UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/12**

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)

5413418261

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 Where does most of the water enter a plant?

A guard cells

B mesophyll cells

C root hair cells

D xylem vessels

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

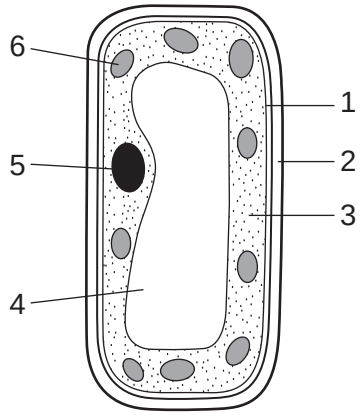
C carbon dioxide, oxygen and starch

D carbon monoxide, oxygen and protein

3 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

4 The diagram shows a palisade cell.



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

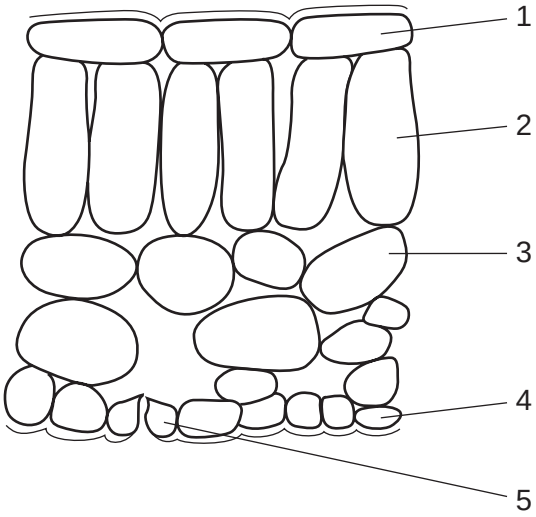
	1	2	3	4	5	6
A	✓	✗	✓	✓	✗	✗
B	✓	✗	✓	✗	✓	✗
C	✗	✓	✗	✓	✗	✓
D	✗	✓	✗	✗	✓	✓

key

✓ = found in plant cells only

✗ = not found in plant cells only

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

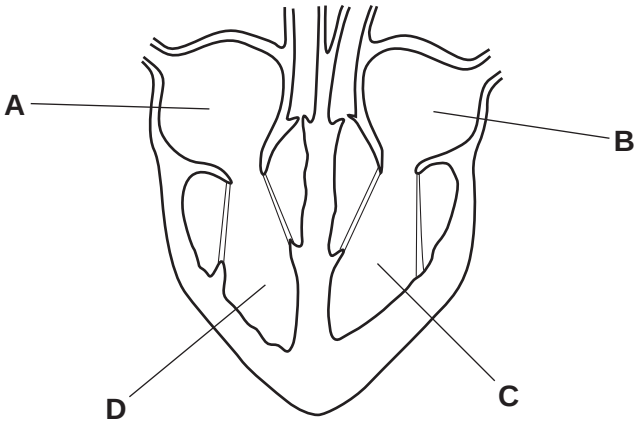


In which cells is light energy turned into chemical energy?

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

6 The diagram shows the human heart in section.

Which chamber of the heart pumps blood the greatest distance?



7 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 $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

8 Which health problems may result from smoking cigarettes?

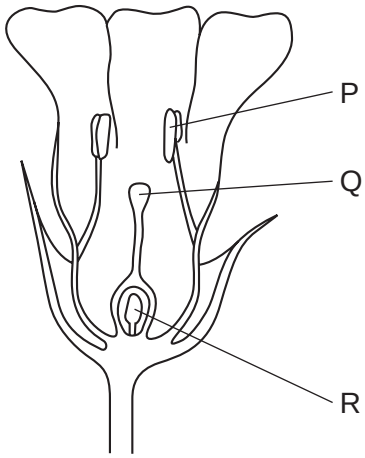
	bronchitis	emphysema	lung cancer
A	✓	✓	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

key

✓ = yes

✗ = no

9 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

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 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

12 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

13 Deforestation in tropical rain forests can lead to

A decreased carbon dioxide in the air.

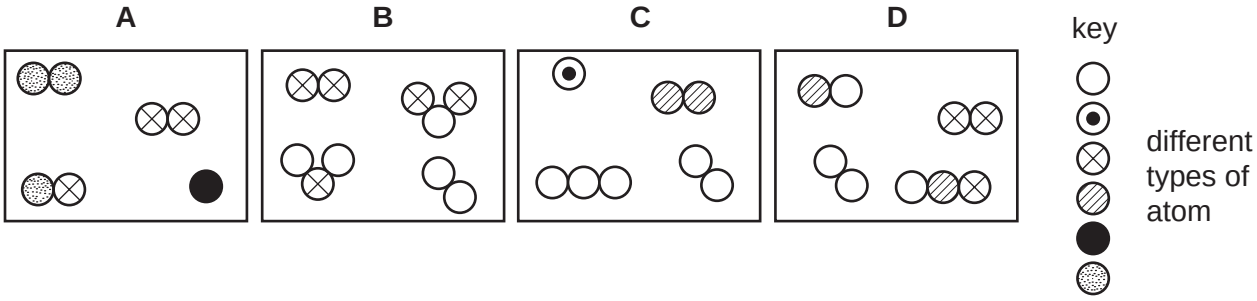
B decreased species diversity.

C increased number of habitats.

D increased oxygen in the air.

14 The diagrams show four different mixtures of gases.

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



15 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 $2H + Cl_2 \rightarrow 2HCl_2$

16 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

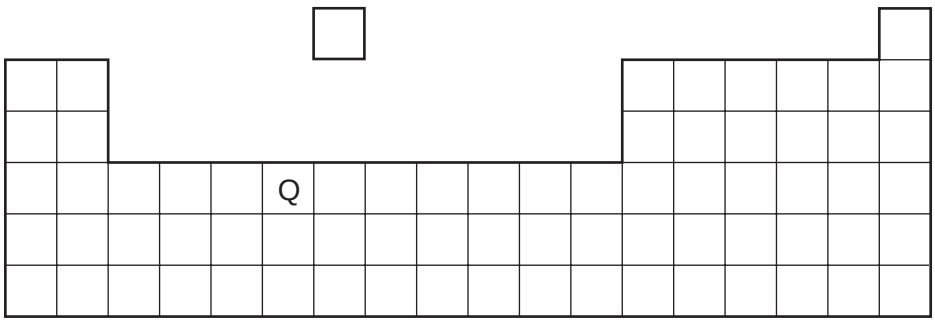
17 Element X reacts with element Y to form compound XY. It also reacts with element Z to form compound XZ.

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

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.

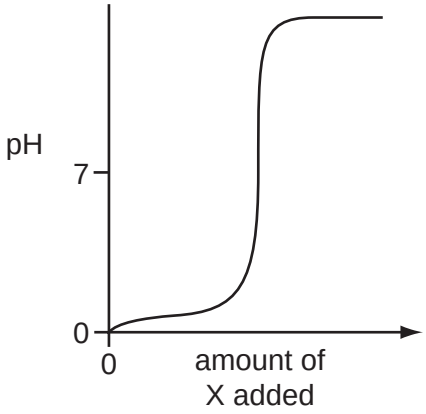
B It is soft and a good electrical conductor.

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

D It reacts violently with cold water.

19 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

20 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

21 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

22 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.

23 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

24 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 $MgCO_3 \rightarrow MgO + CO_2$

25 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

26 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.

27 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.

28 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

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

What is the average speed of the car?

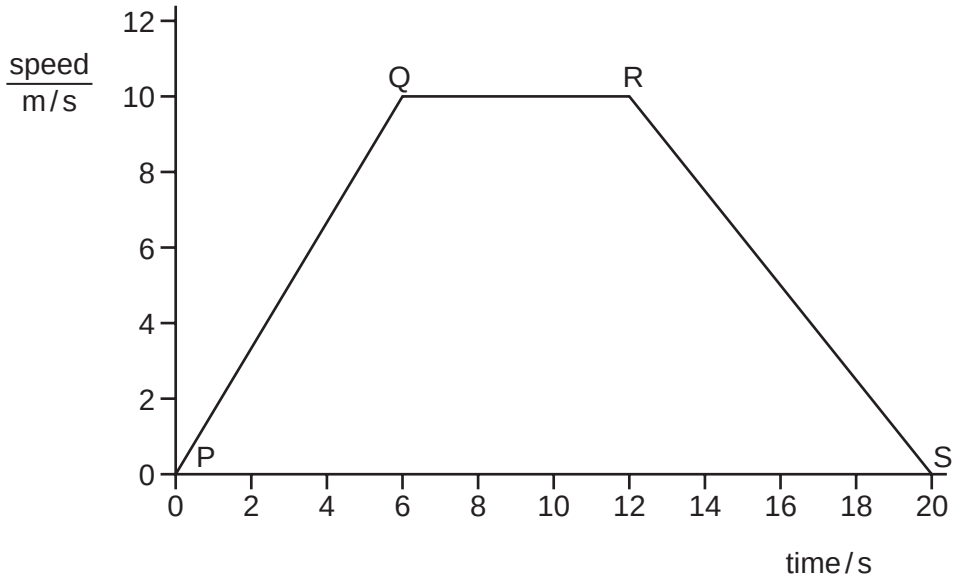
A 2.0 km / hour

B 30 km / hour

C 120 km / hour

D 1800 km / hour

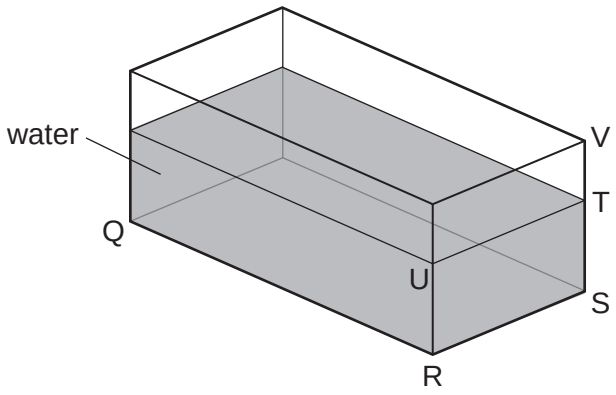
30 The graph shows how the speed of a car changes with time.



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 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

32 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

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

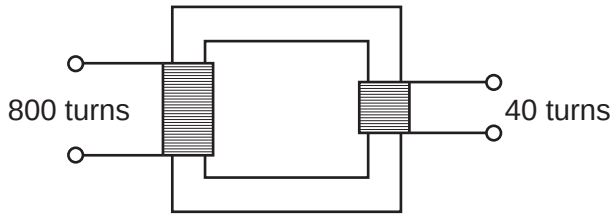
B convection by moving air

C evaporation by moving water vapour

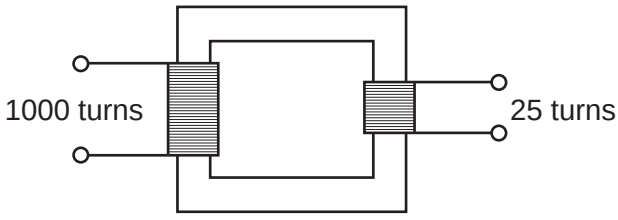
D infra-red radiation

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

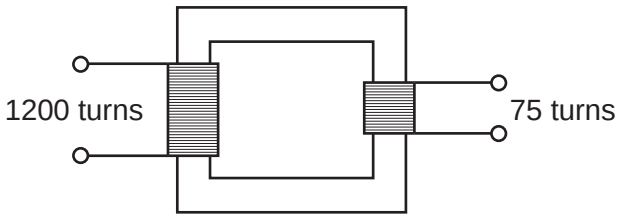
A



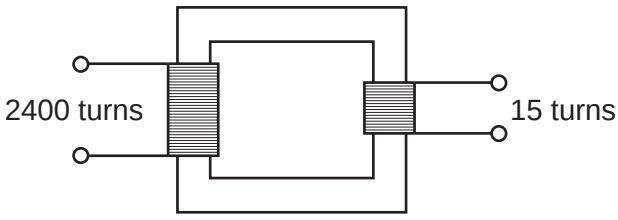
B



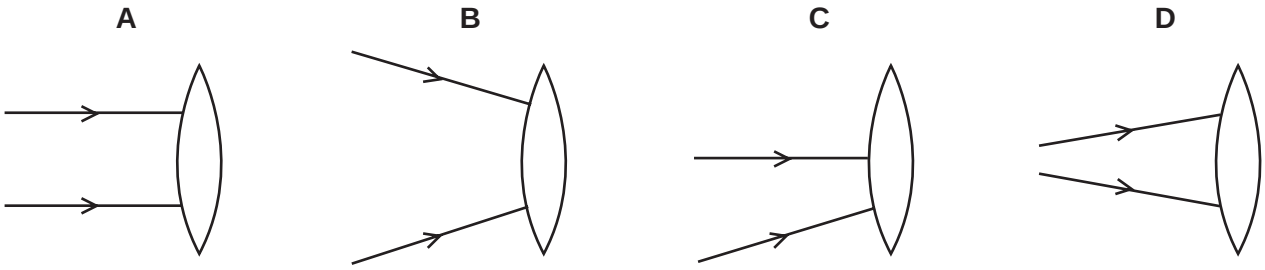
C



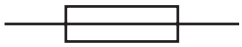
D



35 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?



36 A circuit diagram contains the following symbol.



What does this symbol represent?

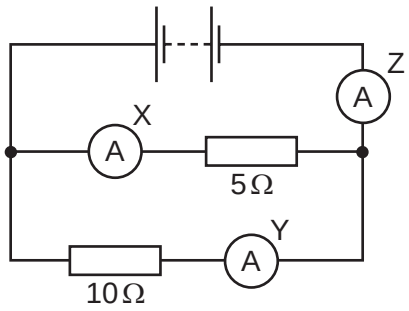
A a fixed resistor

B a fuse

C a relay

D a variable resistor

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



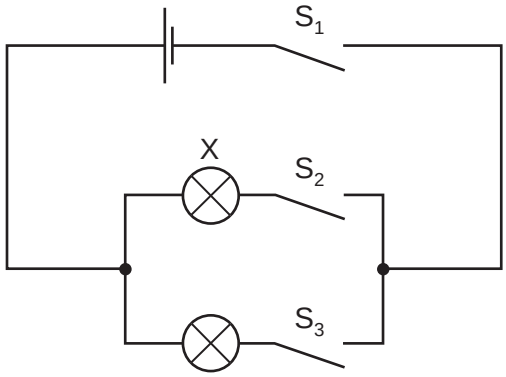
The ammeter readings are 1 A, 2 A and 3 A.

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

[Turn over

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 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

40 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

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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					11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
	7 Li Lithium 3	9 Be Beryllium 4									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
	23 Na Sodium 11	24 Mg Magnesium 12									70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
	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	112 Cd Cadmium 48	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
	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 †															

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

Key: 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.).