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Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

COMBINED SCIENCE **5129/11**

Paper 1 Multiple Choice **October/November 2016**

1 hour

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

3373672214

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.

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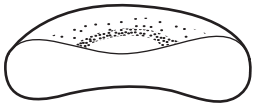
1 A red blood cell has a characteristic shape which is related to its function.

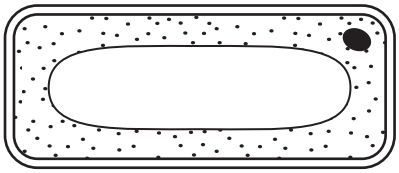
The diagram shows a red blood cell cut in half.



Which row is correct for a red blood cell?

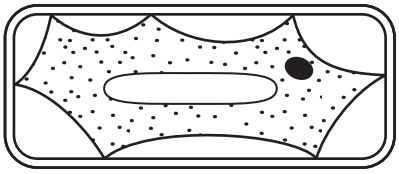
	surface area of cell	rate of oxygen diffusion into cell
A	large	fast
B	large	slow
C	small	fast
D	small	slow

2 The first diagram shows an onion cell in pure water.



onion cell in pure water

The cell is now placed in a concentrated sugar solution. The second diagram shows it after one hour.



onion cell after one hour in concentrated sugar solution

Which statement explains the change?

A Sugar has moved into the cell.

B Sugar has moved out of the cell.

C Water has moved into the cell.

D Water has moved out of the cell.

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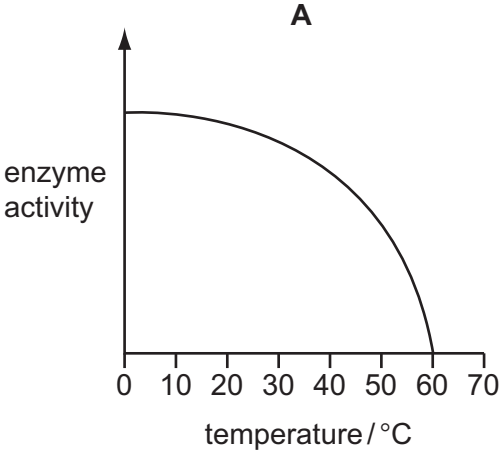
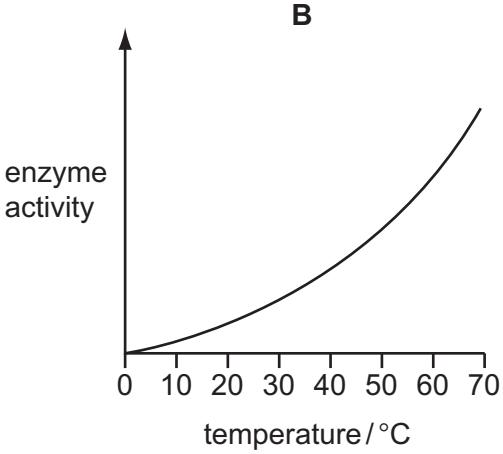
3 Which graph shows how the activity of an enzyme in the human alimentary canal varies with temperature?

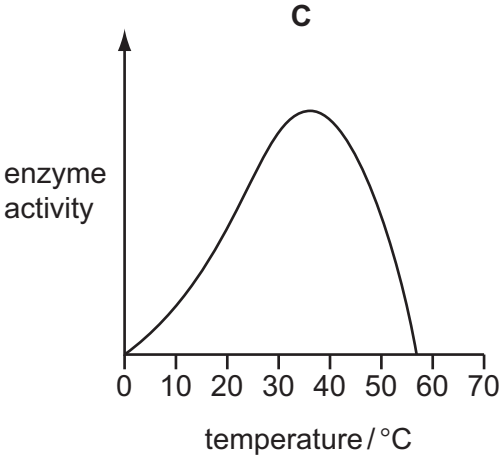
A



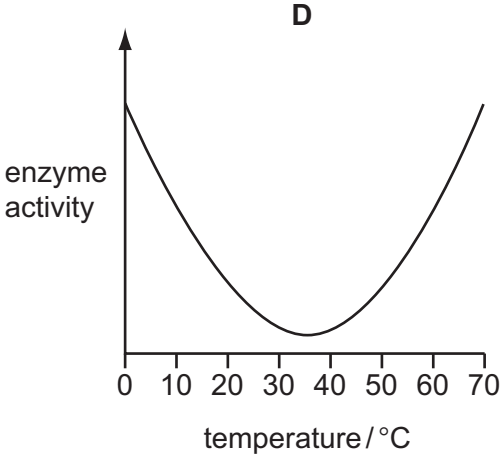
B



C



D



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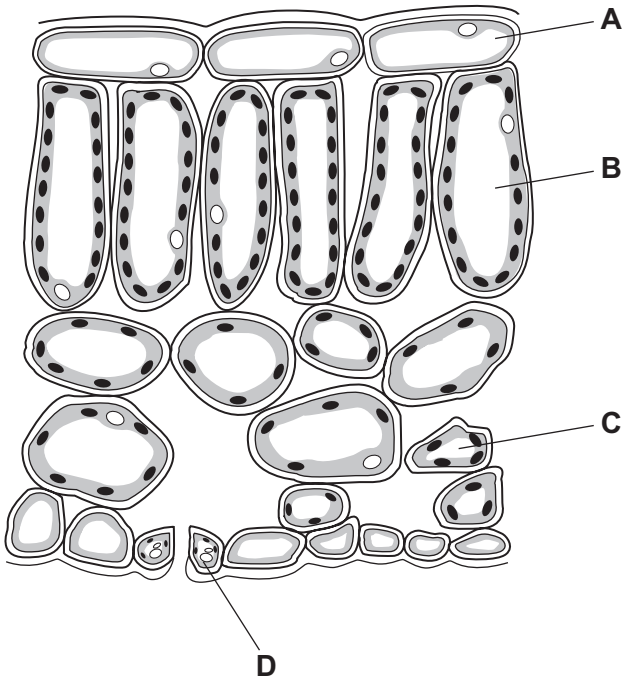
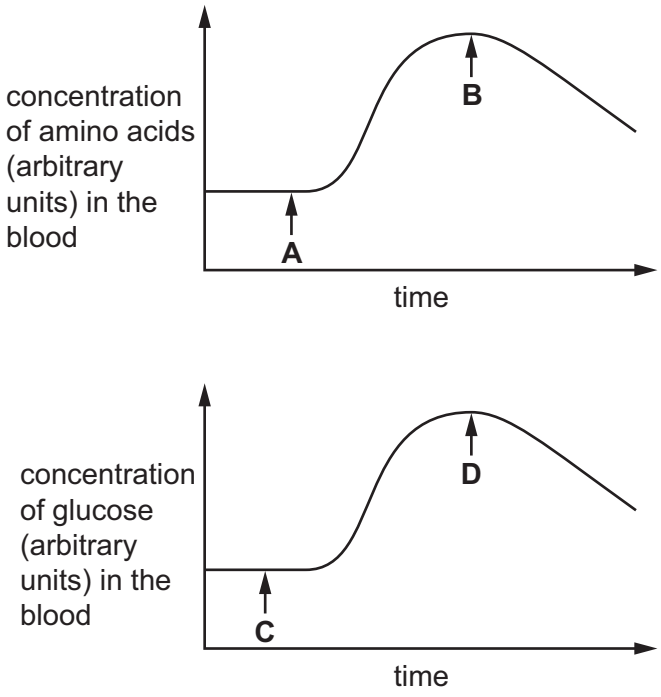
4 The diagram shows a cross-section of part of a leaf.

In which cell does most photosynthesis take place?



5 The graphs show how the concentration of amino acids and glucose in the blood change during and after a meal.

Which point shows carbohydrate has been absorbed through the wall of the small intestine?



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6 What causes wilting to occur in a plant?

	water loss	water uptake
A	high	high
B	high	low
C	low	high
D	low	low

7 What is **not** a cause of coronary heart disease?

A chest pain

B high blood pressure

C obesity

D smoking

8 The main components of atmospheric air are carbon dioxide, nitrogen, oxygen and water vapour.

Which of these are present in greater quantities in expired air compared to inspired air?

A carbon dioxide and nitrogen

B nitrogen and oxygen

C oxygen and water vapour

D water vapour and carbon dioxide

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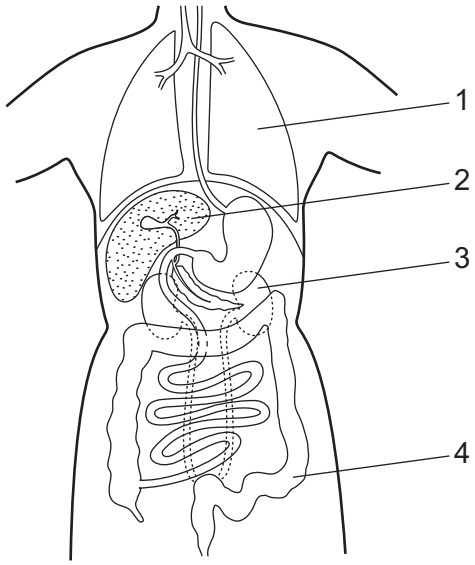
9 The diagram shows a body outline with some of the organs labelled 1, 2, 3 and 4.

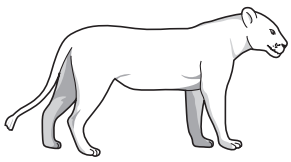


Urea, carbon dioxide and water are excreted from the body.

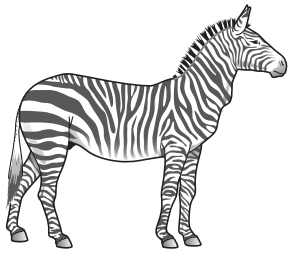
Which row correctly shows where urea and carbon dioxide are excreted?

	urea	carbon dioxide
A	2	1
B	2	4
C	3	1
D	3	4

10 A lion is watching a zebra in the distance before making a kill.



lion



zebra

What changes take place in the lion's eyes as it moves closer to the zebra?

	lens	ciliary muscles
A	fatter	contract
B	fatter	relax
C	thinner	contract
D	thinner	relax

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11 Heroin is an addictive drug.

What does this mean?

A A person becomes blind if they use heroin.

B A person becomes ill if they stop taking heroin.

C Heroin has many side effects.

D It is very difficult to stop taking heroin.

12 Which two factors together are more likely to lead to famine?

A decrease in population and unequal distribution of food

B decrease in population and drought

C increase in population and equal distribution of food

D increase in population and flooding

13 What is the function of the prostate gland?

A to allow the sperm to pass along the sperm ducts to the urethra

B to ejaculate sperm

C to produce fluid in which the sperm swim

D to produce sperm

14 Which method is used to separate ethanol from an aqueous solution of ethanol?

A chromatography

B crystallisation

C filtration

D fractional distillation

15 How many protons, neutrons and electrons are in an atom of $^{238}_{92}U$?

	protons	neutrons	electrons
A	92	238	92
B	92	146	92
C	146	92	238
D	238	92	146

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16 Element X has an electronic structure 2,8,8,1.

Element Y has an electronic structure 2,8,6.

What is made when X and Y react?

	type of compound	formula
A	covalent compound	X_2Y
B	covalent compound	XY_2
C	ionic compound	X_2Y
D	ionic compound	XY_2

17 Hexane is an organic compound.

Hexane has the formula C_6H_{14}.

Hexane has covalent bonds between its constituent atoms.

What is a property of hexane?

A It conducts electricity.

B It has a high melting point.

C It is insoluble in water.

D It is not volatile.

18 The ion of a newly discovered metal X has the symbol X^{3+}.

What is the formula of its chloride?

A XCl_3 **B** X_2Cl_3 **C** X_3Cl **D** X_3Cl_2

19 The table shows the pH of some aqueous solutions.

solution	P	Q	R	S	T
pH	8	4	2	7	10

Two of the solutions are mixed.

Which pair could give a neutral solution on mixing?

A P and S **B** P and T **C** Q and T **D** R and S

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20 Element X is a soft metal which melts at a low temperature.

How does element X react with water?

A It doesn't react with cold water but does react with steam.

B It doesn't react with water.

C It reacts slowly with cold water.

D It reacts violently with cold water.

21 Which element is mixed with zinc to make brass?

A aluminium

B copper

C iron

D magnesium

22 Which statement about atmospheric pollution is **not** correct?

A Carbon monoxide can cause damage to buildings.

B Lead compounds can damage human health.

C Oxides of nitrogen can cause acid rain.

D Sulfur dioxide is made when coal is burned in power stations.

23 Nitrogen is used in the Haber process to manufacture ammonia.

Which conditions are used in this process?

A 200 °C, 40 atmospheres pressure and an iron catalyst

B 200 °C, 450 atmospheres pressure and a copper catalyst

C 450 °C, 20 atmospheres pressure and a copper catalyst

D 450 °C, 200 atmospheres pressure and an iron catalyst

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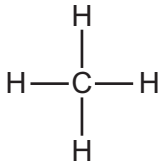
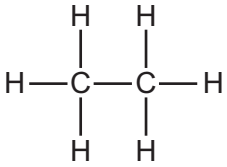
24 The names and molecular structures of two alkanes are shown.



methane



ethane

What is the next alkane in the homologous series?

	name	formula
A	butane	C_3H_6
B	butane	C_3H_8
C	propane	C_3H_6
D	propane	C_3H_8

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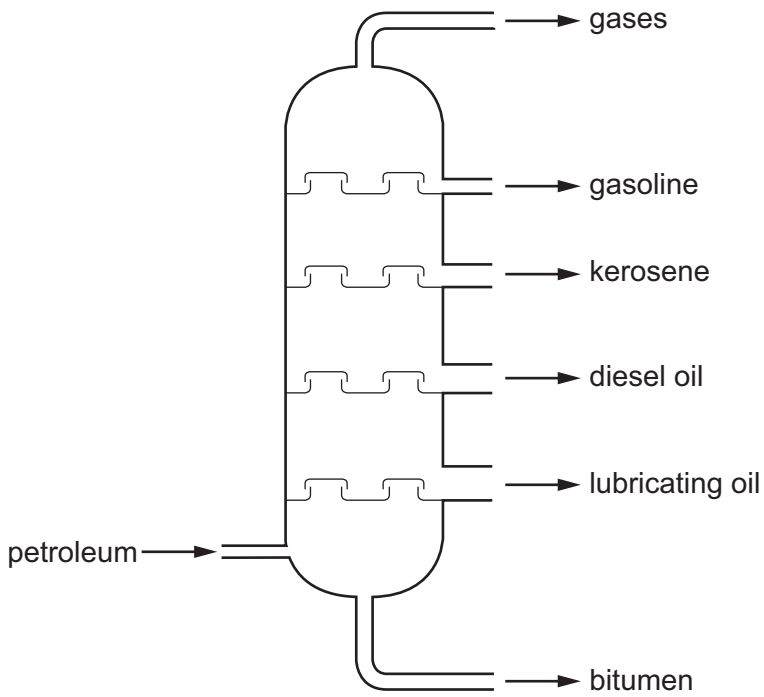
25 The fractional distillation of petroleum is shown.



The gases have small molecules, the lowest boiling temperature and burn most easily.

Bitumen has large molecules, has the highest boiling temperature and burns least easily.

Which statement is correct?

A All of the molecules in any one fraction are the same.

B Gasoline molecules are larger than diesel oil molecules.

C Lubricating oil burns less well than kerosene.

D Lubricating oil has a lower boiling temperature than kerosene.

26 The equation shows the cracking of a hydrocarbon.

$$C_{11}H_{24} \rightarrow 2C_2H_4 + X$$

What is X?

A C_9H_{20} **B** C_7H_{20} **C** C_7H_{16} **D** C_2H_4

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27 Ethanol is made by reacting ethene with steam. Ethanol is also made by the fermentation of sugar obtained from plants.

Which statement is correct?

A Fermentation is a faster process than reacting ethene and steam.

B Fermentation produces ethanol from a renewable source.

C Reacting ethene with steam produces impure ethanol.

D Reacting ethene with steam uses very little energy.

28 A scientist needs to measure the internal diameter of a test-tube as accurately as possible.

Which instrument should be used?

A measuring tape

B metre rule

C micrometer

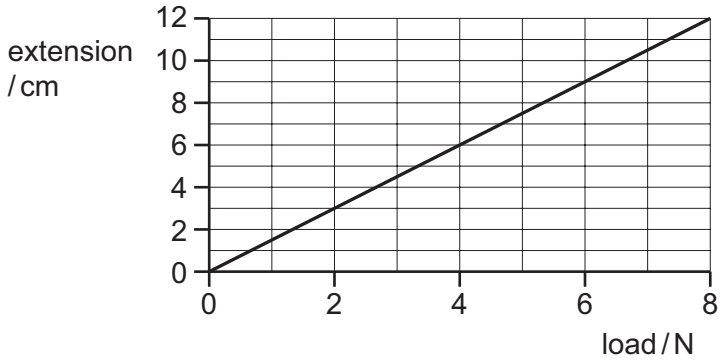
D vernier calipers

29 A block of mass 2 kg is pulled across a frictionless surface by a force of 10 N. A second identical block is placed on top of the first one and the two are pulled across the surface with the same force.

What is the acceleration of the two-block combination?

A $0.40\,m/s^2$ **B** $2.5\,m/s^2$ **C** $5.0\,m/s^2$ **D** $20\,m/s^2$

30 The diagram shows an extension-load graph for a spring.



The length of the spring with no load is 3.0 cm.

Which load gives the spring a length of 9.0 cm?

A 2 N **B** 4 N **C** 6 N **D** 8 N

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31 Which energy source is used in a nuclear power station?

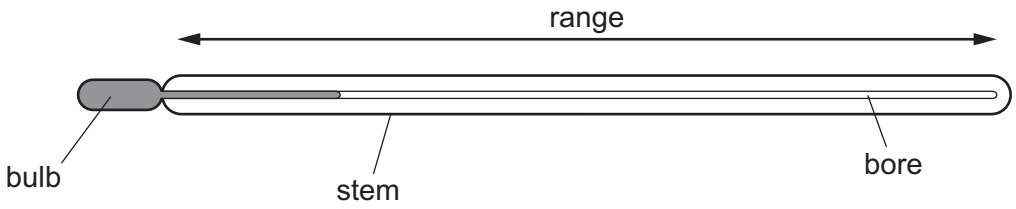
A coal

B hydrogen

C natural gas

D uranium

32 The diagram shows the structure of a typical laboratory liquid-in-glass thermometer.



What determines the sensitivity of this thermometer?

A the diameter of the bore

B the size of the bulb

C the temperature range

D the thickness of the stem

33 Which does **not** have the unit of length, m?

A amplitude

B $\frac{\text{speed}}{\text{frequency}}$

C speed × wavelength

D wavelength

34 There are several components of the electromagnetic spectrum.

How many components are there between microwaves and X-rays?

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

35 A circuit has a current of 0.6 A for a time of 2 minutes.

The current is reduced to 0.2 A for a further 1 minute.

What is the total charge that has passed around the circuit in these three minutes?

A 1.2 C **B** 1.4 C **C** 72 C **D** 84 C

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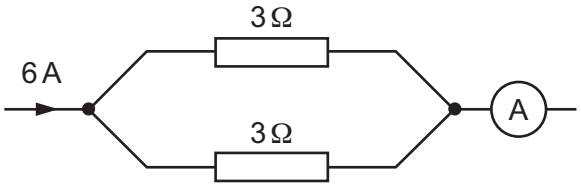
36 A current of 6 A enters the parallel arrangement shown in the diagram.



What is the reading on the ammeter?

A 0 A **B** 2 A **C** 3 A **D** 6 A

37 When making a core for an electromagnet, iron is chosen in preference to steel.

Which statement gives the main reason for choosing iron?

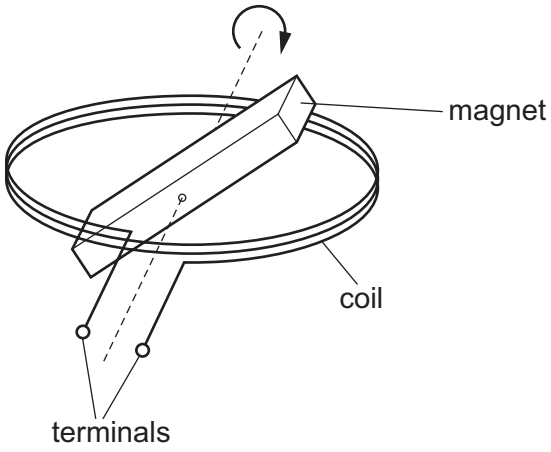
A Iron easily loses its magnetism but steel does not.

B Iron is magnetic but steel is not.

C Steel easily loses its magnetism but iron does not.

D Steel is magnetic but iron is not.

38 A simple a.c. generator consists of a magnet rotating in a coil.



Which change would increase the size of the voltage output?

A increasing the distance between the terminals

B increasing the speed of rotation

C using a coil of fewer turns

D using a weaker magnet

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39 Which row correctly compares beta-particles with gamma-rays?

	beta-particles	gamma-rays
A	less ionising	more penetrating
B	less penetrating	less ionising
C	more ionising	less penetrating
D	more penetrating	more ionising

40 The half-life of a radioactive material is 24 years.

The activity of a sample falls to a fraction of its initial value after 72 years.

What is the fraction?

A $\frac{1}{3}$ **B** $\frac{1}{4}$ **C** $\frac{1}{6}$ **D** $\frac{1}{8}$

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

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

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