

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**COMBINED SCIENCE**

**0653/01**

Paper 1 Multiple Choice

May/June 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.

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



1 Which statement about diffusion is correct?

- A Changing temperature has no effect on the diffusion of molecules.
- B Diffusion involves the random movement of molecules.
- C Small molecules enter but do not leave cells by diffusion.
- D Small molecules diffuse through cell membranes but not through cell walls.

2 A test-tube contains a solution of the enzyme catalase.

Which colour is obtained when this solution is tested with biuret solution?

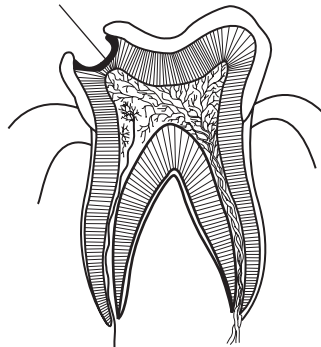
- A blue
- B blue-black
- C orange
- D violet-mauve

3 In what form is carbohydrate stored in a leaf?

- A fat
- B protein
- C starch
- D Vitamin C

4 The diagram shows a section through a decaying tooth.

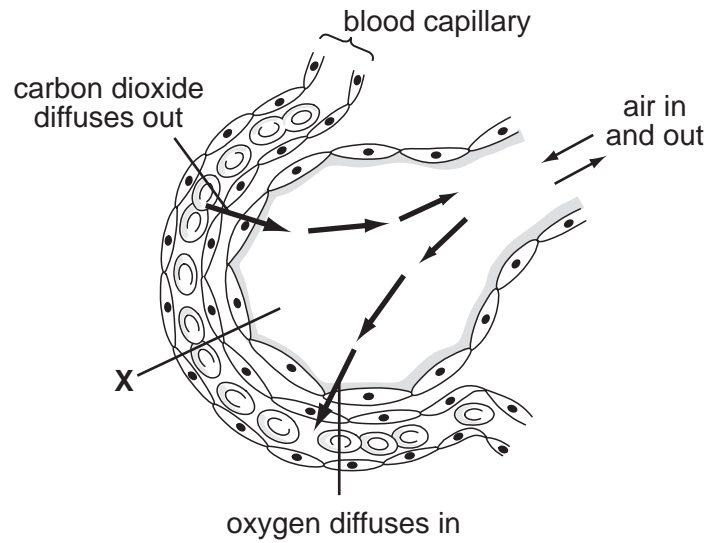
decayed region of tooth



Which parts of the tooth have decayed?

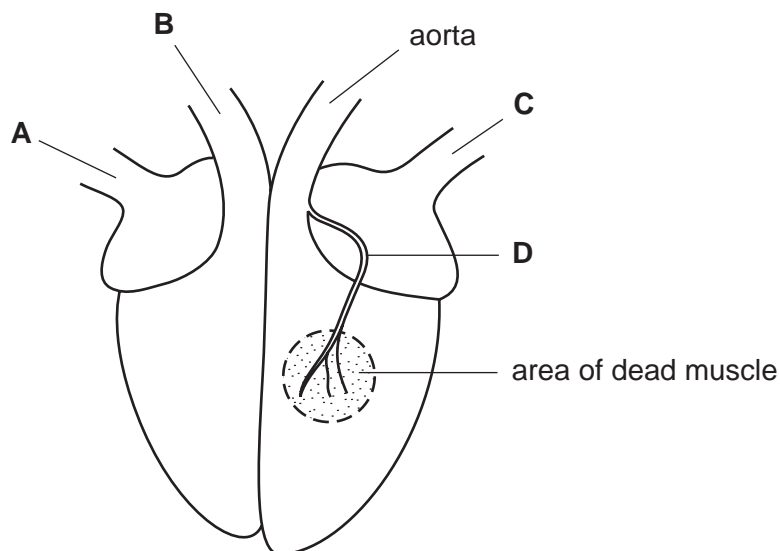
- A dentine and enamel
- B enamel and pulp cavity
- C pulp cavity and root
- D root and dentine

- 5 The diagram shows a section through part of a lung.



What is structure **X**?

- A alveolus
  - B bronchus
  - C pleural membrane
  - D trachea
- 6 The diagram shows an external view of the heart of a man who has recently had a heart attack.
- Which blood vessel was blocked by a blood clot to cause the attack?



7 There are four stages in testing a leaf for starch.

- 1 soften in hot water
- 2 stain with iodine
- 3 boil in alcohol
- 4 boil in water

What is the correct order for these stages?

<b>A</b>	1	2	3	4
<b>B</b>	1	4	3	2
<b>C</b>	3	1	2	4
<b>D</b>	4	3	1	2

8 A person is touched on the back of a hand and they decide to move their arm.

What is the path of nerve signals, when the skin is touched, that causes this response?

- A** effector → spinal cord → brain → spinal cord → receptor
- B** effector → spinal cord → receptor → spinal cord → brain
- C** receptor → spinal cord → brain → spinal cord → effector
- D** receptor → spinal cord → effector → spinal cord → brain

9 In family planning, what acts as a barrier between eggs and sperms?

- A** cap
- B** IUD
- C** pill
- D** rhythm

10 During pollination, pollen grains are transferred from

- A** anther to ovule.
- B** anther to stigma.
- C** stigma to anther.
- D** stigma to ovule.

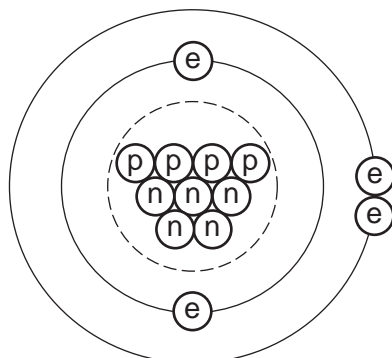
- 11 In the nineteenth century, August Weissmann removed the tails of two mice before breeding from them. He then removed the tails of their offspring before breeding from them again. He repeated this for many generations. All the offspring had tails when they were born.

Why were new mice without tails never born?

- A Asexual reproduction does not produce new varieties.  
 B Genes are not passed on from parents to offspring.  
 C The results of asexual reproduction are not predictable.  
 D Variation due to the environment is not inherited.
- 12 In the carbon cycle, several different processes may release carbon dioxide from dead organisms.

Which process does **not** do so?

- A combustion  
 B decomposition  
 C photosynthesis  
 D respiration
- 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 diagram represents an atom.



key

(p) proton

(n) neutron

(e) electron

( ) nucleus

What is the nucleon number of this atom?

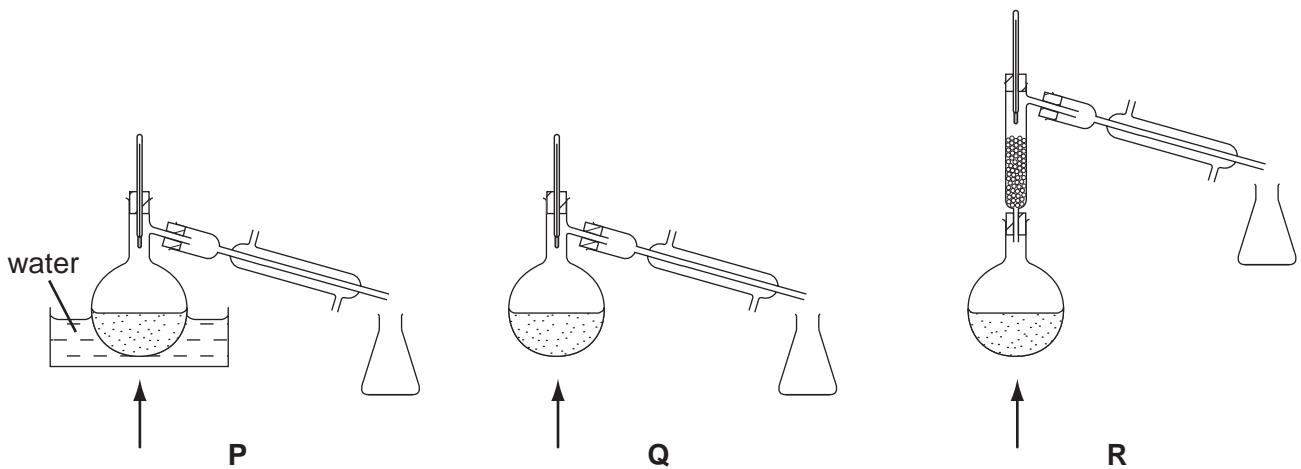
- A 2                      B 4                      C 9                      D 13

15 Metals and non-metals can each form ions.

Which charges do these ions have?

	metal ion	non-metal ion
<b>A</b>	negative	negative
<b>B</b>	negative	positive
<b>C</b>	positive	negative
<b>D</b>	positive	positive

16 A mixture contains two liquids. One liquid has a boiling point of 120 °C and the other boils at 160 °C.



Which apparatus should be used to separate the two liquids?

- A** P only
- B** Q only
- C** R only
- D** P, Q or R

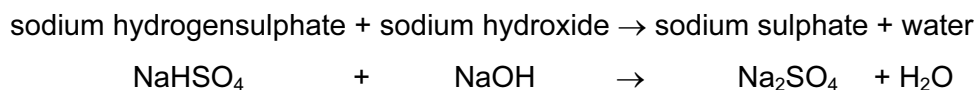
17 Argon is a gas used to fill lamp bulbs.

What are sources of this argon?

	the air	seawater
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x



- 22 Aqueous sodium hydrogensulphate reacts with aqueous sodium hydroxide as shown. In this reaction, the sodium hydrogensulphate loses hydrogen.



Which terms apply to sodium hydrogensulphate in this reaction?

	acid	alkali	salt
<b>A</b>	✓	x	x
<b>B</b>	✓	x	✓
<b>C</b>	x	✓	x
<b>D</b>	x	✓	✓

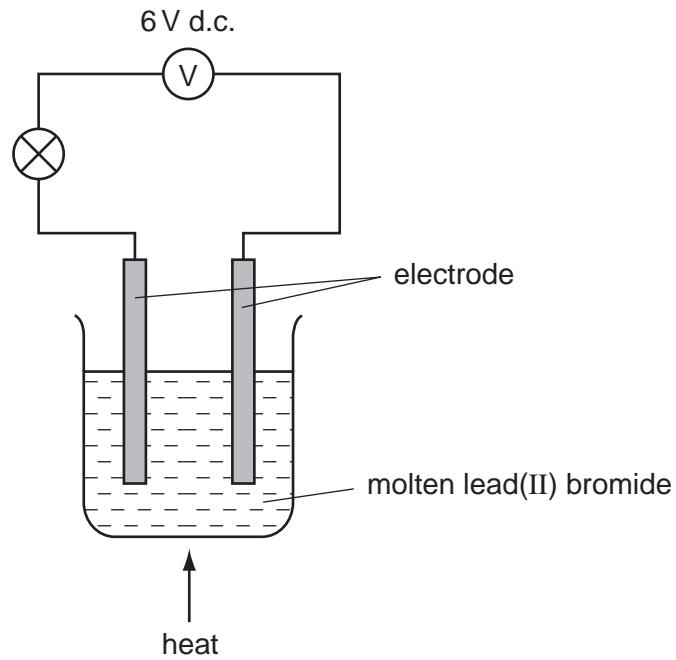
- 23 When glucose,  $\text{C}_6\text{H}_{12}\text{O}_6$ , is heated in a test-tube, it can form carbon and water.

This change is an example of

- A** combustion.
- B** decomposition.
- C** distillation.
- D** evaporation.



24 Molten lead(II) bromide conducts electricity and the bulb lights up in the experiment shown.



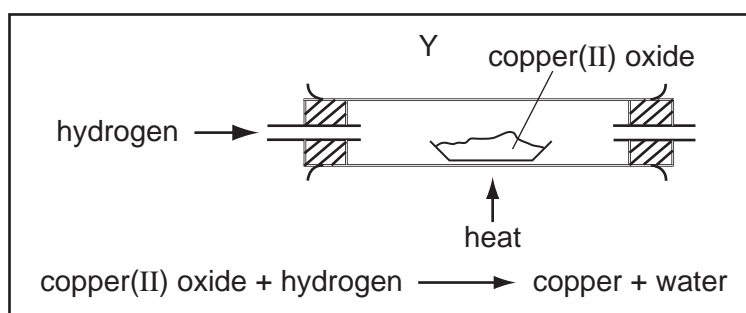
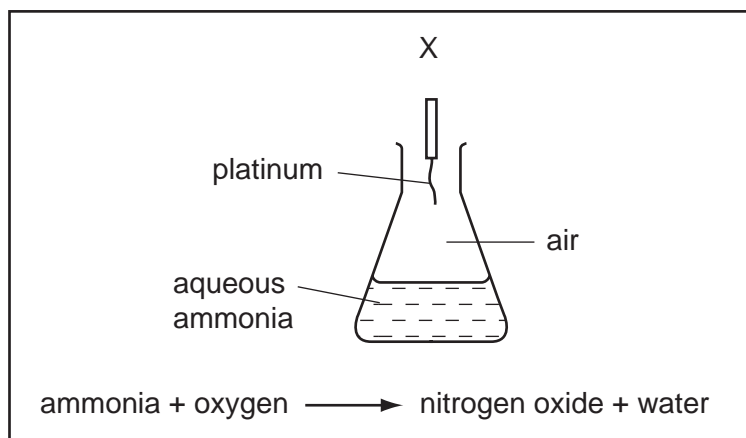
The bulb goes out soon after the heat is removed.

- 1 Lead and bromide ions can no longer move freely.
- 2 Lead and bromide ions have all reacted.
- 3 Lead(II) bromide has fully melted.

Which reasons explain this?

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

25 The diagrams show two experiments X and Y.



Which experiments involve a catalyst?

	X	Y
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

26 Plastics and wood can each be used to make doors and window frames.

Which row in the table shows two correct statements?

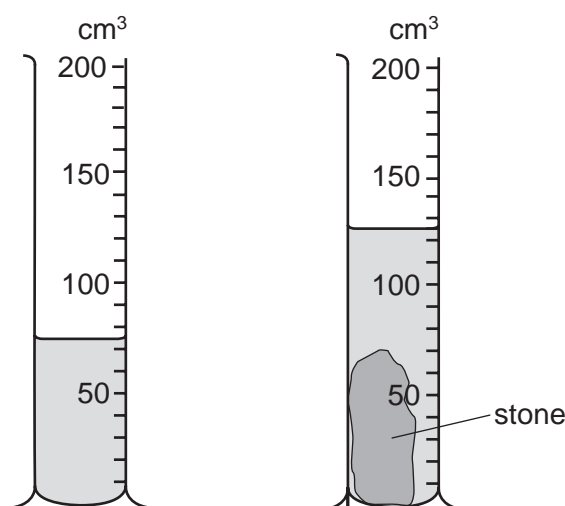
	requires painting for maintenance	obtained from a renewable resource
<b>A</b>	plastics	plastics
<b>B</b>	plastics	wood
<b>C</b>	wood	plastics
<b>D</b>	wood	wood

- 27 Some man-made polymers, for example, poly(ethene), are made from monomers that join together by forming carbon-to-carbon bonds.

From what source are the monomers obtained and what type of carbon-to-carbon bonds form?

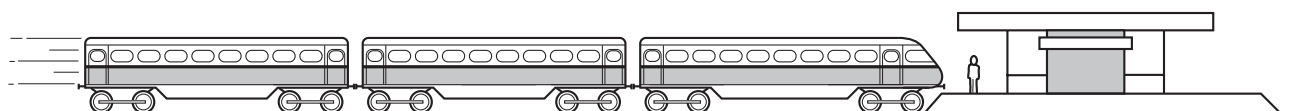
	source of monomers	carbon-to-carbon bonds
<b>A</b>	coal	covalent
<b>B</b>	coal	ionic
<b>C</b>	oil	covalent
<b>D</b>	oil	ionic

- 28 A measuring cylinder contains some water. When a stone is put in the water, the level rises.



What is the volume of the stone?

- A** 50 cm<sup>3</sup>      **B** 70 cm<sup>3</sup>      **C** 75 cm<sup>3</sup>      **D** 125 cm<sup>3</sup>
- 29 A child is standing on the platform of a station, watching the trains.



A train travelling at 30 m/s takes 3 s to pass the child.

What is the length of the train?

- A** 10m      **B** 30m      **C** 90m      **D** 135m

30 A person measures the length, width, height and mass of a rectangular metal block.

Which of these measurements are needed in order to calculate the density of the metal?

- A mass only
- B height and mass only
- C length, width and height only
- D length, width, height and mass

31 Which form of energy do we receive directly from the Sun?

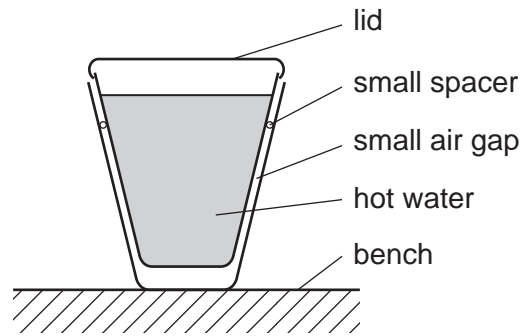
- A chemical
- B light
- C nuclear
- D sound

32 A labourer on a building site lifts a heavy concrete block onto a lorry. He then lifts a light block the same distance in the same time.

Which of the following is true?

	work done in lifting the blocks	power exerted by labourer
<b>A</b>	less for the light block	less for the light block
<b>B</b>	less for the light block	the same for both blocks
<b>C</b>	more for the light block	more for the light block
<b>D</b>	the same for both blocks	more for the light block

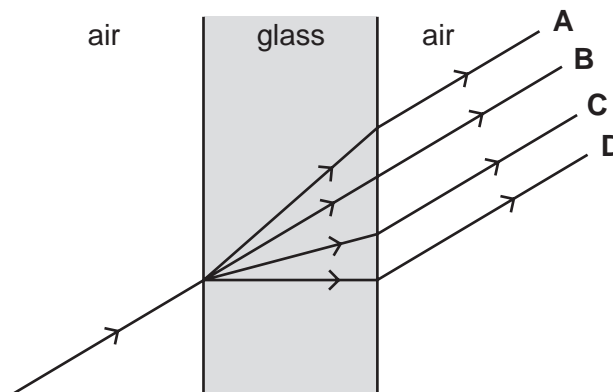
- 33 Two plastic cups are placed one inside the other. Hot water is poured into the inner cup and a lid is put on top as shown.



Which statement is correct?

- A Heat loss by radiation is prevented by the small air gap.
  - B No heat passes through the sides of either cup.
  - C The bench is heated by convection from the bottom of the outer cup.
  - D The lid is used to reduce heat loss by convection.
- 34 A ray of light passes through a window.

Which path does it take?



- 35 Sounds are made by vibrating objects. A certain object vibrates but a person nearby cannot hear any sound.

Which statement might explain why nothing is heard?

- A The amplitude of the sound waves is too large.
- B The frequency of the vibration is too high.
- C The sound waves are transverse.
- D The speed of the sound waves is too high.

36 What are the symbols used for the units of current and resistance?

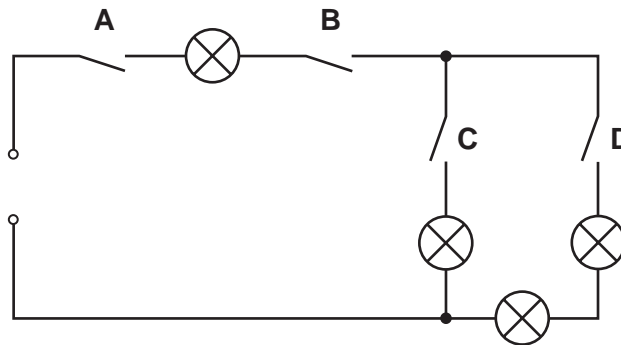
	unit of current	unit of resistance
<b>A</b>	A	W
<b>B</b>	A	$\Omega$
<b>C</b>	V	W
<b>D</b>	V	$\Omega$

37 Four lamps and four switches are connected to a power supply as shown in the circuit diagram.

When all the switches are closed, all the lamps are lit.

When one of the switches is then opened, only **one** lamp goes out.

Which switch is opened?

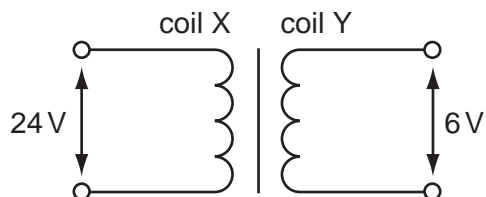


38 An electric power tool is being used outdoors in a shower of rain.

What is the greatest hazard to the user?

- A** The cable gets hot and causes burns.
- B** The circuit-breaker cuts off the current.
- C** The current passes through water and causes a shock.
- D** The tool rusts.

- 39 A transformer is to be used to produce a 6 V output from a 24 V input.

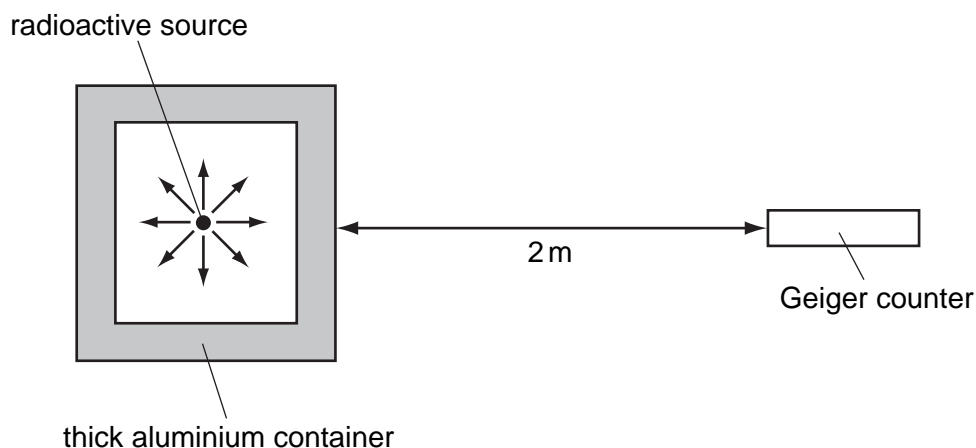


What are suitable numbers of turns for coil X and for coil Y?

	number of turns on coil X	number of turns on coil Y
<b>A</b>	240	60
<b>B</b>	240	240
<b>C</b>	240	960
<b>D</b>	960	60

- 40 A Geiger counter detects radiation from radioactive sources.

A radioactive source is inside a thick aluminium container as shown.



Which type of radiation from this source is being detected?

- A** alpha-particles
- B** beta-particles
- C** gamma-rays
- D** radio waves

**DATA SHEET**  
**The Periodic Table of the Elements**

		Group																
I	II	III	IV	V	VI	VII	0					0						
		1 <b>H</b> Hydrogen 1												4 <b>He</b> Helium 2				
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4											11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10	
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12											27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulphur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18	
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36	
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54			
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	190 <b>Os</b> Osmium 76	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86			
226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89											226 <b>Fr</b> Francium 87						

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

a	<b>X</b>
b	

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

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

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