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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (CHEMISTRY, BIOLOGY) **5126/01**

Paper 1 Multiple Choice **October/November 2010**

1 hour

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

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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 A test-tube containing a liquid X is placed in a beaker of boiling water.

The liquid X starts to boil immediately.

The boiling point of liquid X is

A 100 °C.

B above 100 °C.

C between 0 °C and room temperature.

D between room temperature and 100 °C.

2 Why are sodium and chlorine in the same period of the Periodic Table?

A Sodium and chlorine combine together to form a compound of formula NaC*l*.

B Sodium is a reactive metal and chlorine is a reactive non-metal.

C The atoms of both elements have eight electrons in their second electron shell.

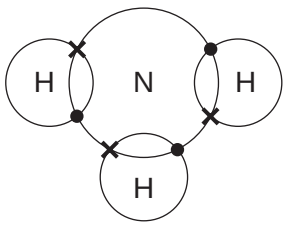
D The atoms of both elements have only three electron shells containing electrons.

3 Which substance could be sodium chloride?

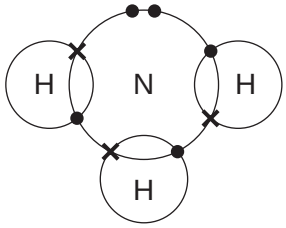
	melting point / °C	conduction of electricity	
		when liquid	in aqueous solution
A	–114	none	none
B	–114	none	good
C	180	none	insoluble
D	808	good	good

4 Which dot and cross diagram is correct for ammonia?

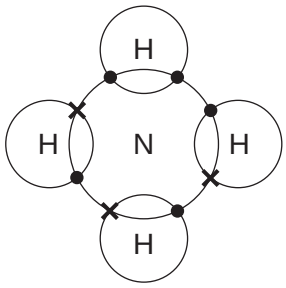
A



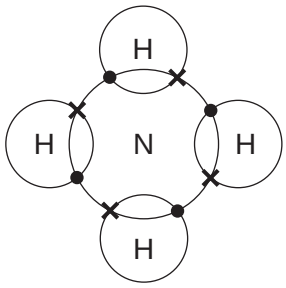
B



C



D



5 7.8 g of an element X react with oxygen to form 9.4 g of an oxide X_2O.

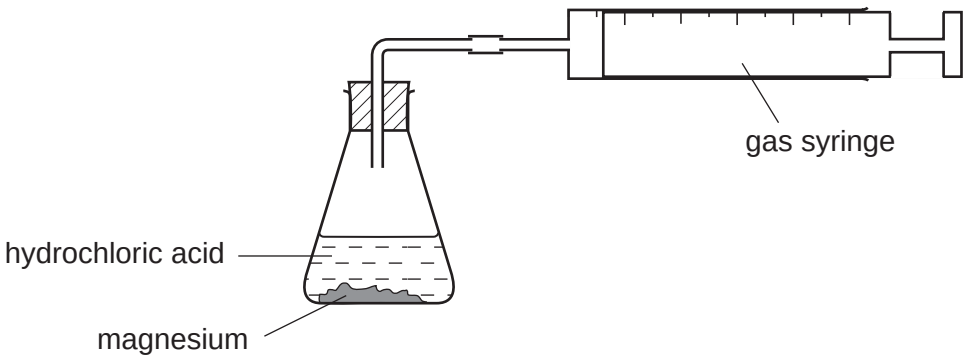
What is the relative atomic mass of X?

A 78 **B** 39 **C** 9.4 **D** 7.8

6 Magnesium reacts with hydrochloric acid as shown in the equation.

$$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

In an experiment the volume of hydrogen produced was measured.



The volume of hydrogen produced was 24 cm^3.

Which mass of magnesium was used?

A 24 g **B** 12 g **C** 0.12 g **D** 0.024 g

7 Which process is endothermic?

A the formation of a hydrogen-chlorine bond

B the formation of rust

C the formation of water from ice

D the formation of water from oxygen and hydrogen

8 Powdered zinc reacts with dilute sulfuric acid.

Which change will speed up this reaction?

A adding water to the mixture

B cooling the mixture

C heating the mixture

D using larger lumps of zinc

9 The approximate pH values of the aqueous solutions of four substances commonly used in cooking are shown.

Which substance could be taken to neutralise excess acid in the stomach?

	substance	pH
A	baking soda	9
B	salt	7
C	lemon juice	4
D	vinegar	3

10 A new halogen Z is discovered.

Its relative atomic mass is 370.

Which properties is Z likely to have?

A dark green gas, soluble in water

B black solid, high melting point

C grey solid, reacting violently with water

D white solid, reacting with acid giving hydrogen

11 Two statements about argon are shown.

1 Argon is used in light bulbs.

2 Argon is a monatomic gas which has a full outer shell of electrons.

Which statements are correct?

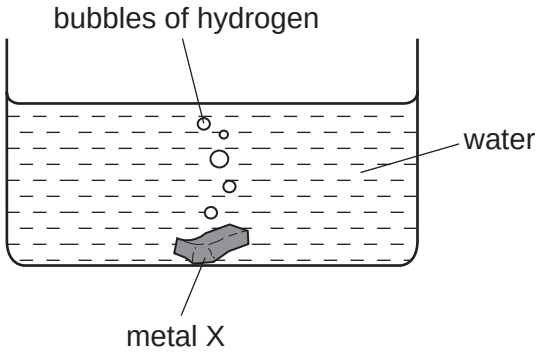
	statement 1	statement 2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = correct

✗ = incorrect

12 The diagram shows a metal X reacting with water.



What is X?

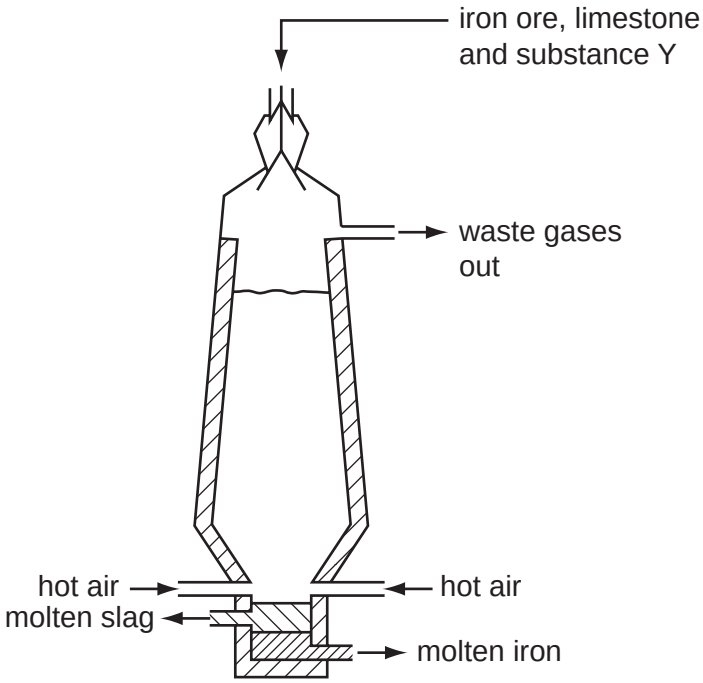
A calcium

B copper

C potassium

D sodium

13 The diagram shows a blast furnace used to extract iron from iron ore.



What is Y?

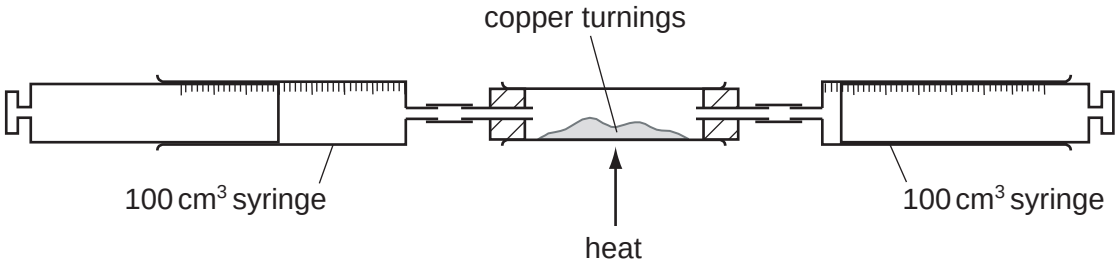
A bauxite

B coke

C oxygen

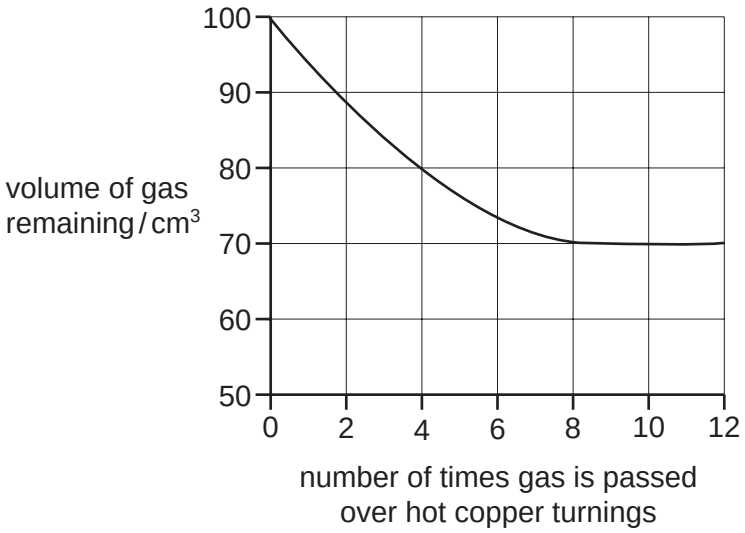
D sand

14 A 100 cm^3 sample of bottled gas, used for diving, was placed in a gas syringe in the apparatus shown.



The gas was passed backwards and forwards over the heated copper turnings.

The results obtained were used to plot the graph below.



What is the percentage of oxygen in the bottled gas?

A 20 % **B** 30 % **C** 70 % **D** 80 %

15 In the Haber process, nitrogen and hydrogen react to produce ammonia.

The reaction is represented by the equation shown.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

Which conditions favour the production of ammonia?

A high temperature and high pressure

B high temperature and low pressure

C low temperature and high pressure

D low temperature and low pressure

[Turn over

16 Which statement about a homologous series is correct?

A The boiling point increases with decreasing relative molecular mass.

B The members have the same empirical formula.

C The members have similar chemical properties.

D The relative molecular masses of consecutive members differ by 12.

17 Which formula represents a compound that undergoes an addition reaction with hydrogen?

A C_2H_6 **B** C_2H_4 **C** CH_4 **D** $C_2H_4Br_2$

18 The list shows reactions in which ethanol is either a reactant or a product.

1 combustion of ethanol

2 conversion of ethene to ethanol

3 fermentation of glucose

4 oxidation of ethanol to ethanoic acid

In which reactions is water also either a reactant or a product?

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

19 Which pair of organic compounds could react together and form an ester?

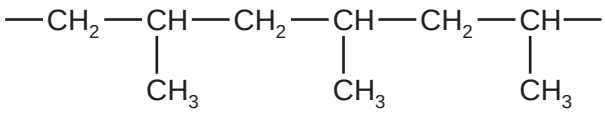
A CH_3CO_2H and HCHO

B CH_3CH_2OH and $HOCH_2CH_2OH$

C HCO_2H and CH_3CO_2H

D $HOCH_2CH_2OH$ and $HO_2CCH_2CO_2H$

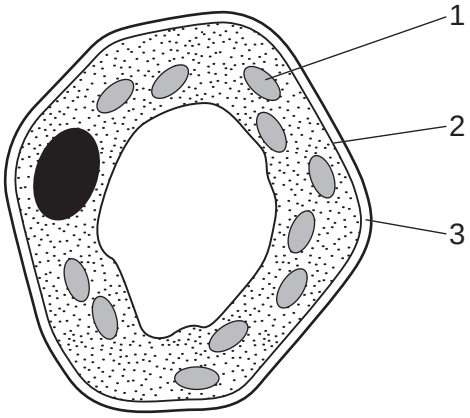
20 A polymer has the structure shown.



What is the molecular formula of the monomer?

A C_2H_4 **B** C_2H_6 **C** C_3H_6 **D** C_3H_8

21 The diagram shows a plant cell as seen under a microscope.



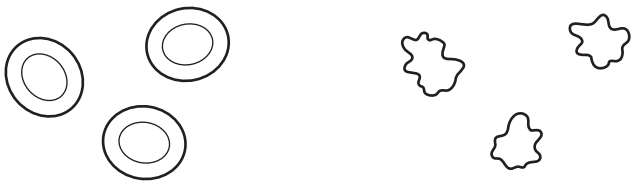
What are the functions in the cell of the numbered parts?

	controlling entry of substances	synthesis of carbohydrate
A	1	3
B	2	1
C	3	2
D	3	1

22 Diagram 1 represents some red blood cells in a solution of the same water potential as plasma.

Diagram 2 shows the same cells after treatment.

diagram 1 diagram 2



Which solution has been used in diagram 2 and in which direction has water moved?

	solution used in diagram 2	direction of water movement
A	higher water potential	into the cells
B	higher water potential	out of the cells
C	lower water potential	into the cells
D	lower water potential	out of the cells

23 Which statements are correct for **all** enzymes?

1 They are proteins.

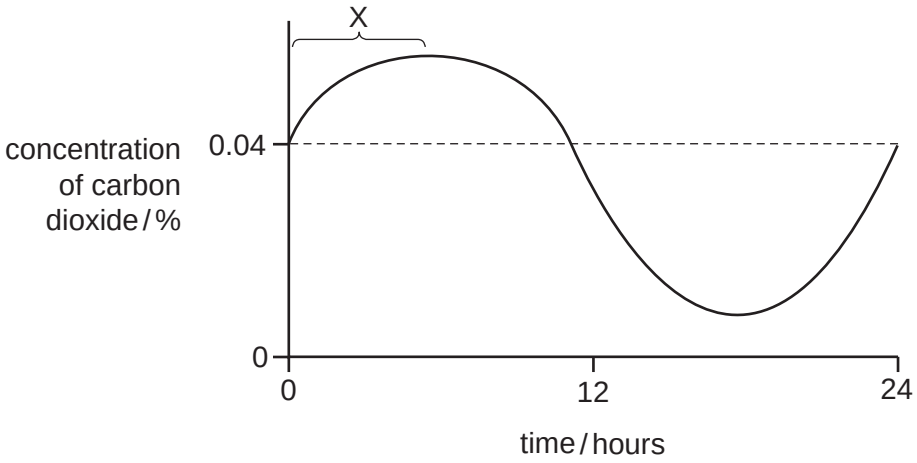
2 They are secreted into the gut.

3 They speed up biochemical reactions.

4 None of them work at low pH.

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

24 The graph shows the concentration of carbon dioxide in the air surrounding a plant measured over 24 hours.

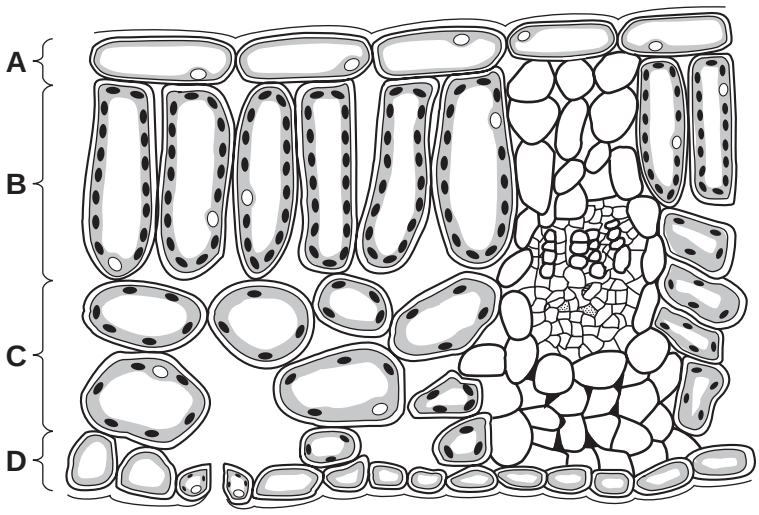


What explains the change in carbon dioxide concentration at X?

	light intensity	plant process
A	darkness	respiration
B	darkness	transpiration
C	daylight	photosynthesis
D	daylight	respiration

25 The diagram shows the arrangement of cells in the leaf of a green plant.

In which region do the cells contain the greatest number of chloroplasts?



26 In which order do these events occur in human nutrition?

A digestion → ingestion → absorption → assimilation

B digestion → ingestion → assimilation → absorption

C ingestion → digestion → absorption → assimilation

D ingestion → digestion → assimilation → absorption

27 The table shows the nutrients in different parts of a meal.

Which food would be most useful in preventing constipation?

	food	energy kJ	protein g	fat g	carbohydrate g	fibre g
A	cucumber sandwich	1054	19	7.3	27	6.1
B	orange juice	163	0.1	0	9.4	0
C	ripe banana	466	1.5	0.4	27	4.9
D	toffee bar	458	2.1	3.3	19	1.1

28 A green plant starts to wilt. It is then given water, and after a short time it recovers.

Which process causes this recovery?

A assimilation

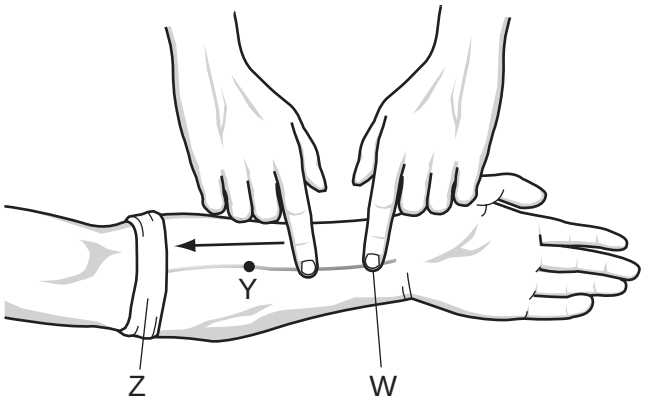
B osmosis

C respiration

D transpiration

[Turn over

29 The diagram shows the investigation of blood flow in the veins of the lower arm.



A cloth is tightly wrapped round the arm at point Z and the veins stand out clearly. One finger presses on the vein at W.

When another finger strokes the vein, as shown in the diagram, the vein lies flat between points W and Y.

Some possible explanations are listed.

1 The bandage at Z prevents backflow of blood.

2 The finger pressed at W prevents more blood entering the vein.

3 A valve at Y prevents backflow.

4 A valve at Z prevents more blood from entering the vein.

Which explanations of the vein lying flat are correct?

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

30 Why is the percentage of nitrogen in inspired air more than in expired air?

A Ciliated cells in the bronchus absorb nitrogen.

B Nitrogen is absorbed into the blood in the alveoli.

C The expired air is mainly carbon dioxide.

D There is an increase in water vapour in expired air.

31 Which feature of alveoli means that there is only a short distance for diffusion of oxygen and carbon dioxide?

A Each alveolus has a large blood supply.

B Each alveolus has a moist surface.

C There are approximately 150 million alveoli in each lung.

D The walls of the alveoli are one cell thick.

32 Where are most nitrogen compounds excreted from humans?

A kidneys

B liver

C rectum

D skin

33 The eye changes focus from looking at a wrist watch to looking at an aeroplane flying overhead. What changes occur inside the eye?

	shape of lens	suspensory ligaments	ciliary muscles
A	thicker	slacken	contract
B	thicker	taut	relax
C	thinner	slacken	contract
D	thinner	taut	relax

34 Which statements about alcohol are correct?

	acts as a depressant	speeds up reaction times	may damage the liver
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

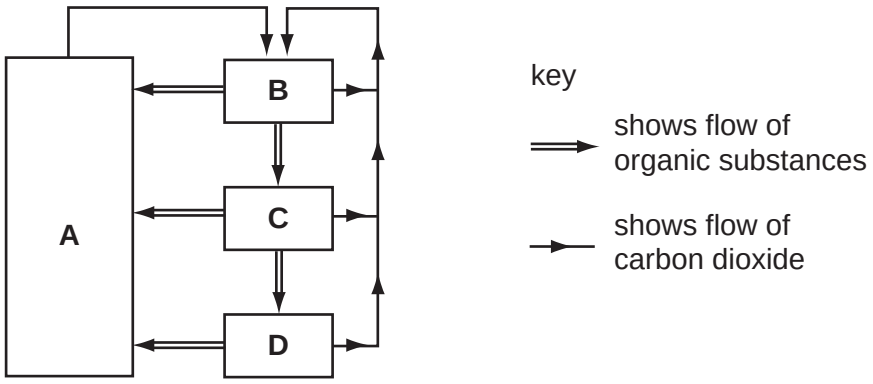
✓ = correct

✗ = incorrect

35 The diagram represents the flow of substances within a balanced ecosystem.

The boxes are various trophic levels.

Which box represents herbivores?



36 Which processes increase and decrease the amount of carbon dioxide in the air?

	process causing increase in carbon dioxide	process causing decrease in carbon dioxide
A	burning of fossil fuels	respiration of plants
B	photosynthesis in plants	respiration of bacteria
C	respiration of animals	photosynthesis in plants
D	respiration of bacteria	burning of fossil fuels

37 What is a long-term effect of cutting down large areas of rain forest?

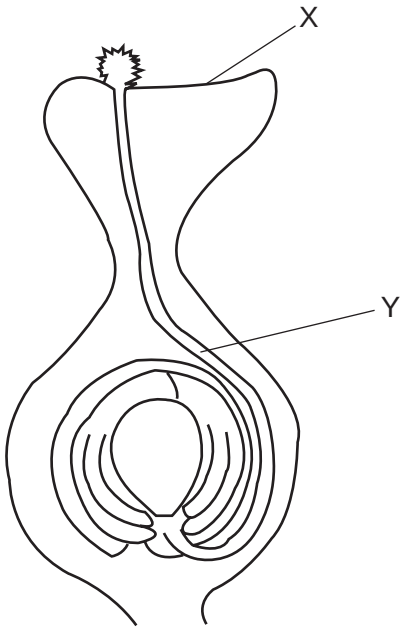
A decreased carbon dioxide in the air

B decreased flooding of low-lying land

C increased rainfall in these areas

D increased rate of soil erosion

38 The diagram shows the carpel of a flower soon after pollination.



What are the labelled structures?

	X	Y
A	stamen	pollen grain
B	stamen	pollen tube
C	stigma	pollen grain
D	stigma	pollen tube

39 Which diseases can be cured with antibiotics?

	gonorrhoea	HIV infection	syphilis
A	✓	✓	✓
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = can be cured with antibiotics

✗ = cannot be cured with antibiotics

40 Which human feature is an example of continuous variation?

A blood group

B foot size

C sex

D types of teeth

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	231 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.).