

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/01

Paper 1 Multiple Choice

October/November 2004

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.

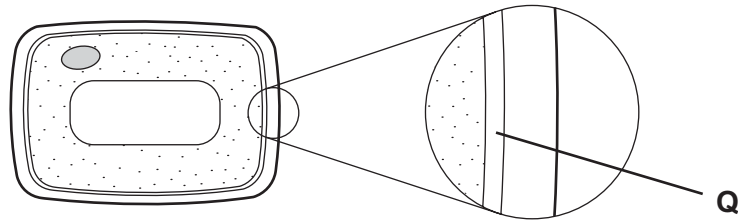
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

This document consists of **16** printed pages.



- 1 The diagram shows a plant cell and part of that cell in higher magnification.



What does structure **Q** do during the uptake of water and mineral ions from the soil?

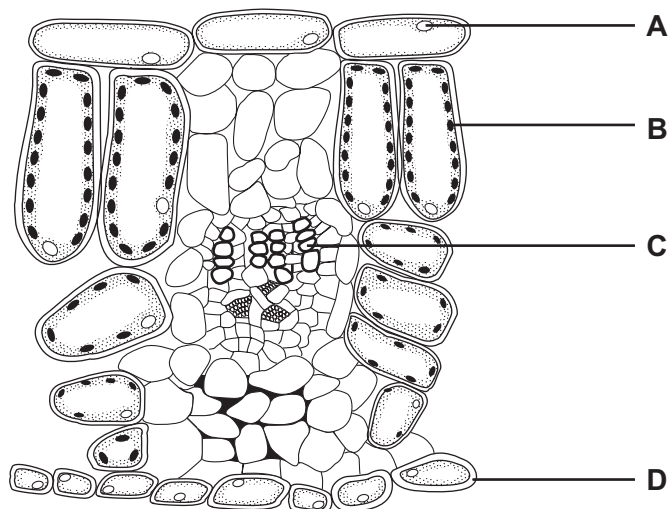
	allows water to pass freely	allows mineral ions to pass freely
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 2 Which gas is given off when the enzyme catalase is added to a solution of hydrogen peroxide?

- A** carbon dioxide
- B** carbon monoxide
- C** hydrogen
- D** oxygen

- 3 The diagram shows a section through a leaf.

Where will starch be found?



4 The table shows diets of four different people.

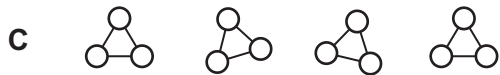
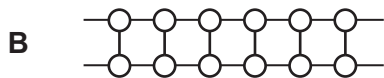
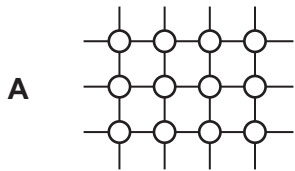
Which diet would cause a person to suffer from scurvy (including bleeding gums) and anaemia (lack of haemoglobin)?

	carbohydrates	vitamin C	proteins	iron
A	x	✓	✓	x
B	✓	x	✓	x
C	✓	✓	x	✓
D	✓	x	x	✓

5 The diagram shows part of a starch molecule.



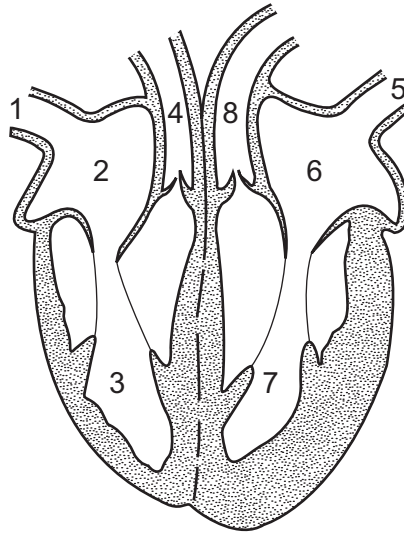
Which diagram shows this molecule after it has been **completely** digested?



6 What is the correct word equation for respiration?

- A** glucose → oxygen + water + carbon dioxide
- B** glucose + carbon dioxide → oxygen + water
- C** glucose + oxygen → water + carbon dioxide
- D** glucose + water → oxygen + carbon dioxide

7 The diagram shows a section through the human heart.

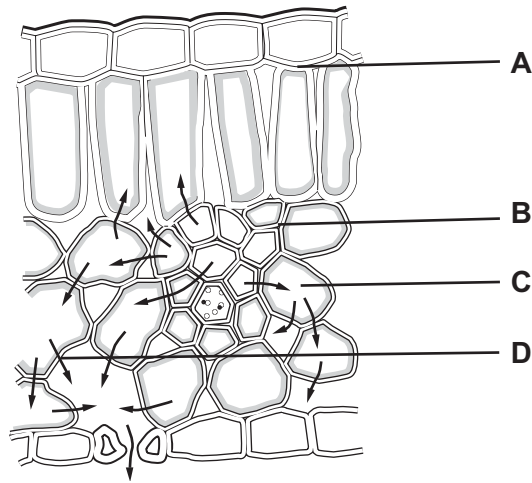


Which sequence shows the flow of **deoxygenated** blood through the heart?

- A 1 → 2 → 3 → 4
 - B 4 → 3 → 2 → 1
 - C 5 → 6 → 7 → 8
 - D 8 → 7 → 6 → 5
- 8 Which part of the blood may be described as 'small colourless fragments of cytoplasm without a nucleus and containing granules'?
- A plasma
 - B platelets
 - C red blood cells
 - D white blood cells

- 9 The diagram shows a section through a leaf. The arrows show water movement.

Where does the water evaporate?



- 10 In experiments on transpiration, both the cutting of a leafy shoot and the assembly of the apparatus must be done under water.

What is the reason for this?

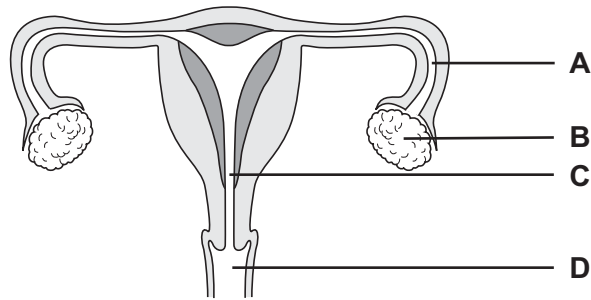
- A to ensure a clean cut
 - B to ensure air-tight seals
 - C to prevent air entering the xylem
 - D to prevent water leaving the shoot
- 11 Four drivers have their reaction times measured.

Which driver is the most likely to have been drinking alcohol?

driver	reaction time /s
A	3
B	4
C	8
D	2

12 The diagram shows the human female reproductive system.

Where is the egg fertilised?



13 The table shows the conditions in which four samples of seeds were kept.

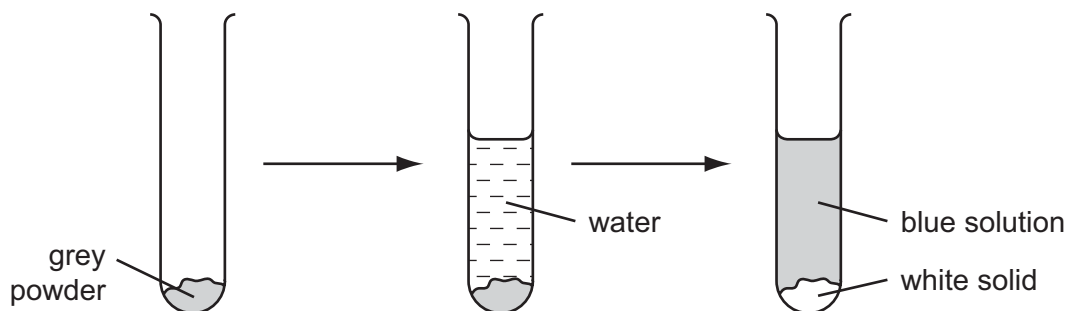
Which sample germinated?

sample	temperature / °C	water	oxygen
A	0	present	absent
B	10	absent	absent
C	20	present	present
D	40	absent	present

14 Which displayed formulae correctly represent a molecule of carbon dioxide and of nitrogen?

	carbon dioxide, CO ₂	nitrogen, N ₂
A	C=O=O	N=N
B	C=O=O	N≡N
C	O=C=O	N=N
D	O=C=O	N≡N

- 15 Some water is added to a grey powder. After shaking, a blue solution and a white solid are seen.



What does the grey powder contain?

- A one element
 - B one compound
 - C a mixture of elements
 - D a mixture of compounds
- 16 Solid mixtures are made from four salts, as shown.

mixture X	mixture Y
barium sulphate: white, insoluble	potassium chromate(VI): yellow, soluble
iron(III) sulphate: brown, soluble	potassium manganate(VII): purple, soluble

Each mixture is shaken with water.

How can the mixtures be separated?

	mixture X	mixture Y
A	chromatography	chromatography
B	chromatography	filtration
C	filtration	chromatography
D	filtration	filtration

- 17 Which formula contains the most elements?

- A HClO
- B PbO_2
- C Rb_2S
- D SiCl_4

18 The table below gives information on the properties of four gases.

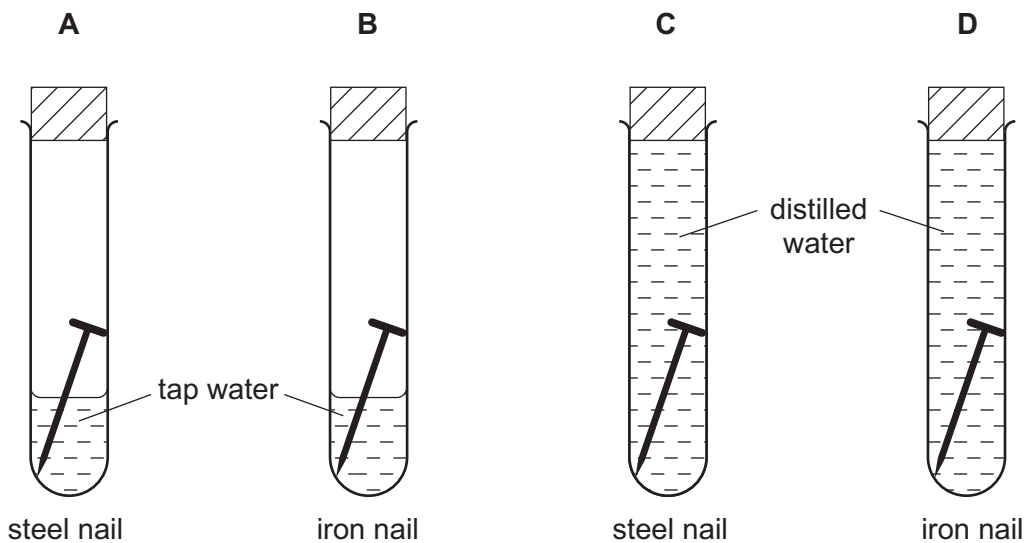
Which gas is the most suitable for filling an airship?

	flammability	density
A	high	high
B	high	low
C	low	high
D	low	low

19 Which substances explode when mixed together at room temperature?

- A** hydrogen and air
- B** magnesium and acid
- C** methane and air
- D** sodium and acid

20 In which test-tube does rusting occur most quickly?



21 The results of flame tests on four ores are shown.

ore	flame colour
P	brick red
Q	green
R	lilac
S	yellow

Which ores contain a metal from Group I?

- A P and Q
- B Q and R
- C R and S
- D S and P

22 In which reaction is carbon dioxide **not** formed?

- A adding hydrochloric acid to calcium
- B adding hydrochloric acid to calcium carbonate
- C burning coke in air
- D burning methane in air

23 What are the correct numbers of atoms in one molecule of nitric acid?

	hydrogen	nitrogen	oxygen
A	1	1	3
B	1	3	1
C	2	1	3
D	2	3	1

24 Are aluminium, iron and sodium hydroxide obtained by electrolysis?

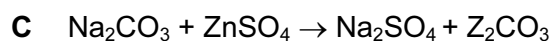
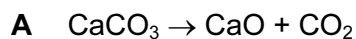
	aluminium	iron	sodium hydroxide
A	✓	✓	✓
B	✓	✓	x
C	x	✓	✓
D	✓	x	✓

25 Octane may undergo, under suitable conditions, either thermal decomposition or combustion.

Which information is correct for these two processes?

	thermal decomposition		combustion	
	oxygen needed	products	oxygen needed	products
A	yes	simpler	no	simpler
B	yes	more complex	no	more complex
C	no	simpler	yes	simpler
D	no	more complex	yes	more complex

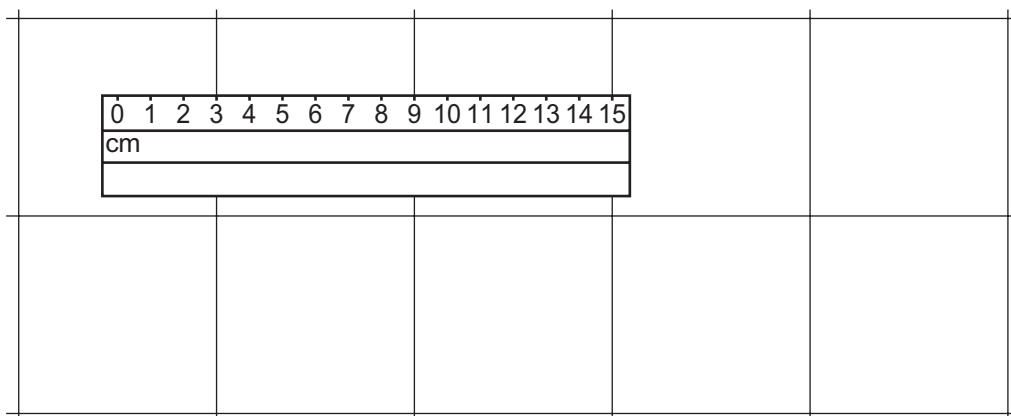
26 Which equation represents a redox reaction?



27 Which of hydrogen, petroleum and wood are fossil fuels?

	hydrogen	petroleum	wood
A	✓	✓	✓
B	✓	x	x
C	x	✓	x
D	x	x	✓

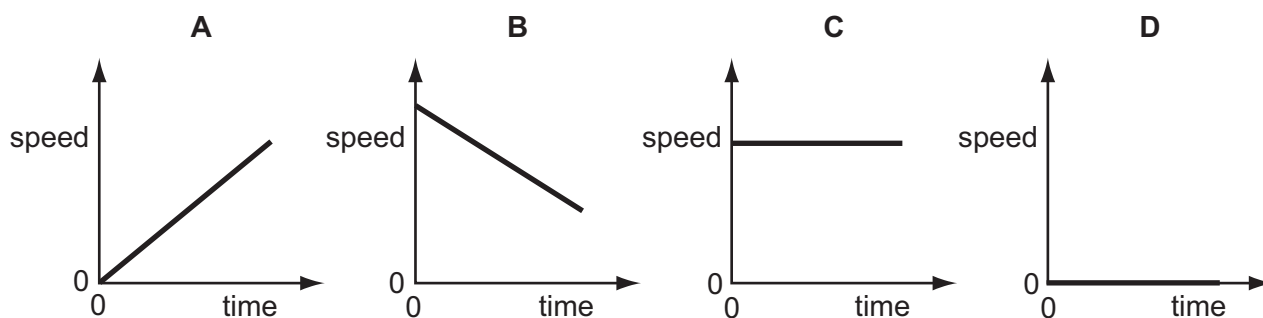
28 A floor is covered with square tiles. The diagram shows a ruler on the tiles.



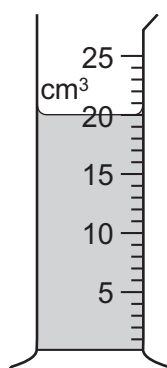
How long is one tile?

- A 3 cm B 6 cm C 9 cm D 12 cm

29 Which speed/time graph applies to an object at rest?



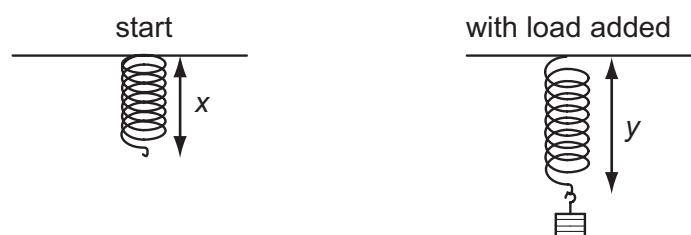
30 The diagram shows some liquid in a measuring cylinder. The mass of the liquid is 16g.



What is the density of the liquid?

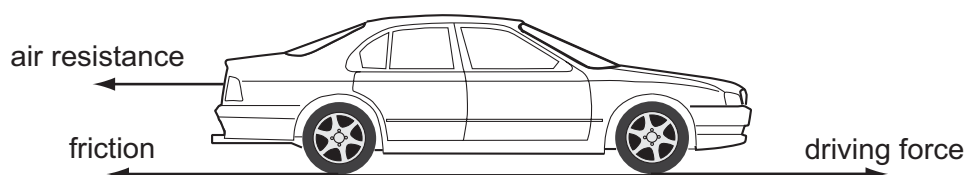
- A 320g/cm^3 B 36g/cm^3 C 1.25g/cm^3 D 0.8g/cm^3

- 31 A student carries out an experiment to plot an extension / load graph for a spring. The diagrams show the apparatus at the start of the experiment and with a load added.



What is the extension caused by the load?

- A** x **B** y **C** $y + x$ **D** $y - x$
- 32 Three horizontal forces act on a car that is moving along a straight, level road.



Which combination of forces would result in the car moving at constant speed?

	air resistance	friction	driving force
A	200 N	1000 N	800 N
B	800 N	1000 N	200 N
C	800 N	200 N	1000 N
D	1000 N	200 N	800 N

- 33 A child pushes a toy car along a level floor and then lets it go.

As the car slows down, what is the main energy change?

- A** from chemical to heat
B from chemical to kinetic
C from kinetic to gravitational (potential)
D from kinetic to heat

34 A beaker of water is heated at its base.

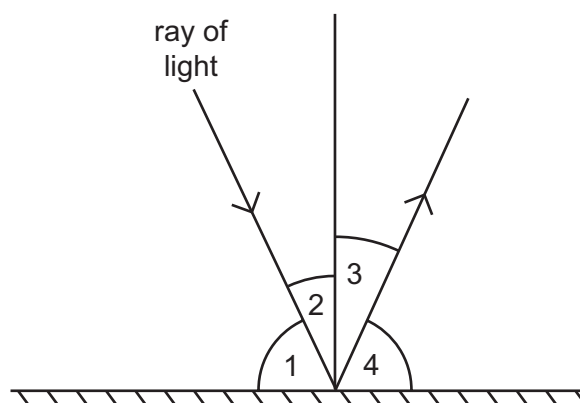
Why does the water at the base rise?

- A It contracts and becomes less dense.
- B It contracts and becomes more dense.
- C It expands and becomes less dense.
- D It expands and becomes more dense.

35 Which type of radiation lies between visible light and microwaves in the electromagnetic spectrum?

- A infra-red
- B radio waves
- C ultra-violet
- D X-rays

36 The diagram shows the path of a ray of light which has been reflected from a smooth surface.

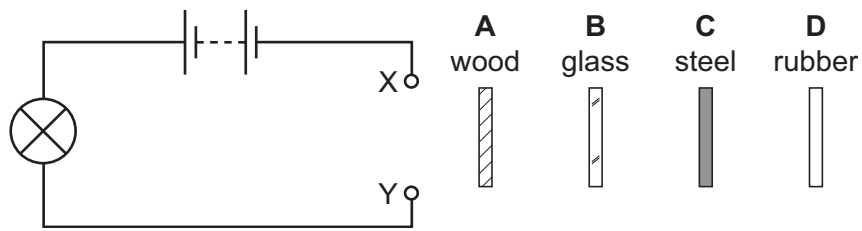


Which angles are the angles of incidence and reflection?

	angle of incidence	angle of reflection
A	1	4
B	2	3
C	3	2
D	4	1

- 37 A circuit is set up with a gap between two terminals X and Y. The four strips of material shown in the diagram are connected in turn across the gap.

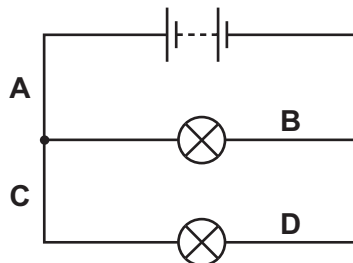
Which strip completes the circuit so that the lamp lights?



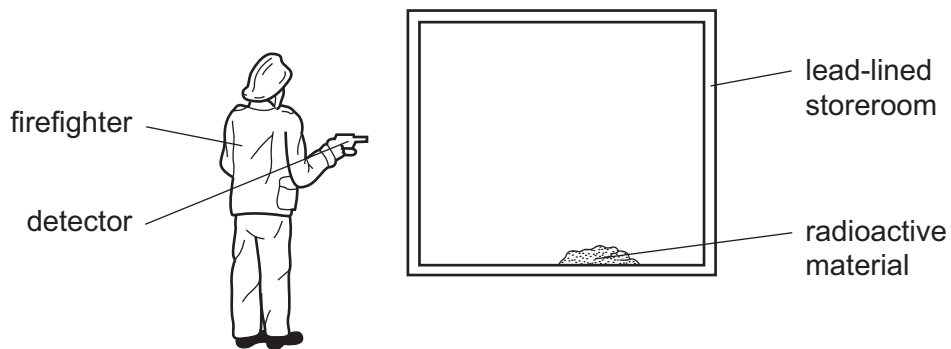
- 38 A pupil measures the voltage across a device and the current in it.

Which calculation gives the resistance of the device?

- A current + voltage
 - B current \div voltage
 - C voltage \div current
 - D voltage \times current
- 39 In which position in the circuit shown should a switch be placed so that both lamps can be switched on or off at the same time?



- 40 During a fire in a laboratory storeroom, some radioactive material was spilled. A firefighter detected radiation through the lead-lined walls of the storeroom. The radiation was emitted by the radioactive material.



Which type of radiation was being detected?

- A alpha-particles
- B beta-particles
- C gamma-rays
- D X-rays

DATA SHEET
The Periodic Table of the Elements

		Group																													
I	II	III	IV	V	VI	VII	0																								
7 Li Lithium 3	9 Be Beryllium 4	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														
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	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	101 Ru Ruthenium 44	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	190 Os Osmium 76	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86																
87 Fr Francium	88 Ra Radium	227 Ac Actinium																													
		*58-71 Lanthanoid series										90-103 Actinoid series																			
		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	238 U Uranium 92	238 Np Neptunium 93	244 Pu Plutonium 94	244 Am Americium 95	254 Cm Curium 96	262 Bk Berkelium 97	267 Cf Californium 98	289 Es Einsteinium 99	288 Fm Fermium 100	289 Md Mendelevium 101	288 No Nobelium 102	289 Lr Lawrencium 103																	

a	X
b	

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

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).