UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE **5129/12**

Paper 1 Multiple Choice **October/November 2012**

1 hour

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.

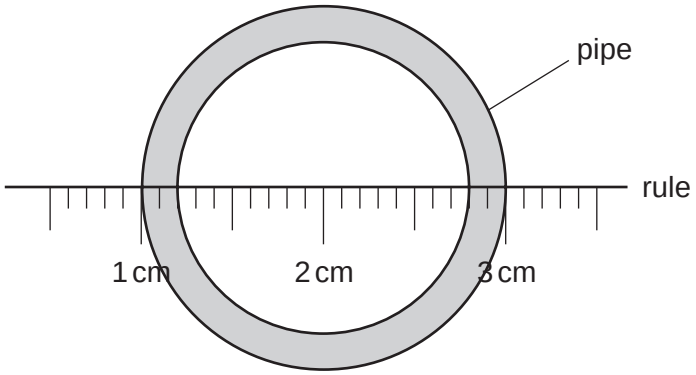
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 20.

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

1 A rule is used to measure the internal diameter of a pipe.



What is the internal diameter of the pipe?

A 1.6 cm **B** 1.8 cm **C** 2.0 cm **D** 2.6 cm

2 A car of mass 1800 kg is brought to a halt. The deceleration is $2\,m/s^2$.

What is the size of the force bringing the car to a halt?

A 900 N **B** 3600 N **C** 18 000 N **D** 36 000 N

3 What describes the density of a material?

A the amount of matter in the material

B the mass per unit volume of the material

C the pull of gravity on the material

D the volume per unit mass of the material

4 A cell will deliver 3000 J of energy to a 2 W electric motor before the cell is exhausted.

How long will the motor run?

A 25 minutes

B 100 minutes

C 1500 minutes

D 6000 minutes

5 A liquid-in-glass laboratory thermometer and a liquid-in-glass clinical thermometer [illegible] properties in common.

Which statement is **not** correct?

A Both thermometers have a graduated scale.

B Both thermometers have thin glass around the bulb.

C Both thermometers have a constriction in the tube.

D Both thermometers have a large bulb and a narrow bore.

6 What happens when a metal bar is heated?

A The distance between the molecules increases, making the bar longer.

B The molecules get larger, making the bar longer.

C The molecules vibrate more quickly, making the bar denser.

D The speed of the molecules increases, making the bar thinner.

7 Radio waves, visible light and X-rays are all part of the electromagnetic spectrum.

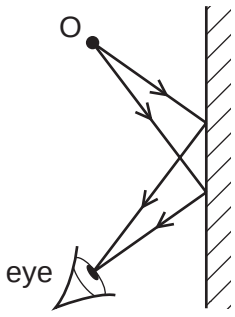
Which is the correct order of increasing wavelength?

	shortest wavelength	⟶	longest wavelength
A	visible light	radio waves	X-rays
B	visible light	X-rays	radio waves
C	X-rays	radio waves	visible light
D	X-rays	visible light	radio waves

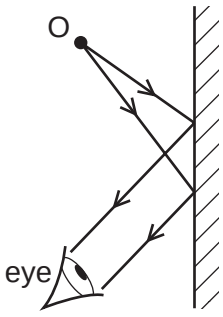
8 An eye views an object O by reflection in a plane mirror.

Which is the correct ray diagram?

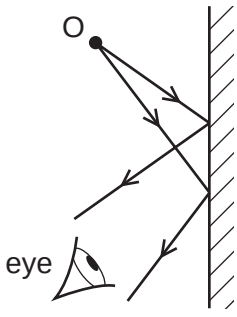
A



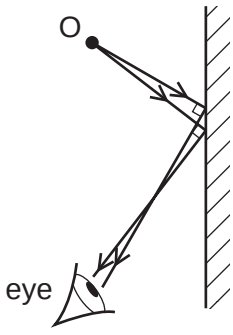
B



C

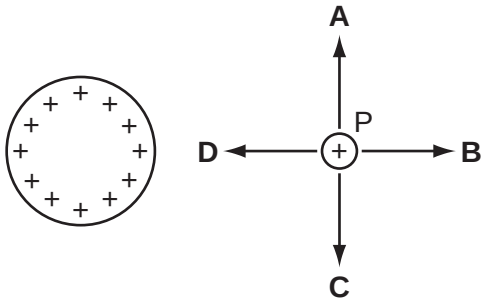


D



9 A small positive charge, P, is positioned close to a positively charged sphere.

What is the direction of the electrostatic force on P?



10 Diagram 1 shows two cells in series with two lamps X and Y. Both lamps light with normal brightness.

Diagram 2 shows a resistor in series with the same cells and lamps.

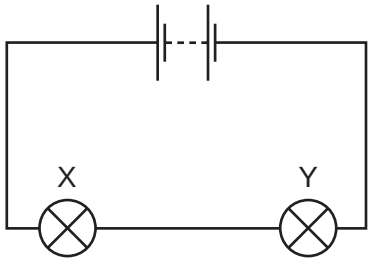


diagram 1

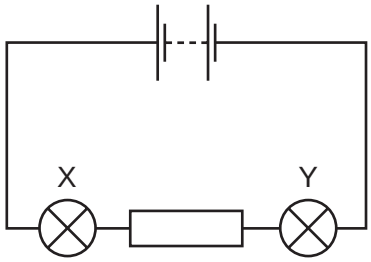


diagram 2

What is the brightness of lamp X and lamp Y in diagram 2?

	lamp X	lamp Y
A	brighter than normal	dimmer than normal
B	brighter than normal	normal
C	dimmer than normal	dimmer than normal
D	normal	dimmer than normal

11 To determine whether a material is magnetic, a student should

A find out if it is a metal or a non-metal.

B find out if it is a conductor or an insulator.

C find out if it can be given an electric charge.

D find out if it affects the direction in which a compass needle points.

12 The primary coil of a simple iron-cored transformer is connected to an a.c. source a... a d.c. source. The secondary coil is connected to an oscilloscope and the output of the t... is observed for each source.

Which row correctly describes the output for a given source?

	source	output
A	a.c.	a.c.
B	a.c.	d.c.
C	d.c.	a.c.
D	d.c.	d.c.

13 An atom has a nucleus surrounded by electrons.

What are the charges on the nucleus and on the whole atom?

	charge on nucleus	charge on whole atom
A	neutral	neutral
B	neutral	positive
C	positive	neutral
D	positive	positive

14 Which statement about the particles in a liquid is **not** correct?

A They are arranged in regular patterns.

B They can escape from the liquid.

C They form a definite surface.

D Their speed increases as temperature increases.

15 What can be deduced from the symbol $^{4}_{2}\mathrm{He}$?

A An atom of helium has two electrons.

B An atom of helium has two protons and four neutrons.

C Helium has a proton number of 4.

D Helium occurs as a diatomic molecule.

16 What is the best way of slowing down the reaction between magnesium and sulfuric a

A adding a catalyst to the reactants

B diluting the acid used in the reaction

C stirring the reagents

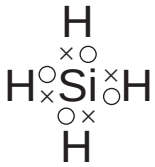
D using magnesium powder instead of ribbon

17 The table gives some properties of four substances.

Which substance is covalently bonded?

	melting point / °C	boiling point / °C	electrical conductivity when liquid	electrical conductivity in aqueous solution
A	808	1465	✓	✓
B	–114	78	✗	✗
C	64	748	✓	✓
D	327	1730	✓	✗

18 The diagram shows the electronic structure of silane, SiH_4.



Which row shows the properties of silane?

	conduction of electricity in the liquid state	melting point
A	good	high
B	good	low
C	non-conductor	high
D	non-conductor	low

19 Which mass of oxygen combines with 16 g of sulfur to form sulfur dioxide, SO_2?

A 4 g **B** 8 g **C** 16 g **D** 32 g

20 Different solids were added to separate test-tubes of warm dilute sulfuric acid.

For which solid is the observation correct?

	solid	observation
A	ammonium sulfate	alkaline gas produced
B	copper	gas evolved ignited with a pop
C	magnesium oxide	solid dissolved with no effervescence
D	zinc carbonate	gas evolved relights glowing splint

21 What is the order of reactivity of the halogens?

	most reactive ⟶		least reactive
A	bromine	chlorine	iodine
B	chlorine	bromine	iodine
C	iodine	bromine	chlorine
D	iodine	chlorine	bromine

22 Which metal does **not** react with dilute hydrochloric acid to give hydrogen?

A copper

B iron

C magnesium

D zinc

23 The boiling points of some elements are given in the table.

element	boiling point / °C
nitrogen	–196
xenon	–108
oxygen	–183

A mixture of nitrogen, xenon and oxygen at –200 °C is allowed to warm up to –150 °C.

Which elements are still in the liquid state at –150 °C?

A a mixture of nitrogen and oxygen

B a mixture of nitrogen and xenon

C nitrogen only

D xenon only

24 Which reaction takes place in the blast furnace?

A $FeCr_2O_4 + 4C \rightarrow Fe + 2Cr + 4CO$

B $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

C $SiO_2 + CaO \rightarrow CaSiO_3$

D $SiO_2 + 2NaOH \rightarrow Na_2SiO_3 + H_2O$

25 Ammonium sulfate, $(NH_4)_2SO_4$, is added to soil to provide an element that is important for plant growth.

What is this element?

A hydrogen

B nitrogen

C oxygen

D sulfur

26 X reacts with steam to form Y.

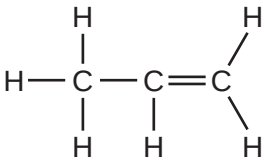
Y can be oxidised to Z.

$$X \xrightarrow{\text{steam}} Y \xrightarrow{\text{oxidation}} Z$$

If Z is propanoic acid, what would be the formula of X?

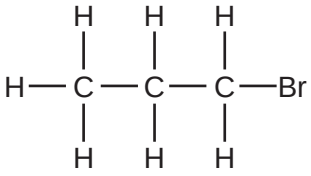
A C_2H_4 **B** C_2H_6 **C** C_3H_6 **D** C_3H_8

27 Propene is an unsaturated hydrocarbon. Its structure is shown.

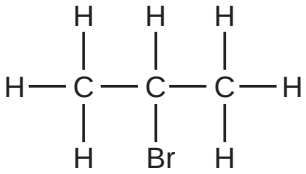


What is produced when propene reacts with bromine?

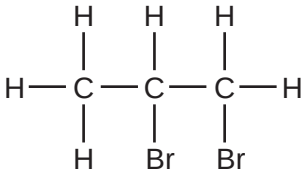
A



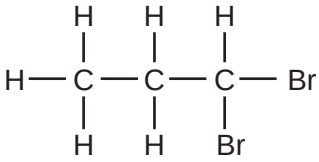
B



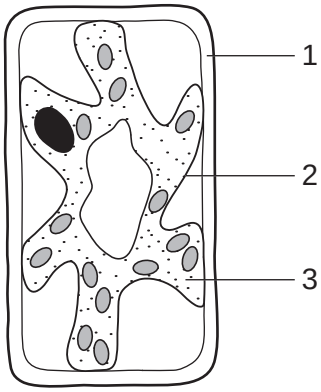
C



D



28 The diagram shows a typical plant cell after being placed into a concentrated salt solution for ten minutes.



Which numbered structures are partially permeable?

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

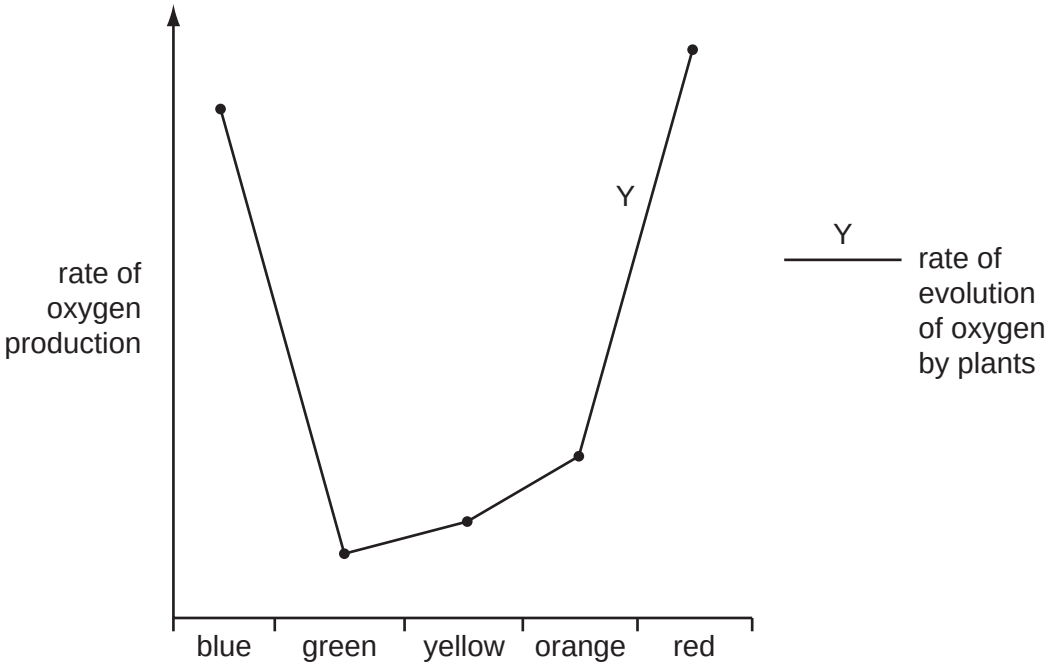
29 The following reaction occurs in the human alimentary canal.

$$\text{starch} \xrightarrow{\text{catalyst}} \text{products}$$

What are the catalyst and the product?

	catalyst	product
A	acid	glucose
B	alkali	energy
C	amylase	maltose
D	bile	amino acid

30 The graph shows the effect of different colours of light on the rate of oxygen production by green plants.



What can be deduced from the graph?

A Photosynthesis is least active in green light.

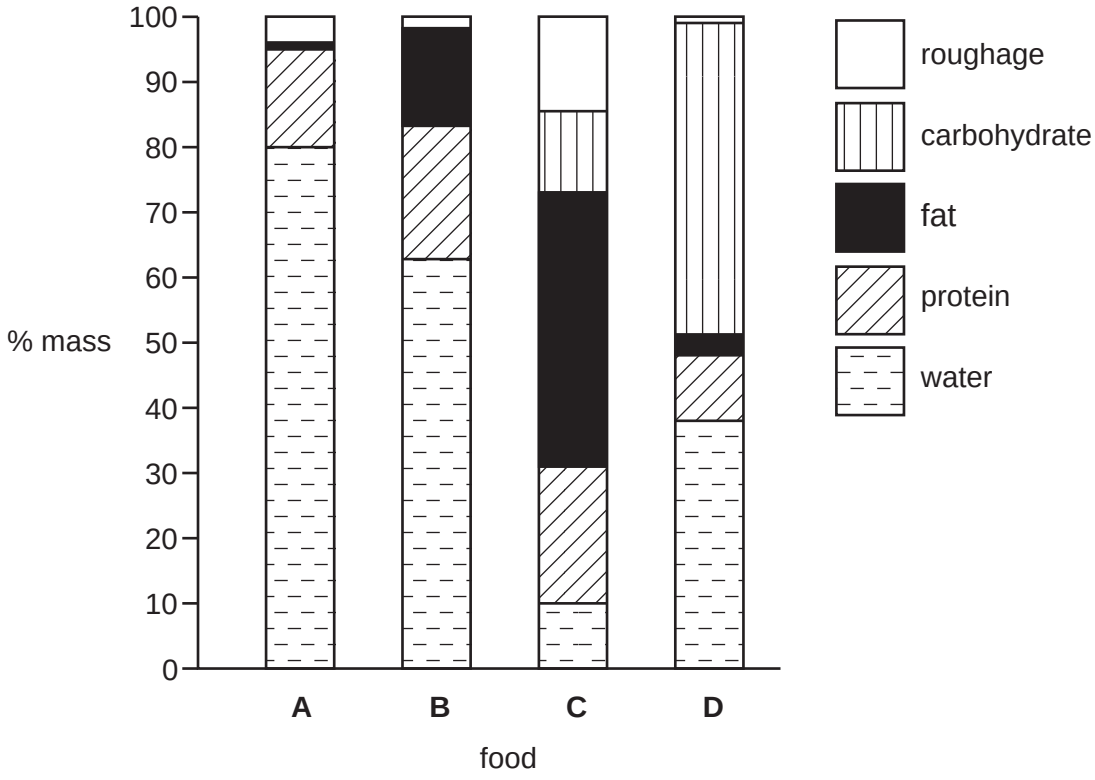
B Photosynthesis is most active in green light.

C Respiration is least active in green light.

D Respiration is most active in green light.

31 The diagram shows the composition of four foods.

Which food will provide the most energy per gram?



32 How do these substances enter a plant's root hairs?

	nitrate	oxygen	water
A	active transport	diffusion	osmosis
B	diffusion	osmosis	active transport
C	osmosis	active transport	diffusion
D	osmosis	diffusion	active transport

33 The table shows substances that pass between capillaries and tissues in a part of the

substance	into the capillaries from the tissues	out of the capillaries into the tissues
oxygen		✓
carbon dioxide	✓	
amino acids		✓
urea	✓	

In which part of the body are these capillaries?

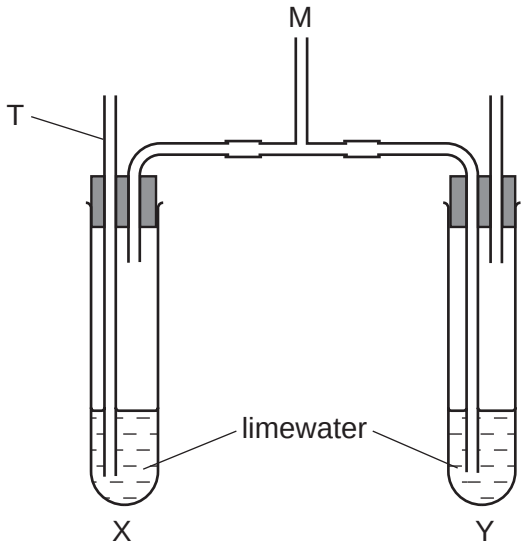
A between the alveoli

B in the kidney

C in the liver

D in the villi

34 The apparatus shown is used to investigate gas exchange during breathing.



What would occur when a person breathes gently in and out several times through tube M?

A The solutions in X and Y both turn cloudy.

B The solution in X remains clear, but that in Y turns cloudy.

C The solution in X turns cloudy, but that in Y remains clear.

D The solution in X is forced out through the tube T.

35 Which statement best describes changes in parts of the eye when starting focusing on a near object?

A Ciliary muscles contract, suspensory ligaments loosen and the lens becomes more rounded.

B Ciliary muscles contract, suspensory ligaments tighten and the lens becomes flatter.

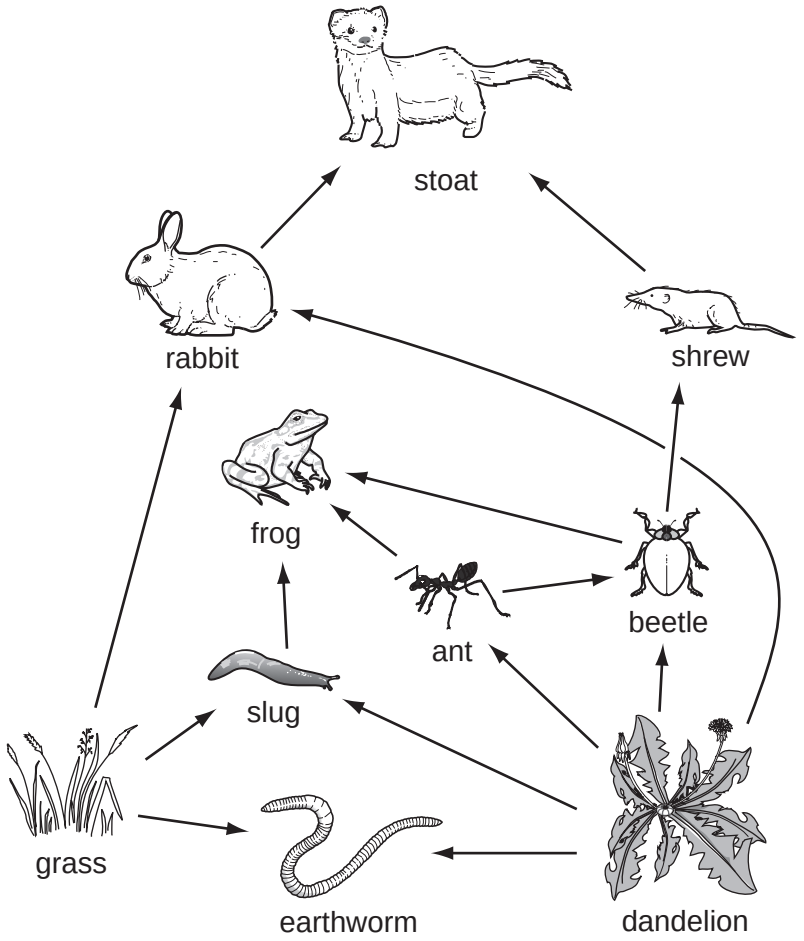
C Ciliary muscles relax, suspensory ligaments loosen and the lens becomes more rounded.

D Ciliary muscles relax, suspensory ligaments tighten and the lens becomes flatter.

36 Which descriptions of drugs are correct?

	have side effects	are broken down by the liver
A	✗	✗
B	✗	✓
C	✓	✗
D	✓	✓

37 The diagram shows part of the food web.



Which organism can properly be described by **only one** of the terms producer, consumer, herbivore and carnivore?

A ant

B dandelion

C frog

D stoat

38 What increases in the long term as a result of tropical deforestation?

A cloud cover

B humidity

C soil erosion

D soil fertility

39 What is always true of the offspring from asexual reproduction in plants?

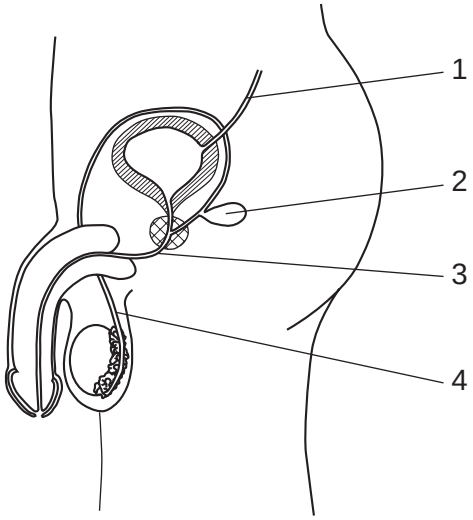
A a new variety

B more resistant to disease

C same flower shape

D same size

40 The diagram shows the male reproductive system.



How could surgical contraception be carried out?

A cutting and tying tube 1

B cutting and tying tube 3

C cutting and tying tube 4

D removing gland 2

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						12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
7 Li Lithium 3	9 Be Beryllium 4									11 B Boron 5	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
23 Na Sodium 11	24 Mg Magnesium 12									27 Al Aluminium 13	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
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	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
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	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.).