

**COMBINED SCIENCE**

**5129/12**

Paper 1 Multiple Choice

**October/November 2018**

**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, 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.

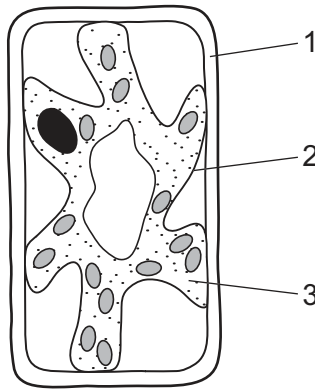
This document consists of **14** printed pages and **2** blank pages.

1 Animal and plant cells contain various structures visible under a microscope.

Which structure is **not** seen in an animal cell?

- A cell membrane
- B chloroplast
- C cytoplasm
- D nucleus

2 The diagram shows a typical plant cell which has been in a concentrated salt solution for ten minutes.



Which numbered structure or structures are partially permeable?

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

3 Which statement about all enzymes is correct?

- A Enzymes are made from carbohydrates.
- B Enzymes are not affected by changes in temperature.
- C Enzymes are used up in the reaction.
- D Enzymes increase the rate of a reaction.

4 What is the appearance of a plant that has insufficient nitrogen-containing ions?

- A The fruits are rotten.
- B The leaves are a very dark green.
- C The leaves are pale with poor growth.
- D The plant wilts.

5 What is likely to be caused by a diet low in both fat and fibre?

- A constipation and obesity
- B constipation only
- C neither constipation nor obesity
- D obesity only

6 A root hair cell has a large surface area.

What does this help the cell to do?

- A absorb water from the soil
- B excrete water from the plant
- C photosynthesise
- D respire

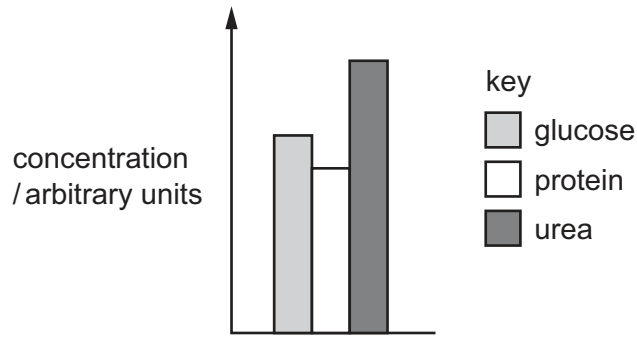
7 In which part of the blood is carbon dioxide transported?

- A plasma
- B platelets
- C red blood cells
- D white blood cells

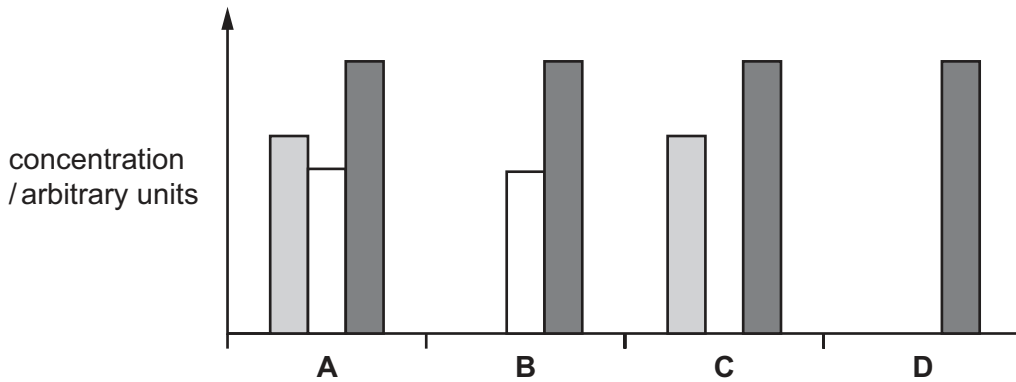
8 Which word equation represents anaerobic respiration in muscles?

- A carbon dioxide + water → glucose + oxygen
- B glucose → lactic acid
- C glucose → lactic acid + carbon dioxide
- D glucose + oxygen → carbon dioxide + water

9 The graph shows the concentration of glucose, protein and urea in the blood of a healthy person.

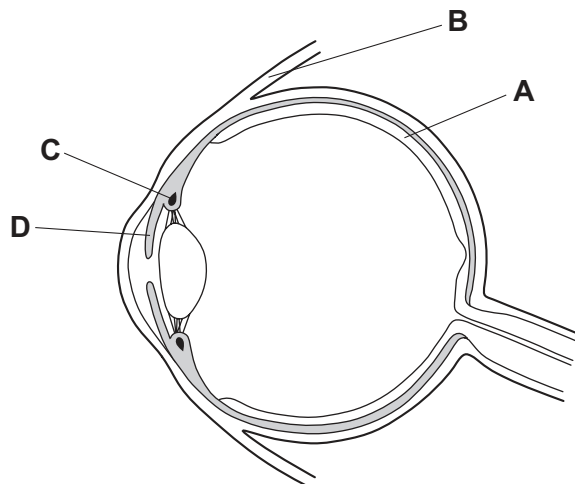


Which graph correctly shows the concentration of these substances in the urine of the same person?



10 The diagram shows an eye in section.

Which structure is mainly responsible for changing focus from a distant to a near object?

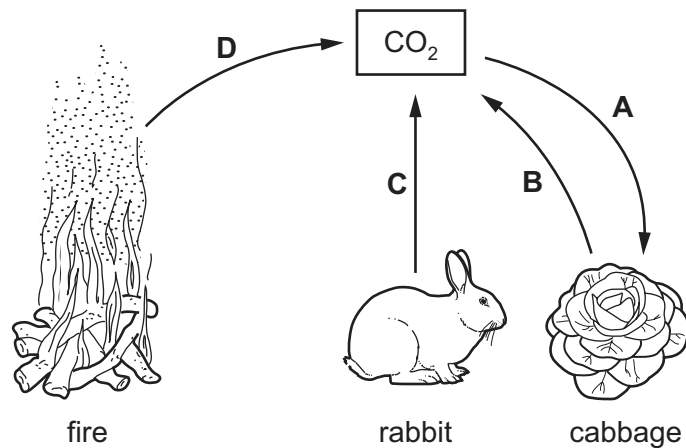


11 What is an effect of alcohol consumption?

- A increased heart rate
- B reduced risk of contracting infections
- C reduced risk of liver damage
- D slower reaction time

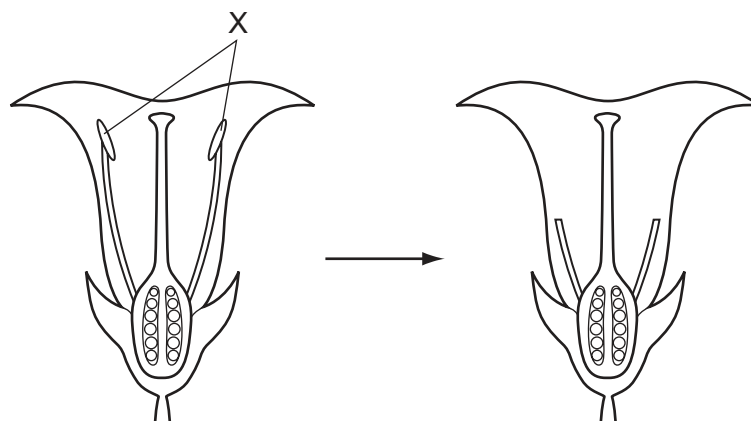
12 The diagram shows part of the carbon cycle.

Which arrow shows a process that releases oxygen?



13 The diagram shows a flower.

A plant breeder removed the structures labelled X before they had developed fully.



What is the effect of removing these structures?

- A It prevents asexual reproduction.
- B It prevents the flower from being pollinated.
- C It prevents the flower from pollinating itself.
- D It prevents the flower from producing seeds.

14 Hydrochloric acid is used to neutralise  $25\text{ cm}^3$  of aqueous sodium hydroxide in a titration.

Which piece of apparatus is used to measure the volume of hydrochloric acid?

- A balance
- B burette
- C measuring cylinder
- D pipette

15 An isotope of element X is represented by  ${}^{19}_9\text{X}$ .

What is the electronic structure of an atom of X?

- A 2,7
- B 2,8
- C 2,8,8,1
- D 2,8,18

16 Which elements react with each other to form an ionic compound?

- A calcium and chlorine
- B magnesium and potassium
- C nitrogen and hydrogen
- D sulfur and oxygen

17 The table shows some properties of four substances.

Which substance is sodium chloride?

	melting point/ $^{\circ}\text{C}$	ability to conduct electricity when liquid	ability to conduct electricity in aqueous solution
<b>A</b>	-114	none	good
<b>B</b>	180	none	poor
<b>C</b>	808	good	good
<b>D</b>	3550	good	poor

18 A chloride ion is  $\text{Cl}^-$ . An oxide ion is  $\text{O}^{2-}$ . The formula of aluminium chloride is  $\text{AlCl}_3$ .

What is the formula of aluminium oxide?

- A  $\text{AlO}$
- B  $\text{Al}_2\text{O}$
- C  $\text{Al}_2\text{O}_3$
- D  $\text{Al}_3\text{O}_2$

19 Propane,  $C_3H_8$ , is completely burned in oxygen to make carbon dioxide and water.

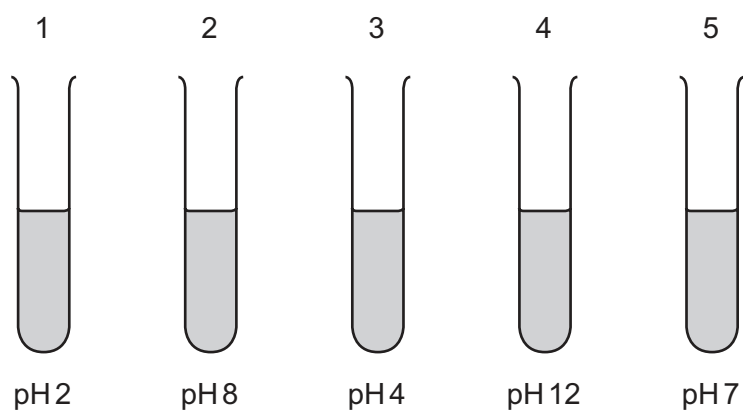
What is the chemical equation for this reaction?

- A  $C_3H_8 + 7O_2 \rightarrow 3CO_2 + 8HO$   
 B  $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$   
 C  $2C_3H_8 + 7O_2 \rightarrow 6CO + 8H_2O$   
 D  $C_3H_8 + 10O \rightarrow 3CO_2 + 4H_2O$

20 A student tests five solutions to discover which are acidic, alkaline or neutral.

The student tests each solution using Universal Indicator paper to determine the pH.

The results are shown.



Which solutions are acidic?

- A 1 and 3      B 1 and 5      C 2 and 3      D 2 and 4
- 21 The oxide of which element dissolves in rain water to produce an acidic solution?
- A calcium  
 B iron  
 C sodium  
 D sulfur
- 22 Which property determines the order of the elements in the Periodic Table?
- A the masses of their atoms  
 B the number of electrons in the outer shell  
 C the number of neutrons in the nucleus  
 D the number of protons in the nucleus

23 Compound X has a high melting point.

X conducts electricity when molten or in aqueous solution.

X does not conduct electricity when solid.

X is made by reacting chlorine gas with element Z.

Which statement describes a physical property of element Z?

- A Z does not conduct electricity.
- B Z is a gas at room temperature.
- C Z is malleable.
- D Z is soluble in water.

24 K, L, M and N are metals.

K reacts slowly with cold water.

L burns with a brilliant white flame when reacted with steam but is unreactive with cold water.

M reacts very slowly with dilute hydrochloric acid.

N reacts slowly with steam but is unreactive with cold water.

What is the order of reactivity, starting with the most reactive metal?

	most reactive	→		least reactive
<b>A</b>	K	L	N	M
<b>B</b>	K	N	L	M
<b>C</b>	M	L	N	K
<b>D</b>	M	N	L	K

25 Argon, neon, nitrogen and oxygen are all present in clean air.

What is the order of volume composition (%) of these gases in the clean air?

	highest %	→		lowest %
<b>A</b>	nitrogen	argon	oxygen	neon
<b>B</b>	nitrogen	oxygen	argon	neon
<b>C</b>	oxygen	neon	nitrogen	argon
<b>D</b>	oxygen	nitrogen	neon	argon



26 Petroleum is separated into useful fractions by fractional distillation.

What is a use of the oils fraction?

- A fuel for cars
- B fuel for aircraft
- C making roads
- D making polishes

27 Ethanol is a component of some perfumes.

Why is ethanol used?

- A because it can be drunk
- B because it has a smell
- C because it is a solvent
- D because it is flammable

28 The table shows possible units for speed, velocity and acceleration.

Which row gives the correct units for each quantity?

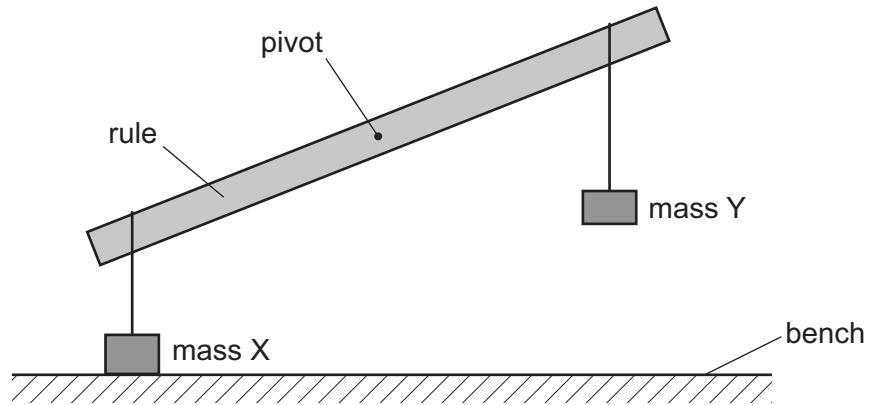
	speed	velocity	acceleration
<b>A</b>	m	m/s	m/s
<b>B</b>	m	m/s <sup>2</sup>	m/s <sup>2</sup>
<b>C</b>	m/s	m/s <sup>2</sup>	m/s
<b>D</b>	m/s	m/s	m/s <sup>2</sup>

29 A block of mass 0.50 kg is pushed across a frictionless surface with a force of 2.0 N.

What is the acceleration of the block?

- A 0.25 m/s<sup>2</sup>
- B 1.0 m/s<sup>2</sup>
- C 4.0 m/s<sup>2</sup>
- D 10.0 m/s<sup>2</sup>

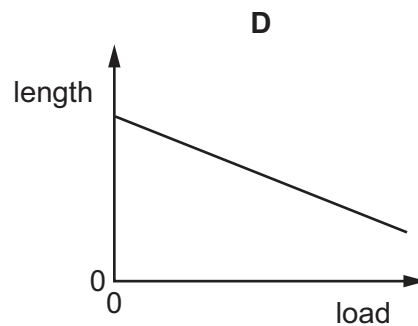
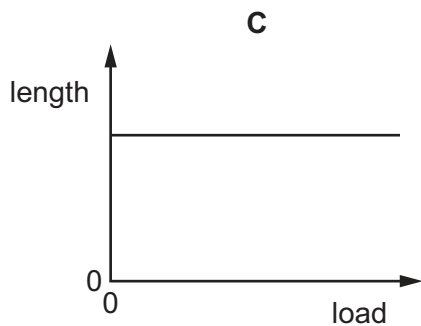
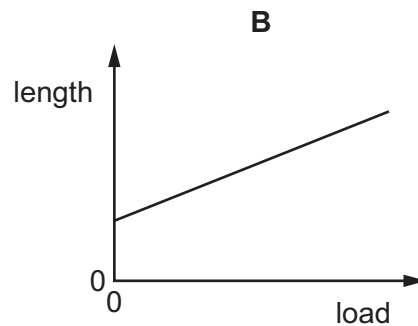
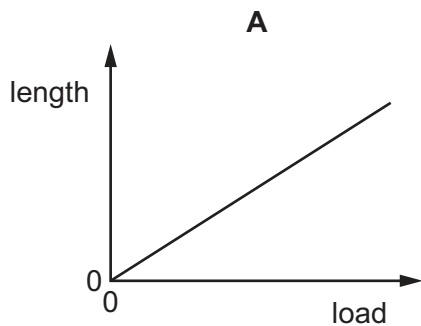
30 In an experiment to verify the law of moments, the rule does not balance.



How can the rule be balanced?

- A Move X away from the pivot.
  - B Move Y towards the pivot.
  - C Reduce the mass of X.
  - D Reduce the mass of Y.
- 31 A student adds different loads to the end of a spring. She measures the length in each case and plots a graph of length against load.

Which graph is correct?



32 A force of 60 N is used to push a box 10 m across a floor in 30 seconds.

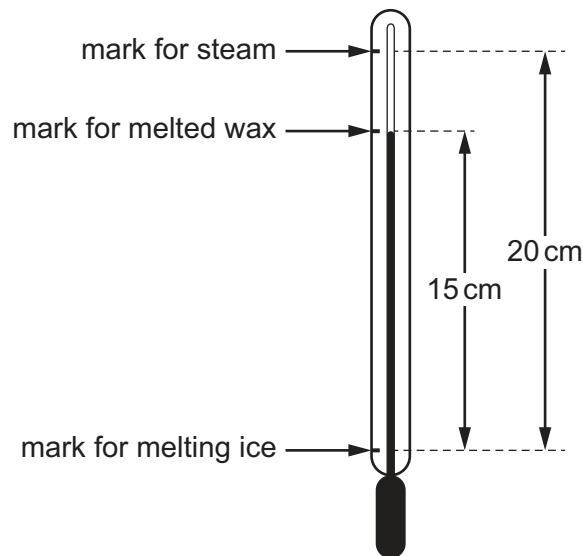
What is the average power developed?

- A 20 W                      B 180 W                      C 600 W                      D 18 000 W

33 A student calibrates an unmarked liquid-in-glass thermometer by marking the column when the thermometer is in steam at  $100^{\circ}\text{C}$  and when it is in melting ice at  $0^{\circ}\text{C}$ .

He then uses the thermometer to find the temperature of some melted wax.

The diagram shows the marks and measurements made by the student.



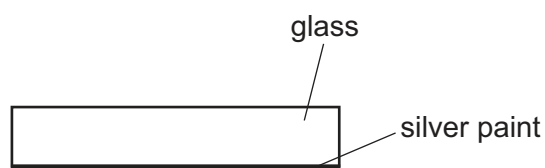
What is the temperature of the melted wax?

- A  $15^{\circ}\text{C}$                       B  $20^{\circ}\text{C}$                       C  $75^{\circ}\text{C}$                       D  $130^{\circ}\text{C}$

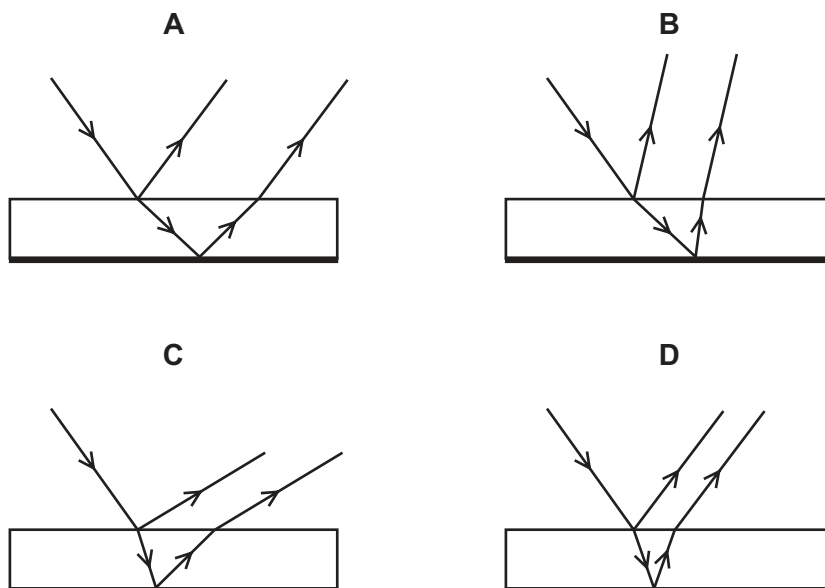
34 Which row correctly shows examples of transverse and longitudinal waves?

	transverse	longitudinal
<b>A</b>	gamma-rays	water waves
<b>B</b>	infra-red	sound
<b>C</b>	radio	light
<b>D</b>	sound	X-rays

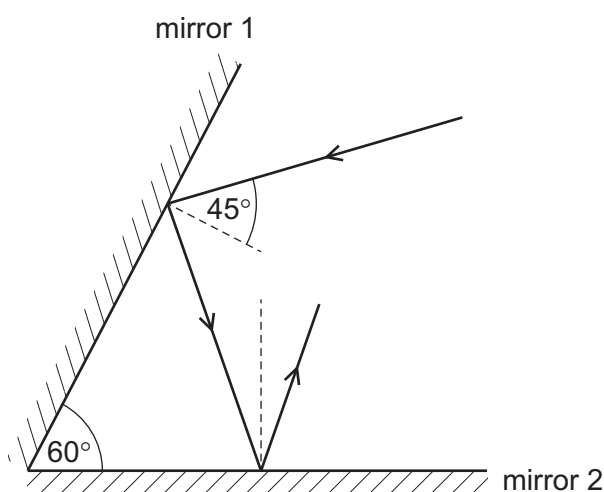
- 35 A plane mirror consists of a sheet of glass with silver paint on the back surface. The diagram shows a cross-section through the mirror.



Which diagram correctly shows what happens when a ray of light is incident on the surface of the glass?



- 36 A ray of light is incident on a mirror as shown.



A second mirror is at  $60^\circ$  to the first mirror.

What is the angle of reflection from the second mirror?

- A  $15^\circ$       B  $25^\circ$       C  $45^\circ$       D  $75^\circ$

37 The volt, V, is the unit of potential difference across a circuit component.

How can the volt also be written?

- A JC                      B  $\frac{J}{C}$                       C  $\Omega C$                       D  $\frac{\Omega}{C}$

38 A mobile phone (cell phone) takes 4.0 hours to fully recharge from a 5.0 V power supply.

The charging current is 0.25 A.

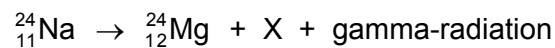
How much electrical energy is transferred from the power supply?

- A 5.0 J                      B 300 J                      C 720 J                      D 18 000 J

39 What does the nucleus of an atom of carbon contain?

- A neutrons only  
B protons only  
C protons and electrons only  
D protons and neutrons only

40 The radioactive nuclide of sodium  ${}_{11}^{24}\text{Na}$  decays to a nuclide of magnesium  ${}_{12}^{24}\text{Mg}$  with the release of a particle X and gamma-radiation.



What is X?

- A an alpha-particle  
B a beta-particle  
C a neutron  
D a proton



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The Periodic Table of Elements

		Group																				
I	II	III	IV	V	VI	VII	VIII															
3 Li lithium 7	4 Be beryllium 9	11 Na sodium 23	12 Mg magnesium 24	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	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 Ac actinium —	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 —								

1  
H  
hydrogen  
1

**Key**  
atomic number  
atomic symbol  
name  
relative atomic mass

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
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 —

lanthanoids

actinoids

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