UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice **May/June 2013**

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.
DO **NOT** WRITE IN ANY BARCODES.

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.
Electronic calculators may be used.

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

1 Which substance can enter a plant cell by diffusion?

A carbon dioxide

B cellulose

C protein

D starch

2 Which comparison between a typical plant cell and a typical animal cell is correct?

	feature	plant cell	animal cell
A	cell activities controlled by	nucleus and cell membrane	nucleus and cell wall
B	location of chlorophyll	chloroplasts	cytoplasm
C	location of DNA	cytoplasm	nucleus
D	starch grains	present	absent

3 A test-tube contains a solution of an enzyme.

Which colour is obtained when the biuret test is carried out on this solution?

A blue

B blue-black

C orange

D purple

4 Which two chemical substances are required for photosynthesis?

A carbon dioxide and glucose

B glucose and oxygen

C oxygen and water

D water and carbon dioxide

5 What is a function of the small intestine?

A It allows food to be stored.

B It cuts food into small pieces.

C It provides a large surface area for absorption.

D It provides space for the storage of faeces.

6 Which substance makes up a higher percentage of expired air compared to inspired air?

A carbon dioxide

B nitrogen

C noble gases

D oxygen

7 What is the function of the valves in the heart?

A to prevent blood from flowing backwards

B to pump blood through the heart

C to separate blood cells from plasma

D to separate oxygenated and deoxygenated blood

8 What are the functions of phloem?

	provides support	transports mineral ions	transports sugars
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

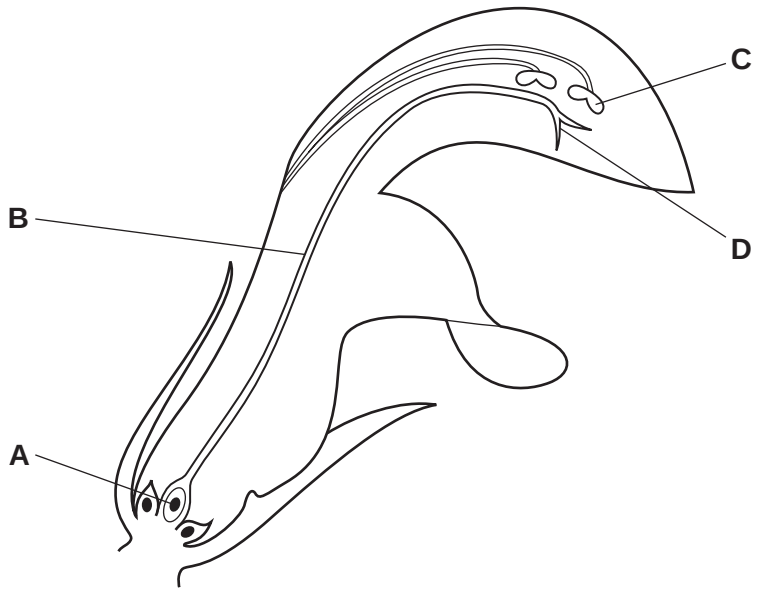
key

✓ = function of phloem

✗ = not a function of phloem

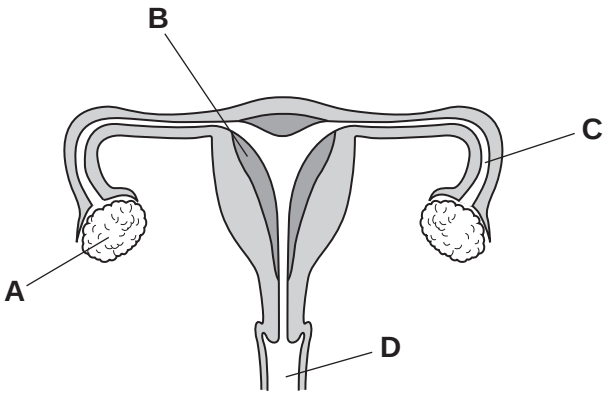
9 The diagram shows a section through a flower.

Which part receives pollen during pollination?



10 The diagram shows a section through the female reproductive system.

Where is the fertilised egg implanted?



11 What describes sexual reproduction?

A Diploid gametes form a haploid zygote, offspring genetically dissimilar to parents.

B Diploid gametes form a haploid zygote, offspring genetically similar to parents.

C Haploid gametes form a diploid zygote, offspring genetically dissimilar to parents.

D Haploid gametes form a diploid zygote, offspring genetically similar to parents.

12 Which chemical is a building block for making proteins?

A amino acid

B fatty acid

C glucose

D glycerol

13 The diagram shows a calendar for February and March with four of the weeks shaded.

	February				March			
	7	14	21	28	7	14	21	28
1	8	15	22	1	8	15	22	29
2	9	16	23	2	9	16	23	30
3	10	17	24	3	10	17	24	31
4	11	18	25	4	11	18	25	
5	12	19	26	5	12	19	26	
6	13	20	27	6	13	20	27	

Menstruation for a woman starts on February 14th.

During which shaded week will the lining of the uterus be at its thickest and be rich in blood vessels?

A February 7th – February 13th

B February 14th – February 20th

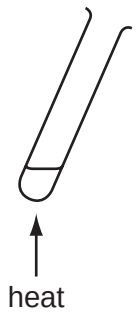
C February 21st – February 27th

D February 28th – March 6th

14 Aqueous copper(II) sulfate consists of copper(II) sulfate dissolved in water.

Which apparatus could **not** be used to remove water from this solution?

A



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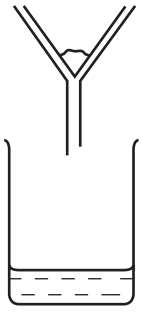

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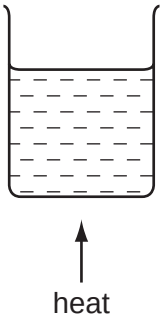
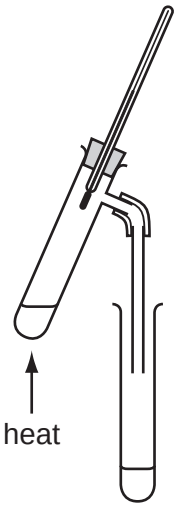
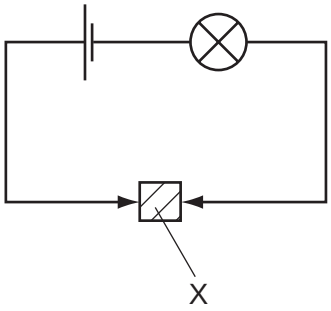


D



15 A solid X is placed in the circuit shown.

The lamp lights.



What is X?

A an alloy

B a compound

C an electrolyte

D a salt

16 The reaction of zinc and sulfur to form zinc sulfide is exothermic.

Which information in the table is correct?

	elements in zinc sulfide	energy change during the formation of zinc sulfide
A	difficult to separate	heat given out
B	difficult to separate	heat taken in
C	easy to separate	heat given out
D	easy to separate	heat taken in

17 A student carries out experiments with zinc and dilute hydrochloric acid.

Which change in conditions makes the reaction slower?

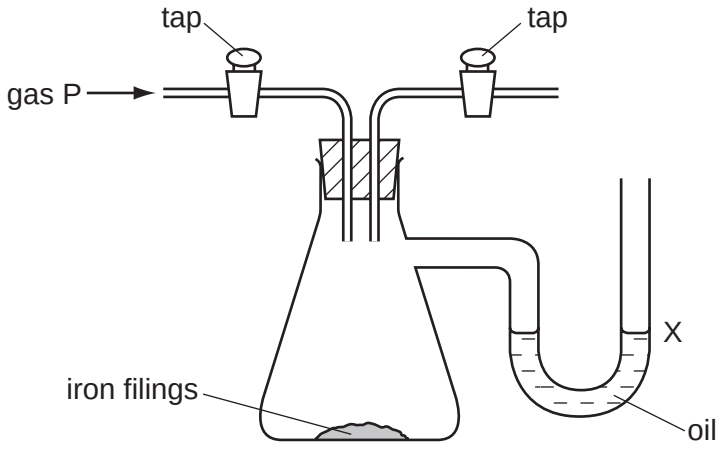
A adding a suitable catalyst

B increasing the concentration of the acid

C increasing the particle size of the zinc

D increasing the temperature

18 The diagram shows an experiment on the rusting of iron.



The flask is filled with gas P. The taps are closed and the apparatus is left for a week.

The experiment is repeated with four different gases.

What happens to the oil level at X?

	gas P	oil level at X
A	damp nitrogen	rises
B	damp oxygen	falls
C	dry nitrogen	falls
D	dry oxygen	rises

19 Copper(II) sulfate is prepared by reacting copper(II) oxide with dilute sulfuric acid.

$$CuO(s) + H_2SO_4(aq) \rightarrow CuSO_4(aq) + H_2O(l)$$

Which statement is correct?

A Excess copper(II) oxide is used because it can be easily removed by filtration.

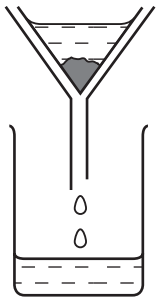
B Excess copper(II) oxide is used because it can be easily removed by reacting with more sulfuric acid.

C Excess sulfuric acid is used because it can be easily removed by evaporation.

D Excess sulfuric acid is used because unreacted copper(II) oxide would contaminate the product.

20 The diagrams show two techniques used in school chemistry laboratories for separating mixtures.

1



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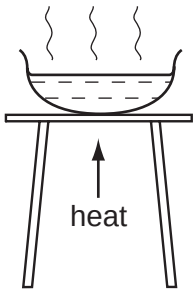
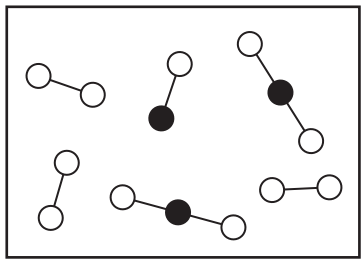


Which technique can also be used to purify a domestic water supply?

A 1 and 2 **B** 1 only **C** 2 only **D** neither 1 nor 2

21 The diagram shows the particles in a mixture of gases.



Which statement is **not** correct?

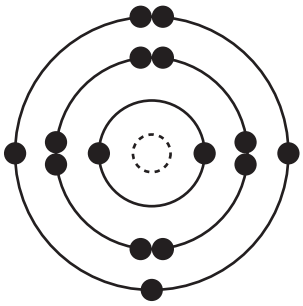
A There are two different types of atom in the box.

B There are three different compounds in the box.

C There are three different types of molecule in the box.

D There are six molecules in the box.

22 The diagram shows the electronic structure of an atom of element X.

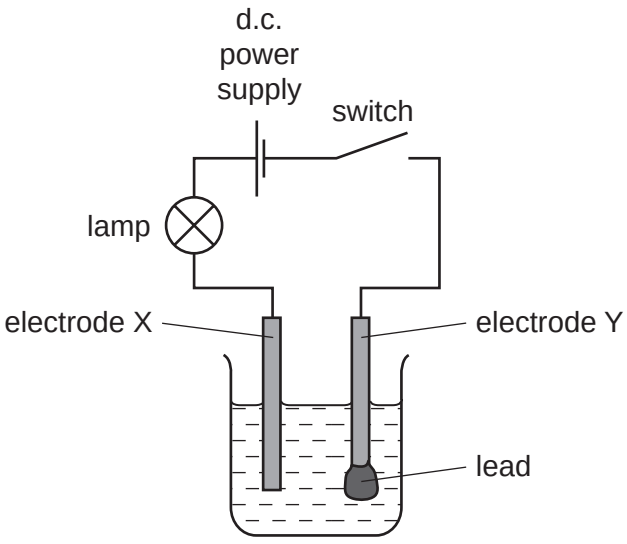


In which group of the Periodic Table is X, and how many protons does its atom contain?

	group number	number of protons
A	3	15
B	3	16
C	5	15
D	5	16

23 The diagram shows the apparatus used for the electrolysis of lead(II) bromide using inert electrodes X and Y.

Lead is formed at electrode Y.



Which statement about the electrolysis is correct?

A A green gas is given off at electrode X.

B Electrode Y is the anode.

C Only a physical change takes place when the current is switched on.

D The electrolyte is in the molten state.

24 P, Q, R and S are four gases found in air.

P is very unreactive.

Q makes up 21% of the air.

R makes up 78% of the air.

S is formed when fossil fuels are burned.

Which row is correct?

	P	Q	R	S
A	argon	nitrogen	oxygen	carbon dioxide
B	argon	oxygen	nitrogen	carbon dioxide
C	carbon dioxide	oxygen	nitrogen	argon
D	carbon dioxide	nitrogen	oxygen	argon

25 Which chemical test shows the presence of water?

A Water has a boiling point of 100 °C.

B Water has a freezing point of 0 °C.

C Water turns anhydrous cobalt chloride from blue to pink.

D Water turns anhydrous copper sulfate from blue to white.

26 Which statements about the complete combustion of methane are correct?

1 The reaction is endothermic.

2 Carbon dioxide is formed.

3 Water is formed.

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

27 Which method is used to extract copper from copper(II) oxide?

A dissolving copper(II) oxide with hydrochloric acid and then filtering

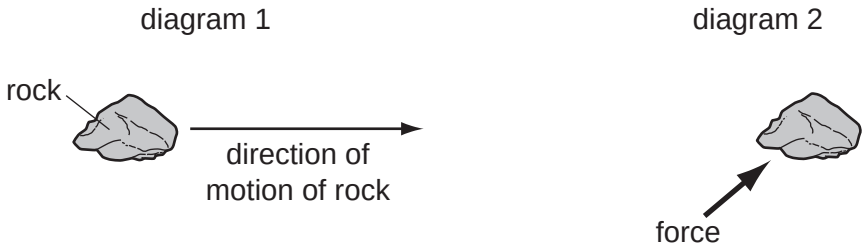
B dissolving copper(II) oxide in water and then filtering

C heating the copper(II) oxide

D heating the copper(II) oxide mixed with carbon

28 Diagram 1 shows a small rock moving through space. There are no forces acting on the rock.

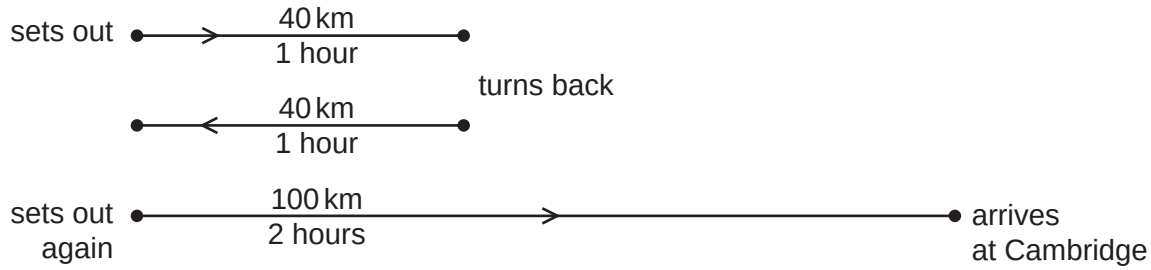
A force is now applied to the rock. Diagram 2 shows the direction of the force.



What is the effect, if any, of this force on the motion of the rock?

	speed of body	direction of motion of body
A	changes	changes
B	changes	no effect
C	no effect	changes
D	no effect	no effect

29 A car driver sets out from home to travel to Cambridge. After one hour he is 40 km from home. He discovers that he must return home to collect his briefcase. This journey also takes him one hour. He sets off again immediately. He reaches Cambridge, 100 km from home, 2 hours later.



What is the average speed for the whole of his journey from leaving home the first time?

A 25 km / h **B** 45 km / h **C** 50 km / h **D** 90 km / h

30 As part of a festival, a wooden wheel is set on fire. The burning wheel rolls down a hill.

What is one energy conversion that occurs as the wheel burns and rolls down the hill?

A gravitational to kinetic

B heat to chemical

C kinetic to chemical

D light to gravitational

31 When sweat evaporates, which change of state takes place?

A gas to liquid

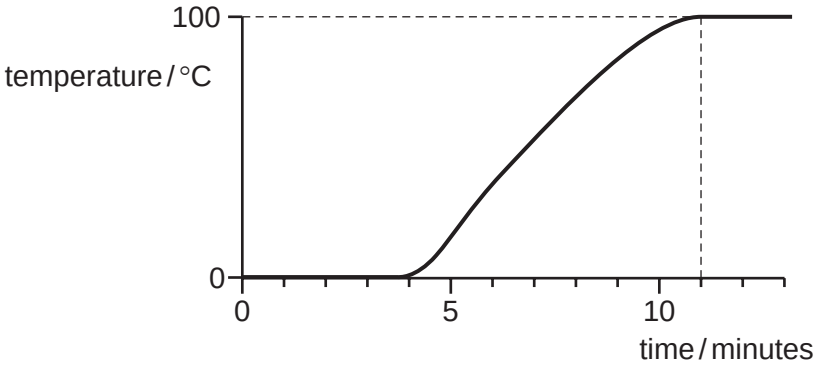
B liquid to gas

C liquid to solid

D solid to gas

32 A block of ice is supplied with heat at a constant rate. Eventually, the melted ice boils.

The graph shows how the temperature changes with time.



How long does it take to melt all the ice?

A 4 minutes **B** 7 minutes **C** 11 minutes **D** 13 minutes

33 On a summer's day, hot air rises above hot roofs.

What is the name of this process?

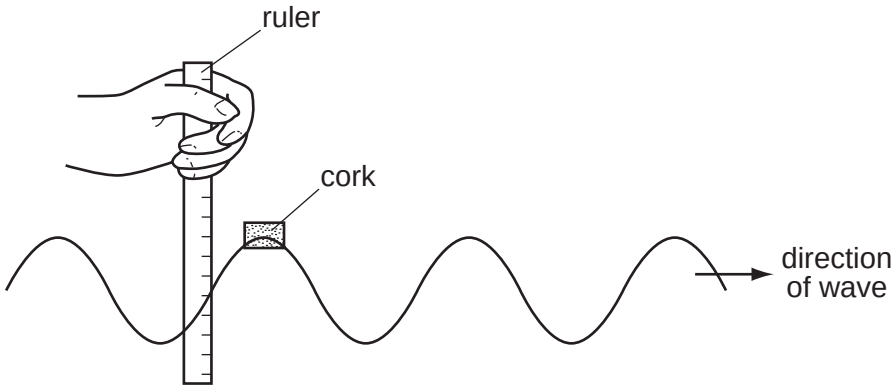
A concentration

B condensation

C conduction

D convection

34 A student measures the distance a cork moves up and down on a wave in a tank of water.



Which quantity can she obtain from this measurement?

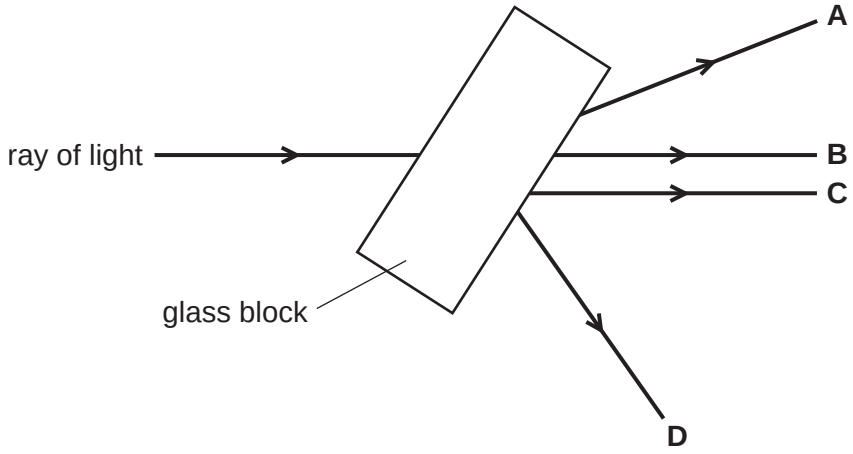
A amplitude

B frequency

C speed

D wavelength

35 Which labelled ray shows the path of the ray of light after it has passed through the glass block?



36 The diagram shows part of the electromagnetic spectrum.

gamma rays	P	ultra violet waves	Q	infrared waves

Which line in the table shows the missing types of radiation at P and at Q?

	at P	at Q
A	microwaves	radio waves
B	microwaves	visible light
C	X-rays	radio waves
D	X-rays	visible light

37 An electronic circuit in a fire alarm makes a loudspeaker vibrate alternately at two different frequencies.

Which pair of frequencies is suitable to use in the alarm to alert people to the danger of fire?

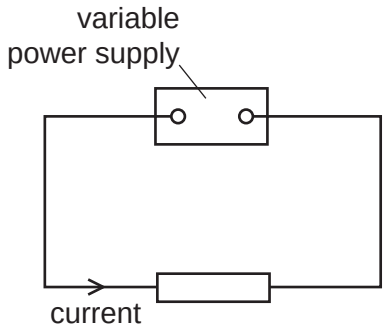
A 1.5 Hz and 15 Hz

B 15 Hz and 150 000 Hz

C 150 Hz and 15 000 Hz

D 150 000 Hz and 15 000 000 Hz

38 A variable power supply is connected to a resistor and there is a current in the resistor.



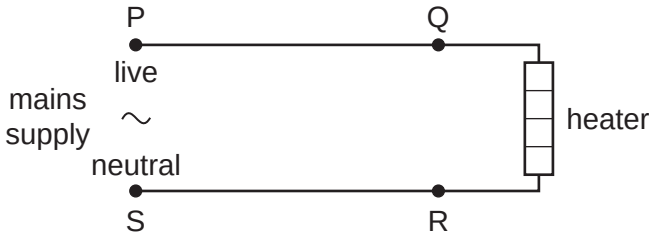
The potential difference across the resistor is increased.

The temperature of the resistor does not change.

What happens to the current in the resistor and what happens to the resistance of the resistor?

	current	resistance
A	decreases	increases
B	decreases	stays the same
C	increases	decreases
D	increases	stays the same

39 The circuit shows a mains supply connected to a heater.



Between which labelled points should a fuse be connected in the circuit?

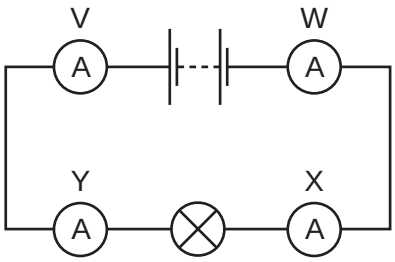
A between P and Q

B between Q and R

C between R and S

D between S and P

40 Four ammeters V, W, X and Y are connected in the circuit shown.



Which ammeters have the same reading as each other?

A V and W only

B V and Y only

C X and Y only

D V, W, X and Y

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 = 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.).