plant?

A guard cells

B mesophyll cells

C root hair cells

D xylem vessels

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

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

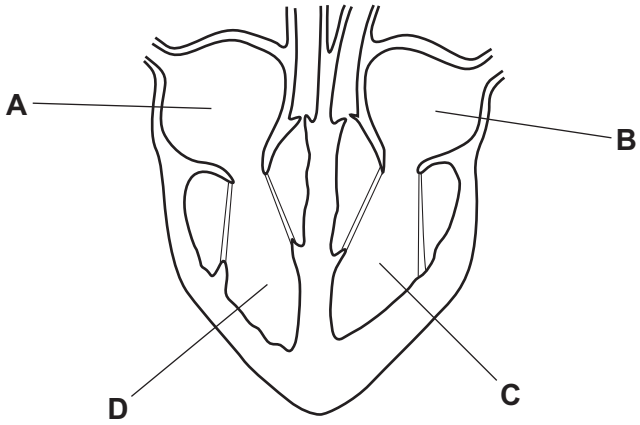
5 Which health problems may result from smoking cigarettes?

	bronchitis	emphysema	lung cancer
A	✓	✓	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

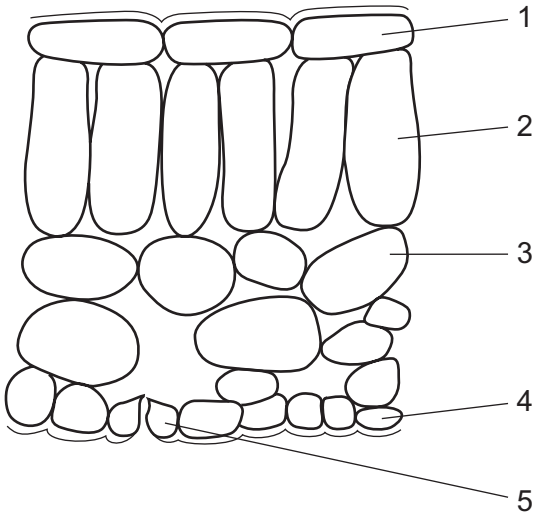
key
✓ = yes
✗ = no

6 The diagram shows the human heart in section.

Which chamber of the heart pumps blood the greatest distance?



7 The diagram shows the arrangement of cells in a vertical section of a leaf of a green plant. No cell contents are shown.



In which cells is light energy turned into chemical energy?

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

8 The statements describe events that occur when glucose is absorbed from the alimentary canal.

1 Blood sugar level falls.

2 Blood sugar level rises.

3 Insulin is released.

4 Liver removes glucose from the blood.

Which is the correct order of events?

A $2 \rightarrow 3 \rightarrow 4 \rightarrow 1$

B $2 \rightarrow 4 \rightarrow 3 \rightarrow 1$

C $3 \rightarrow 2 \rightarrow 4 \rightarrow 1$

D $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

9 What does the intra-uterine device (IUD) prevent?

A fertilisation of the egg

B implantation of the zygote

C release of eggs from the ovary

D sperms entering the uterus

10 Which feature **must** all members of the same clone of a plant have in common?

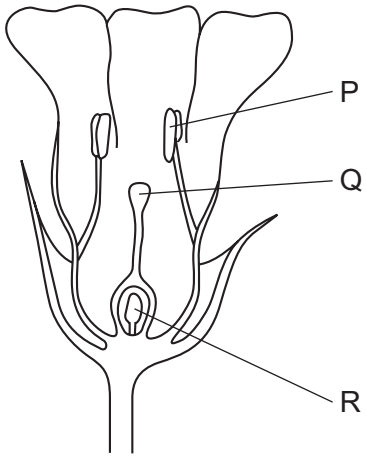
A They all grow at the same rate.

B They all grow from seeds.

C They all have fruits of the same size.

D They all have the same alleles.

11 The diagram shows a section through a flower.



Where are the male gametes made and where are the female gametes made?

	male gametes	female gametes
A	P	Q
B	P	R
C	Q	P
D	Q	R

12 Which type or types of variation in organisms can be inherited?

	variation caused by genes	variation caused by the environment
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

13 Deforestation in tropical rain forests can lead to

A decreased carbon dioxide in the air.

B decreased species diversity.

C increased number of habitats.

D increased oxygen in the air.

14 An atom is represented by the symbol $^{19}_{9}X$.

How many electrons, neutrons and protons are in this atom?

	electrons	neutrons	protons
A	9	9	9
B	9	10	9
C	10	10	9
D	19	9	10

15 Element X reacts with element Y to form compound XY. It also reacts with element Z to form compound XZ.

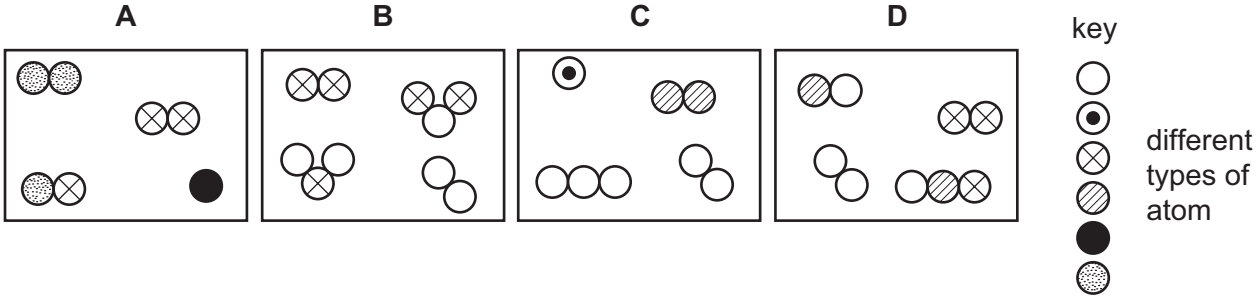
Compound XY is an electrolyte and compound XZ is a non-electrolyte.

Which row correctly shows whether elements X, Y and Z are metals or non-metals?

	metals	non-metals
A	X	Y, Z
B	X, Z	Y
C	Y	X, Z
D	Y, Z	X

16 The diagrams show four different mixtures of gases.

Which diagram represents a mixture containing **only** elements?



17 Which equation is correctly balanced and shows the correct formulae?

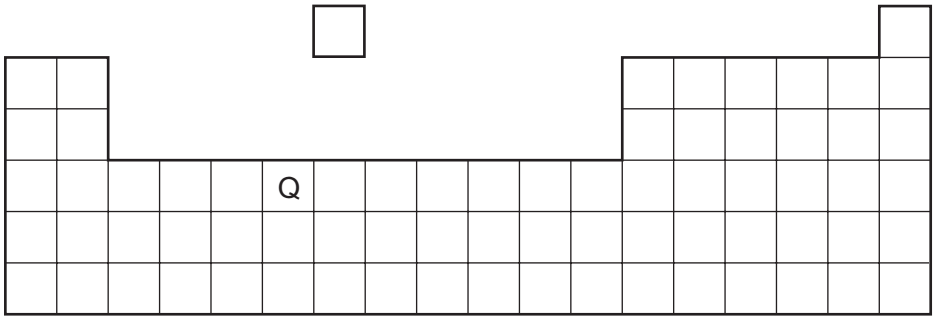
A $H_2 + Cl_2 \rightarrow H_2Cl_2$

B $H_2 + Cl_2 \rightarrow 2HCl$

C $2H + 2Cl_2 \rightarrow H_2Cl_2$

D $2H + Cl_2 \rightarrow 2HCl_2$

18 The position in the Periodic Table of an element Q is shown.



Which description of Q is correct?

A It is green and has diatomic molecules.

B It is soft and a good electrical conductor.

C It is very dense and has a high melting point.

D It reacts violently with cold water.

19 A new alloy is resistant to corrosion. It costs about the same as aluminium but it is slightly poisonous.

Its density compared with stainless steel and aluminium is shown.

	aluminium	new alloy	stainless steel
density / g / cm^3	2.7	2.8	7.9

What could this new alloy be used to make?

A aircraft frames

B cutlery

C electrical insulators

D food containers

20 Carbon monoxide gas is present in car exhausts.

Why is this gas a pollutant?

A It causes acid rain.

B It causes asthma.

C It damages buildings.

D It is poisonous.

21 Metal X reacts vigorously with dilute hydrochloric acid.

Salts of metal X give a red colour in a flame test.

What is X?

A calcium

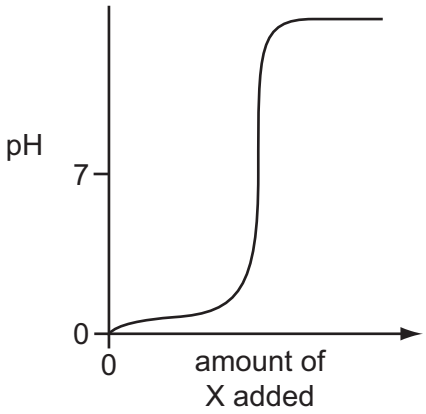
B copper

C potassium

D sodium

22 Substance X is added to dilute sulfuric acid until reaction is complete.

The graph shows how the pH changes during the reaction.



Which type of substance is X?

A base

B catalyst

C indicator

D salt

23 Which chemical equation represents a thermal decomposition reaction?

A $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

B $HCl + NaOH \rightarrow NaCl + H_2O$

C $H_2 + Cl_2 \rightarrow 2HCl$

D $MgCO_3 \rightarrow MgO + CO_2$

24 Element X is non-metallic.

It is used in the purification of water.

It is made by electrolysis of one of its salts.

At which electrode is it formed and what is its colour?

	electrode	colour
A	anode	red
B	anode	yellow-green
C	cathode	red
D	cathode	yellow-green

25 Many industrial reactions use a catalyst.

What are the advantages of using a catalyst?

	they are not used up in the reaction	they increase speed of the reaction	they increase the amount of product
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

key
✓ = true
✗ = not true

26 Kerosene is a hydrocarbon fuel obtained from crude oil.

Which statement is correct?

A Kerosene burns to form carbon dioxide and water.

B Kerosene contains the elements carbon, hydrogen and oxygen.

C Kerosene is used as a fuel for cars.

D The combustion of kerosene is an endothermic reaction.

27 Plastics are used as substitutes for natural materials.

Which statement about the manufacture of plastics is correct?

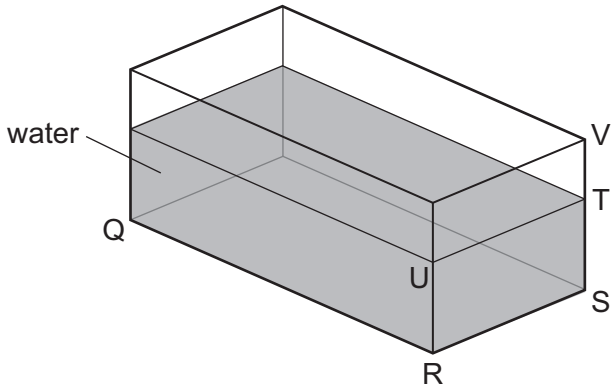
A Plastics are made by breaking long-chain molecules into shorter chain ones.

B Plastics are made by joining polymers together.

C Plastics are made by fractional distillation of crude oil (petroleum).

D Plastics are made by joining short-chain molecules together.

28 A glass tank contains some water.



The length QR and the width RS of the tank are known.

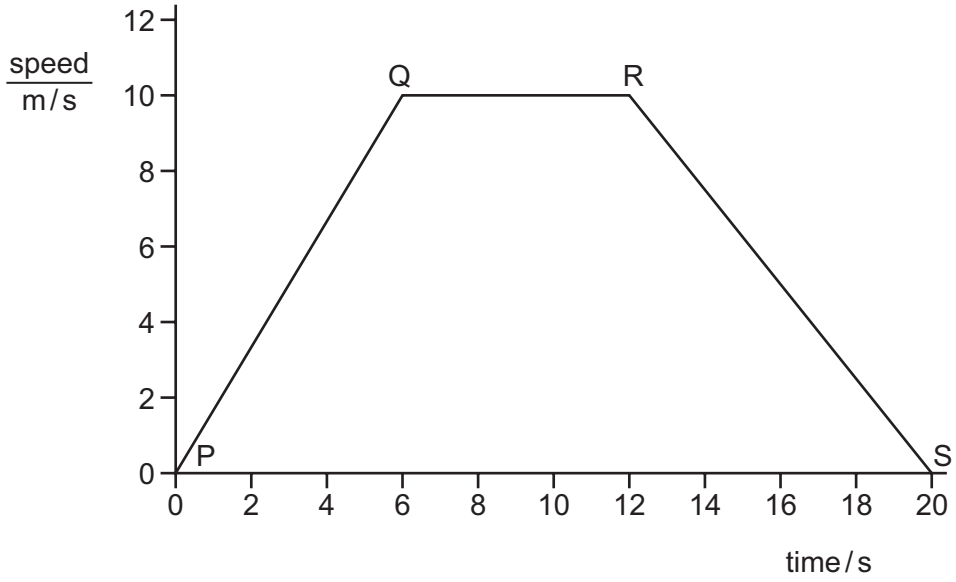
What other distance needs to be known in order to be able to calculate the volume of the water?

A ST **B** SV **C** TU **D** TV

29 Which is the unit for force and which is the unit for weight?

	force	weight
A	kg	kg
B	kg	N
C	N	kg
D	N	N

30 The graph shows how the speed of a car changes with time.



Between which points on the graph is the acceleration zero?

A PQ only **B** QR only **C** RS only **D** PQ and RS

31 A car takes 30 minutes to travel a distance of 60 km.

What is the average speed of the car?

A 2.0 km / hour

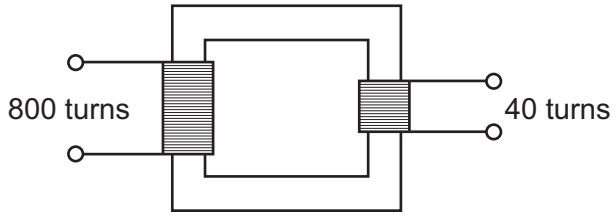
B 30 km / hour

C 120 km / hour

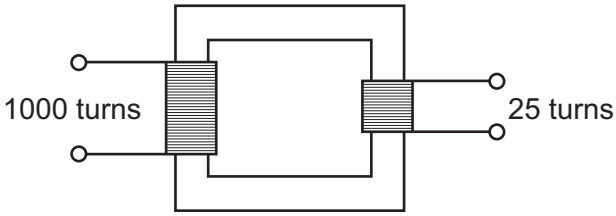
D 1800 km / hour

32 Which transformer would change a 240 V a.c. input into a 15 V a.c. output?

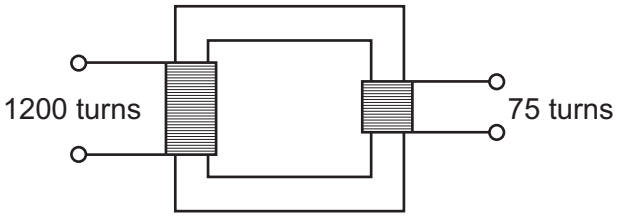
A



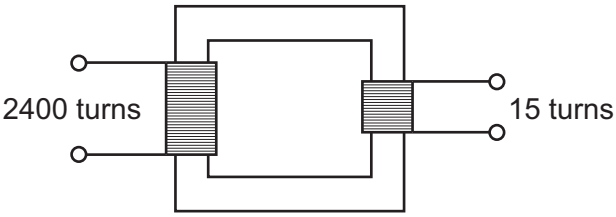
B



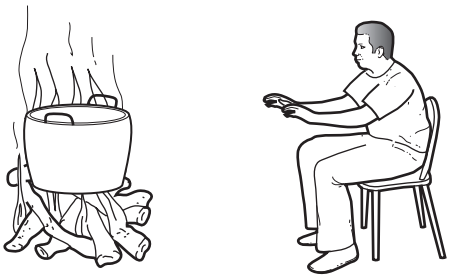
C



D



33 A man warms himself by a fire.



Which method of heat transfer supplies the **most** heat energy to him?

A conduction through the air

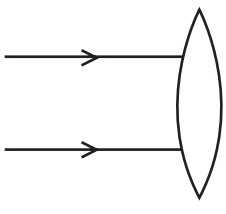
B convection by moving air

C evaporation by moving water vapour

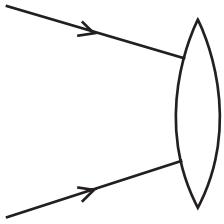
D infra-red radiation

34 In which diagram will the two light rays shown both pass through the principal focus (focal point) of the lens after passing through the lens?

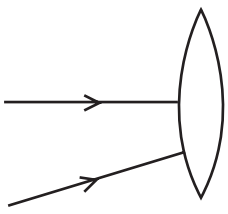
A



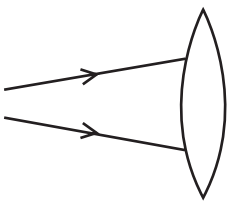
B



C



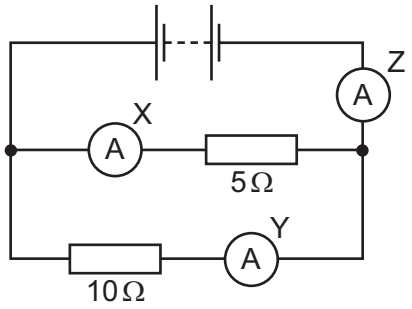
D



35 Which row shows the input energy and the output energy for a microphone?

	input energy	output energy
A	electrical	potential
B	electrical	sound
C	sound	electrical
D	sound	potential

36 The diagram shows a circuit with three ammeters, X, Y and Z.

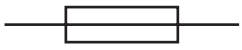


The ammeter readings are 1 A, 2 A and 3 A.

Which ammeter has which reading?

	X	Y	Z
A	1 A	2 A	3 A
B	3 A	2 A	1 A
C	2 A	3 A	1 A
D	2 A	1 A	3 A

37 A circuit diagram contains the following symbol.



What does this symbol represent?

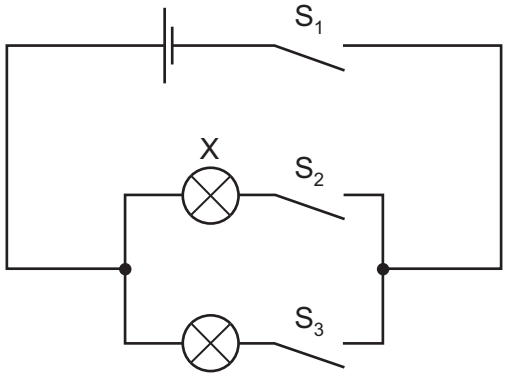
A a fixed resistor

B a fuse

C a relay

D a variable resistor

38 The diagram shows an electric circuit.



Which switches will have to be closed so that **only** bulb X will light?

A S_1, S_2 and S_3

B S_1 and S_2 only

C S_1 and S_3 only

D S_2 and S_3 only

39 A student copies a diagram of the electromagnetic spectrum but makes a mistake.

radio waves	micro-waves	infra-red waves	visible light	X-rays	ultraviolet waves	gamma rays

large wavelength small wavelength

Which **two** names should be interchanged so that the order is correct?

A infra-red waves and ultraviolet waves

B radio waves and infra-red waves

C radio waves and visible light

D X-rays and ultraviolet waves

40 Which type of radiation has the greatest ionising effect, and which is the most penetrating?

	greatest ionising effect	most penetrating
A	alpha-particles	alpha-particles
B	alpha-particles	gamma-rays
C	gamma-rays	alpha-particles
D	gamma-rays	gamma-rays

BLANK PAGE

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** Sulfur 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	73 **Ge** Germanium 32	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.).