

COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice

May/June 2015

45 minutes

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

* 6 7 2 6 7 4 8 6 6 0 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, 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.

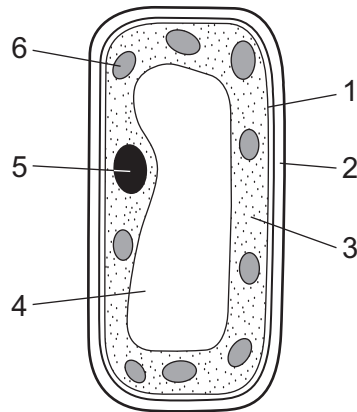
Electronic calculators may be used.

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

1 Which process produces an element that is excreted?

- A fertilisation
- B photosynthesis
- C respiration
- D transpiration

2 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	✓	x	✓	✓	x	x
B	✓	x	✓	x	✓	x
C	x	✓	x	✓	x	✓
D	x	✓	x	x	✓	✓

3 Which substances may diffuse into and out of plant cells?

	into plant cells	out of plant cells
A	chlorophyll	oxygen
B	oxygen	water
C	starch	chlorophyll
D	water	starch

4 When an apple is cut, the cut surface quickly turns brown. This is due to enzyme action.

Which action destroys the enzyme?

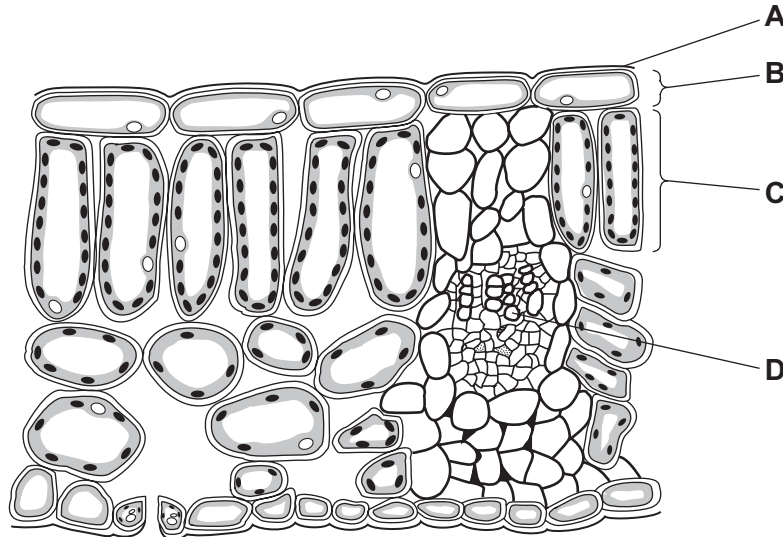
- A brushing the cut surface with a strong sugar solution
- B cutting the apple into smaller pieces
- C dipping the cut apple in boiling water
- D dipping the cut apple in cold water

5 Which nutrients are needed in the diet to produce strong bones?

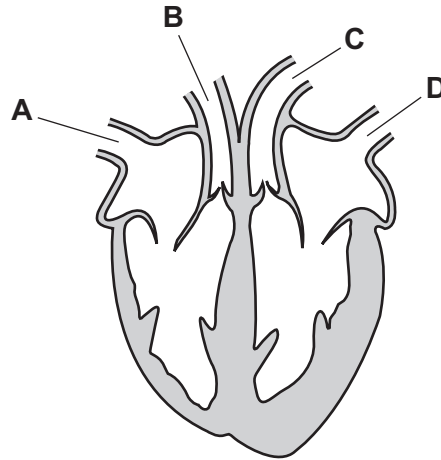
	calcium	iron	vitamin C	vitamin D
A	✓	✓	x	x
B	✓	x	x	✓
C	x	✓	x	✓
D	x	x	✓	✓

6 The diagram shows a section through a leaf.

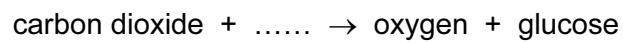
Where are there cells that contain the light-absorbing structures?



- 7 The diagram represents the human heart and associated blood vessels.
Which blood vessel carries deoxygenated blood away from the heart?

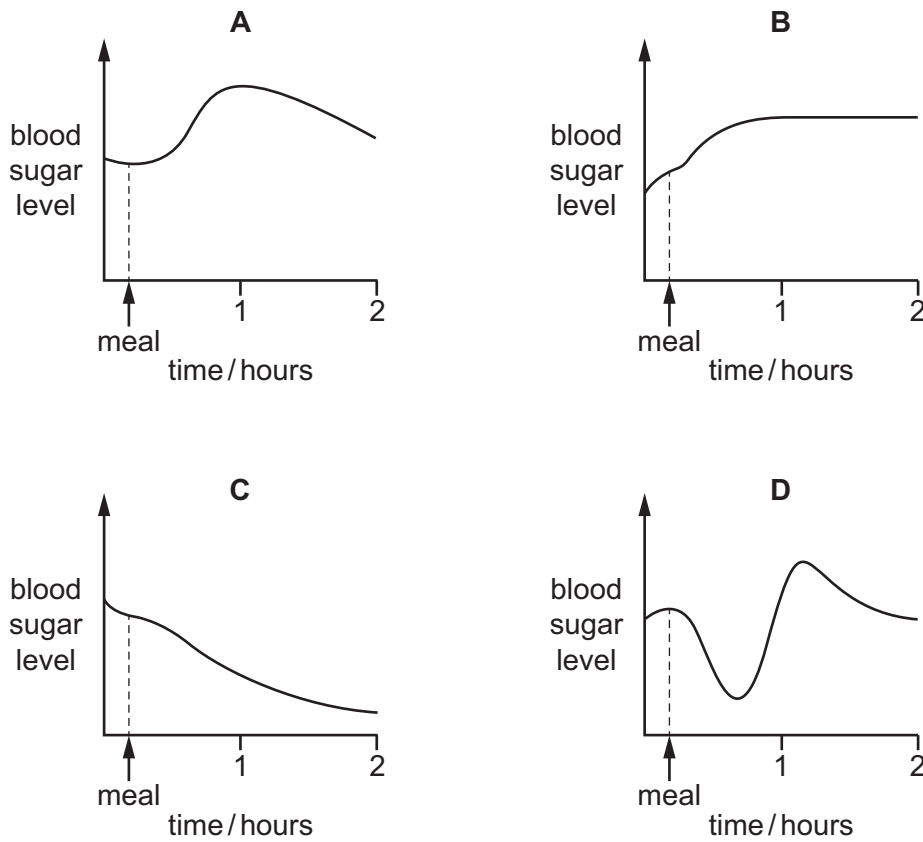


- 8 Which word is missing from the equation for a chemical reaction which takes place in living cells?

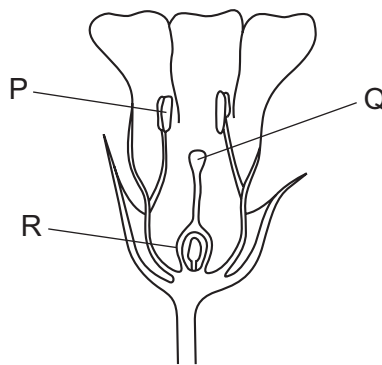


- A enzyme
B fat
C starch
D water
- 9 Where in the body are hormones destroyed?
- A gall bladder
B kidney
C liver
D pancreas

10 A healthy person does not eat for several hours but then has a meal rich in carbohydrates.
Which graph shows how the person's blood sugar level changes after the meal?



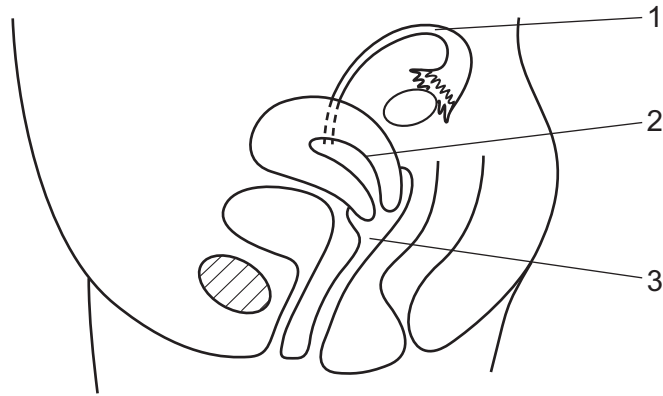
11 The diagram shows a section through a flower.



Which row correctly identifies the labelled parts of the flower?

	P	Q	R
A	anther	ovary	stigma
B	anther	stigma	ovary
C	stamen	carpel	sepal
D	stamen	sepal	carpel

12 The diagram shows a side view of the female reproductive system in a human.



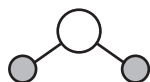
Where do fertilisation and implantation occur?

	fertilisation	implantation
A	1	2
B	2	1
C	2	3
D	3	2

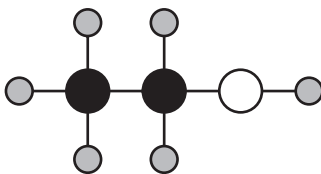
13 When fossil fuels are burnt, what is released?

	energy	carbon dioxide	oxygen
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

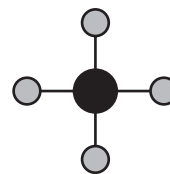
14 The structures of three molecules are shown.



water



ethanol



methane

How many atoms are in each of these molecules?

	water	ethanol	methane
A	2	3	2
B	2	4	5
C	3	3	2
D	3	9	5

15 Which method is used to determine the number of dyes present in ink?

- A** chromatography
- B** crystallisation
- C** distillation
- D** filtration

16 Fluorine and chlorine are in Group VII of the Periodic Table.

Which number increases by eight from fluorine to chlorine?

- A** the number of atoms in one molecule
- B** the number of electrons in one atom
- C** the number of electrons in one molecule
- D** the number of nucleons in one atom

17 Sodium nitrate contains one atom of sodium, one atom of nitrogen and three atoms of oxygen.

What is the formula of sodium nitrate?

- A** NaN_3O
- B** NaNO_3
- C** SN_3O
- D** SNO_3

18 During the electrolysis of aqueous copper chloride, inert electrodes are placed in the solution. The copper chloride solution is the1.....

Copper is deposited on the2..... when electricity is passed through the solution.

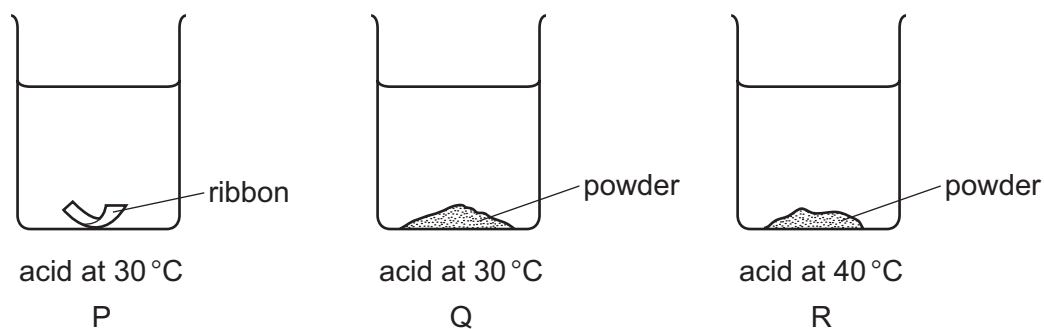
Which words correctly complete the gaps?

	gap 1	gap 2
A	electrode	anode
B	electrode	cathode
C	electrolyte	anode
D	electrolyte	cathode

19 Which change **must** take place in an endothermic reaction?

- A** Bubbles of gas are released.
- B** The mass decreases.
- C** The temperature decreases.
- D** The temperature increases.

20 The diagram shows equal masses of magnesium added to equal volumes of acid of the same concentration.



What is the order of the speed of reaction?

	fastest	→	slowest
A	P	R	Q
B	Q	R	P
C	R	P	Q
D	R	Q	P

21 The following reactions occur in the blast furnace.

reaction 1: iron oxide + carbon monoxide \rightarrow iron + carbon dioxide

reaction 2: iron oxide + carbon \rightarrow iron + carbon monoxide

Which two substances are oxidised in these reactions?

- A carbon and carbon monoxide
- B carbon monoxide and carbon dioxide
- C iron and carbon dioxide
- D iron and iron oxide

22 The table shows the results of tests on an aqueous solution of X.

test	result
blue litmus paper	turns red
aqueous silver nitrate	white precipitate formed

What is X?

- A HCl
- B HNO₃
- C NaCl
- D NaOH

23 Chromium is a transition metal.

Which properties are shown by chromium?

	high melting point	low density	acts as a catalyst
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

key

✓ = yes

x = no

24 A new alloy is resistant to corrosion.

It costs about the same as aluminium but it is slightly poisonous.

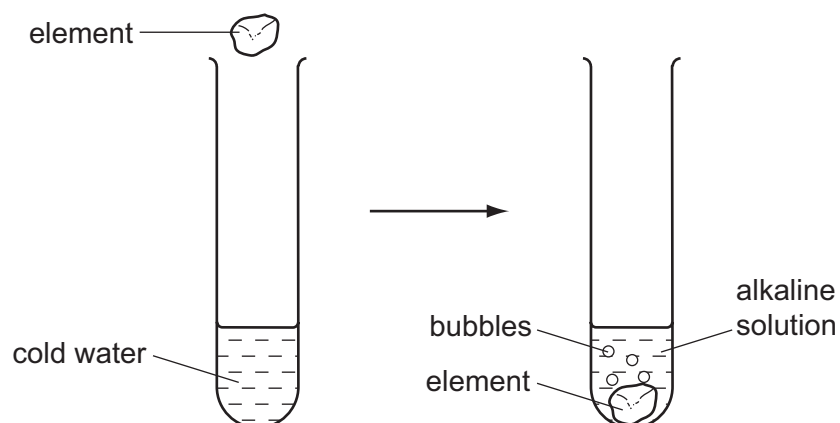
Its density, compared with stainless steel and aluminium, is shown.

	aluminium	new alloy	stainless steel
<u>density</u> g/cm ³	2.7	2.8	7.9

What is this new alloy used to make?

- A aircraft frames
- B cutlery
- C electrical insulators
- D food containers

25 The diagram shows an element being added to cold water to form a gas and an alkaline solution.



What is the element?

- A calcium
- B carbon
- C copper
- D sulfur

26 Which process does **not** produce carbon dioxide?

- A combustion of coal
- B reaction of calcium carbonate with hydrochloric acid
- C respiration
- D rusting of iron

27 Which gas is the main constituent of natural gas?

- A carbon dioxide
- B methane
- C nitrogen
- D oxygen

28 A student travels a distance of 6.0 km at a steady speed. She completes her journey in a time of 5.0 minutes.

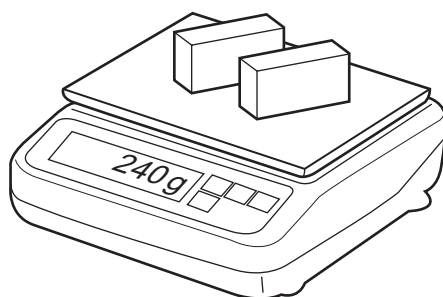
What is her speed?

- A 1.2 m/s
- B 20 m/s
- C 30 m/s
- D 50 m/s

29 A shop-keeper places **two** identical blocks of cheese on a balance.

The combined mass of the two blocks of cheese is 240 g.

Each block measures 2.0 cm × 5.0 cm × 10.0 cm.



What is the density of the cheese?

- A 0.42 g/cm³
- B 0.83 g/cm³
- C 1.2 g/cm³
- D 2.4 g/cm³

30 Energy is stored in petrol and in a box of matches.

In which form is the energy stored in each?

	petrol	a box of matches
A	chemical	chemical
B	chemical	thermal
C	kinetic	chemical
D	kinetic	thermal

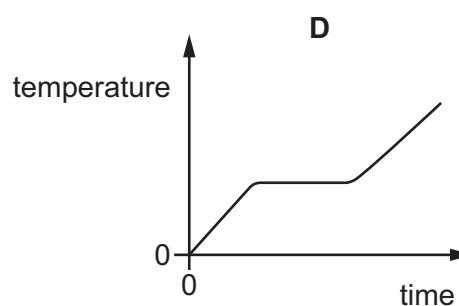
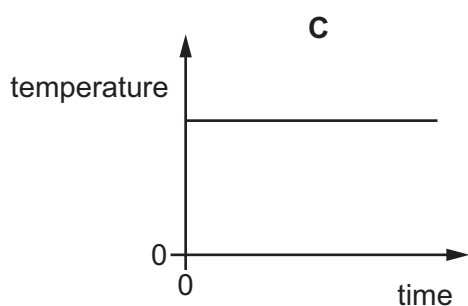
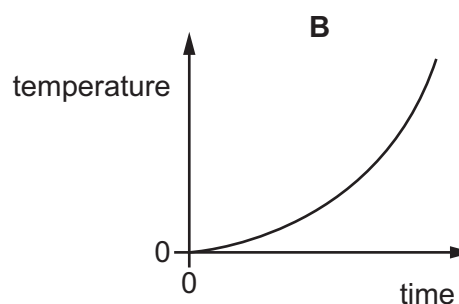
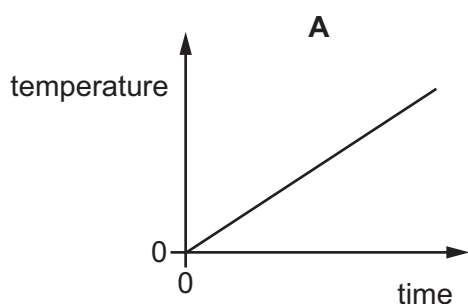
- 31 A container of milk is wrapped in a wet cloth. Air blows over the cloth. The temperature of the milk changes as the water in the cloth evaporates.

Which statement is correct?

- A** The temperature of the milk falls because the less energetic water molecules escape from the cloth.
- B** The temperature of the milk falls because the more energetic water molecules escape from the cloth.
- C** The temperature of the milk rises because the less energetic water molecules escape from the cloth.
- D** The temperature of the milk rises because the more energetic water molecules escape from the cloth.

- 32 A pure solid is heated until it all becomes a liquid, and is then heated further.

Which graph shows how its temperature changes with time?



- 33 Which row is correct?

	conduction of heat	convection of heat
A	can happen in a solid	can happen in a solid
B	can happen in a solid	only happens in liquids and gases
C	only happens in liquids and gases	can happen in a solid
D	only happens in liquids and gases	only happens in liquids and gases

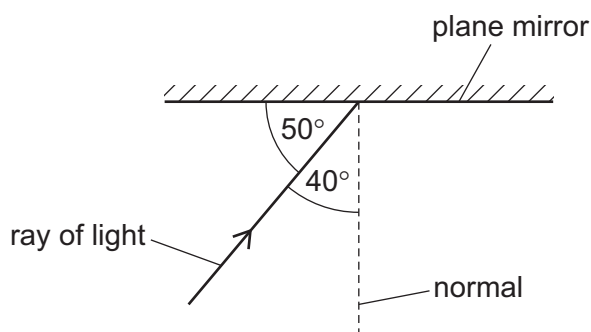
- 34 Waves cause a small boat to move regularly up and down.

A student calculates the number of times that the boat moves up and down in one second.

Which wave property has he calculated?

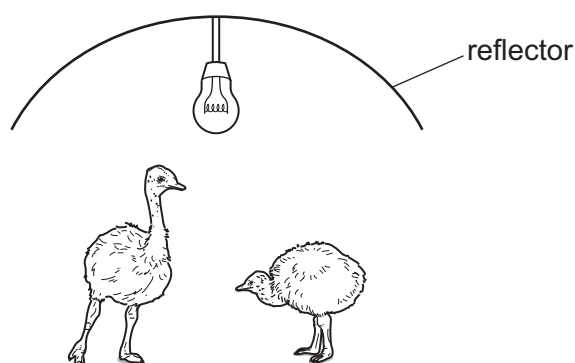
- A amplitude
 - B frequency
 - C speed
 - D wavelength
- 35 The diagram shows a ray of light striking a plane mirror.

The angle between the ray and the mirror is 50° .



What is the angle of reflection of the ray when it is reflected from the mirror?

- A 40°
 - B 50°
 - C 80°
 - D 100°
- 36 A filament lamp is used in a zoo to keep young animals warm.



What are the main types of wave given out by the lamp?

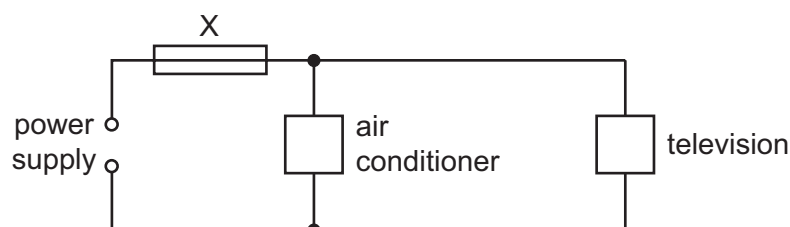
- A visible light and infra-red
- B visible light and microwaves
- C visible light and radio waves
- D visible light and X-rays

37 A whistle produces a sound that dogs can hear. It cannot be heard by humans.

What is a possible frequency for the sound of the whistle?

- A 0.025 kHz B 0.25 kHz C 2.5 kHz D 25 kHz

38 An air conditioner and a television are both connected to the same electrical circuit.



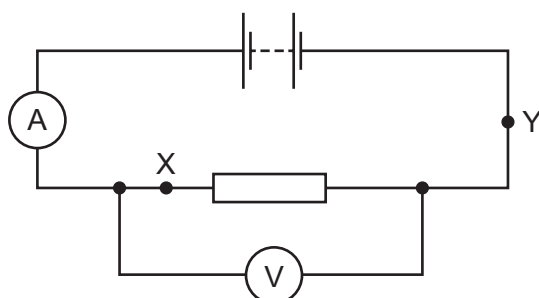
The current in the air conditioner is 9.0 A and the current in the television is 2.0 A.

Several different fuses are available.

Which fuse should be connected at X?

- A 1 A B 3 A C 7 A D 13 A

39 A student wishes to determine the resistance of a resistor. He sets up the circuit shown.

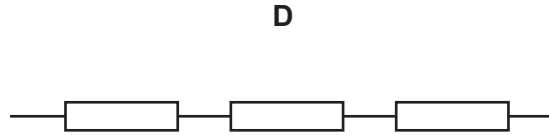
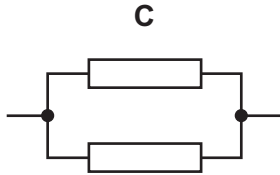
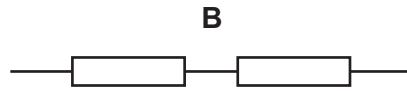
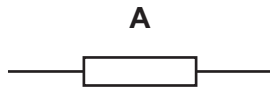


Which statement about the circuit is true?

- A The ammeter and the voltmeter should change places.
 B The circuit is correct.
 C The voltmeter should be in position X.
 D The voltmeter should be in position Y.

40 The diagrams show different arrangements of identical resistors.

Which arrangement has the least resistance?



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 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	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	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	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	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86																											
226 Ra Radium 88	227 Ac Actinium 89	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>140 Ce Cerium 58</td> <td>141 Pr Praseodymium 59</td> <td>144 Nd Neodymium 60</td> <td>146 Pm Promethium 61</td> <td>150 Sm Samarium 62</td> <td>152 Eu Europium 63</td> <td>157 Gd Gadolinium 64</td> <td>162 Dy Dysprosium 66</td> <td>165 Ho Holmium 67</td> <td>167 Er Erbium 68</td> <td>169 Tm Thulium 69</td> <td>173 Yb Ytterbium 70</td> <td>175 Lu Lutetium 71</td> </tr> <tr> <td>232 Th Thorium 90</td> <td>238 Pa Protactinium 91</td> <td>238 U Uranium 92</td> <td>238 Np Neptunium 93</td> <td>244 Pu Plutonium 94</td> <td>244 Am Americium 95</td> <td>244 Cm Curium 96</td> <td>244 Bk Berkelium 97</td> <td>244 Cf Californium 98</td> <td>244 Es Einsteinium 99</td> <td>244 Fm Fermium 100</td> <td>244 Md Mendelevium 101</td> <td>244 No Nobelium 102</td> <td>244 Lr Lawrencium 103</td> </tr> </table>														140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	146 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	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 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	244 Pu Plutonium 94	244 Am Americium 95	244 Cm Curium 96	244 Bk Berkelium 97	244 Cf Californium 98	244 Es Einsteinium 99	244 Fm Fermium 100	244 Md Mendelevium 101	244 No Nobelium 102	244 Lr Lawrencium 103
140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	146 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	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 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	244 Pu Plutonium 94	244 Am Americium 95	244 Cm Curium 96	244 Bk Berkelium 97	244 Cf Californium 98	244 Es Einsteinium 99	244 Fm Fermium 100	244 Md Mendelevium 101	244 No Nobelium 102	244 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 dm³ at room temperature and pressure (r.t.p.).