



**COMBINED SCIENCE**

**5129/11**

Paper 1 Multiple Choice

**May/June 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.

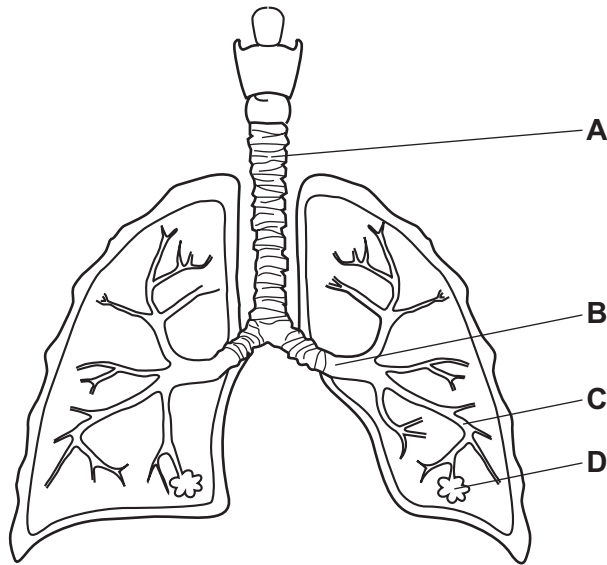
This document consists of **15** printed pages and **1** blank page.

1 What is the name of the process by which water passes through a partially permeable membrane?

- A evaporation
- B excretion
- C osmosis
- D transpiration

2 The diagram shows the human breathing system.

Where does diffusion of oxygen and carbon dioxide take place?



3 Four test-tubes contain starch solution and amylase. They are placed in water baths at different temperatures and provided with different pHs, as shown in the table.

After 30 minutes, iodine solution is added to each tube.

In which test-tube do the contents remain yellow-brown?

	temperature / °C	pH
<b>A</b>	35	2.5
<b>B</b>	35	6.9
<b>C</b>	75	2.5
<b>D</b>	75	6.9

4 A farmer uses faeces and urine from his cattle as fertiliser.

What is the main element provided by fertiliser that the plants use to make proteins?

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

5 What is the name of the process that moves food along the alimentary canal?

- A absorption
- B assimilation
- C digestion
- D peristalsis

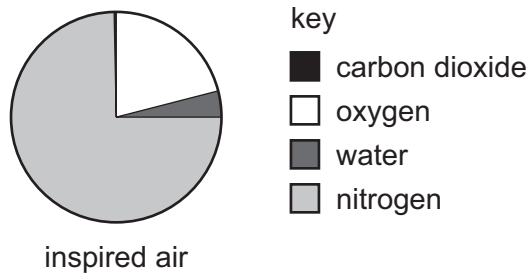
6 What is transpiration?

- A absorption of water by root hairs
- B loss of water vapour from stomata
- C movement of water up through the xylem
- D wilting

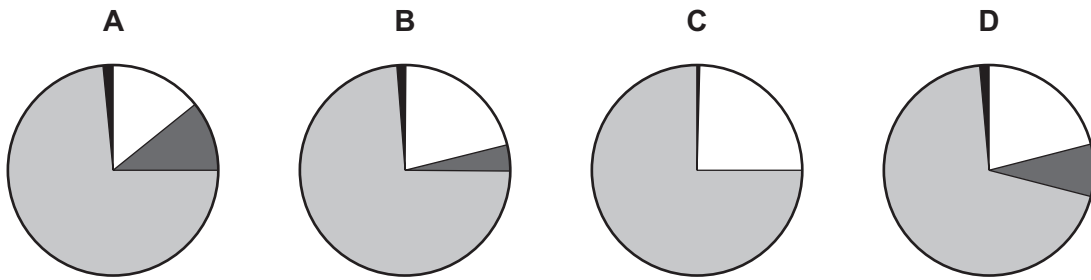
7 What is a cause of coronary heart disease?

- A blockage of the valves in the heart
- B bursting of the coronary arteries
- C deposit of fat in the coronary arteries
- D irregular heartbeat

- 8 The pie chart shows the proportion of gases in inspired air.



Which pie chart represents expired air?



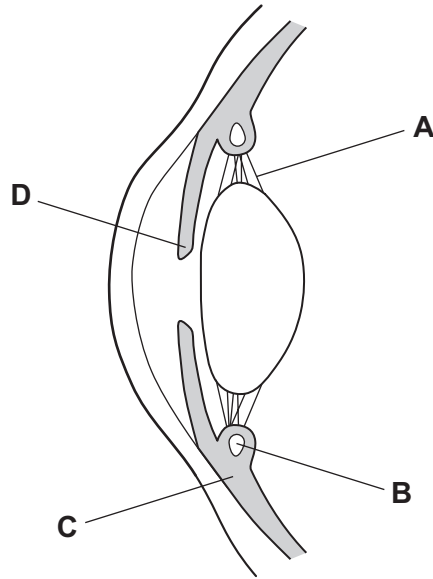
- 9 The body cannot store amino acids.

Which flow chart correctly shows what happens to excess amino acids in blood?

- A**    excess amino acids in the blood → broken down in kidney → urea in the urine → travel to liver → urea in the blood
- B**    excess amino acids in the blood → broken down in kidney → urea in the blood → travel to liver → urea in the urine
- C**    excess amino acids in the blood → broken down in liver → urea in the urine → travel to kidney → urea in the blood
- D**    excess amino acids in the blood → broken down in liver → urea in the blood → travel to kidney → urea in the urine

10 The diagram shows a section through part of a human eye.

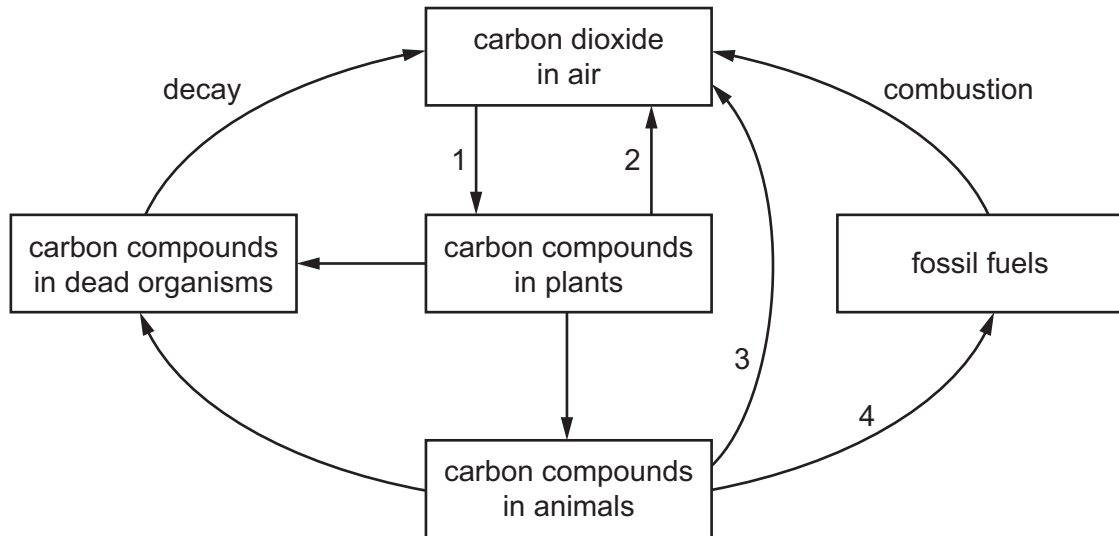
Which structure contains the muscles that contract to control pupil size?



11 Which row best describes some of the effects of alcohol abuse?

	short-term effect	long-term effect
<b>A</b>	addiction	liver disease
<b>B</b>	addiction	reduced self-control
<b>C</b>	liver disease	addiction
<b>D</b>	reduced self-control	liver disease

12 The diagram shows the carbon cycle.



Which arrows represent respiration?

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

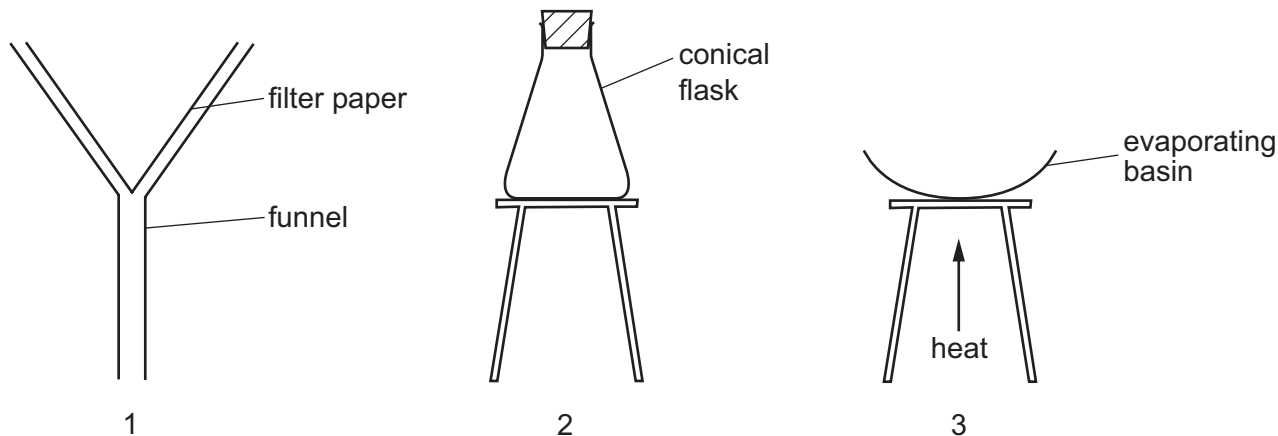
13 The diagram shows a wind pollinated plant.



What is structure X?

- A** anther  
**B** carpel  
**C** petal  
**D** sepal

14 The diagrams show three sets of apparatus.



Which apparatus is used to obtain separate samples of sand and salt from a mixture of sand and salt solution?

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

15 An atom of sodium is represented by  ${}_{11}^{23}\text{Na}$ .

What is the number of electrons in this atom?

- A 11      B 12      C 23      D 34

16 Which statement about the formation of ions is correct?

- A Metal atoms gain electrons to form positive ions.  
 B Metal atoms lose electrons to form negative ions.  
 C Non-metal atoms gain electrons to form negative ions.  
 D Non-metal atoms lose electrons to form positive ions.

17 Which statement about covalent bonding is **not** correct?

- A A covalent bond forms when a metal atom donates an electron to a non-metal atom.  
 B A covalent bond is a pair of shared electrons.  
 C The bonding between oxygen and hydrogen is covalent.  
 D When atoms form covalent bonds, they get the same electronic configuration as a noble gas.

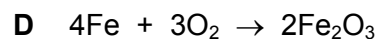
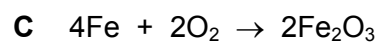
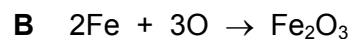
18 The formula of an ammonium ion is  $\text{NH}_4^+$ .

The formula of a sulfate ion is  $\text{SO}_4^{2-}$ .

What is the formula of ammonium sulfate?

- A  $\text{NH}_4\text{SO}_4$       B  $\text{NH}_4(\text{SO}_4)_2$       C  $(\text{NH})_4\text{SO}_4$       D  $(\text{NH}_4)_2\text{SO}_4$

19 Which balanced equation for the reaction between iron and oxygen is correct?



20 Which statement about bases is **not** correct?

A Bases dissolved in water turn red litmus blue.

B Bases neutralise sodium hydroxide solution.

C Bases react with acids to form salts.

D Bases react with ammonium salts to form ammonia.

21 P, Q, R and S are four elements.

The letters are not their chemical symbols.

element	physical state at room temperature	number of electrons in outer shell	metal or non-metal
P	gas	2,6	non-metal
Q	gas	2,7	non-metal
R	solid	2,8,2	metal
S	gas	2,8,7	non-metal

Which elements are in the same group of the Periodic Table?

A P and Q

B P and S

C Q and S

D R and S

22 A metal is used to make a pipe to transport hydrochloric acid.

Which metal is suitable for making the pipe?

A copper

B iron

C magnesium

D zinc



23 The table shows some metals and their uses.

For which metal is the correct reason given for the stated use?

	metal	use	reason
<b>A</b>	aluminium	manufacture of aeroplane wings	strength and high density
<b>B</b>	copper	electrical wiring	good conductor of heat
<b>C</b>	iron	manufacturing stainless steel	rusts
<b>D</b>	zinc	galvanising iron	zinc is more reactive than iron

24 A sample of polluted air is shaken with 50 cm<sup>3</sup> of distilled water and the pH of the resulting solution is measured.

The experiment is repeated with the same volume of unpolluted air.

The results are shown.

sample	pH
unpolluted air	6
polluted air	2

Which statement explains the pH of the polluted air?

- A** It is polluted with carbon dioxide.
- B** It is polluted with carbon monoxide.
- C** It is polluted with lead compounds.
- D** It is polluted with sulfur dioxide.

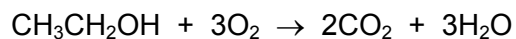
25 Which substance produces hydrogen gas when it reacts with dilute hydrochloric acid?

- A** magnesium
- B** magnesium carbonate
- C** magnesium hydroxide
- D** magnesium oxide

26 Which molecular formula represents an alkane?

- A** C<sub>2</sub>H<sub>2</sub>
- B** C<sub>3</sub>H<sub>8</sub>
- C** C<sub>4</sub>H<sub>8</sub>
- D** C<sub>5</sub>H<sub>10</sub>

27 A reaction of ethanol is shown.



Which statement about this reaction is **not** correct?

- A One of the products turns lime-water cloudy.
- B The ethanol is a fuel.
- C The ethanol is being reduced.
- D The reaction is exothermic.

28 The gradient of the line on a graph gives the acceleration of a moving object.

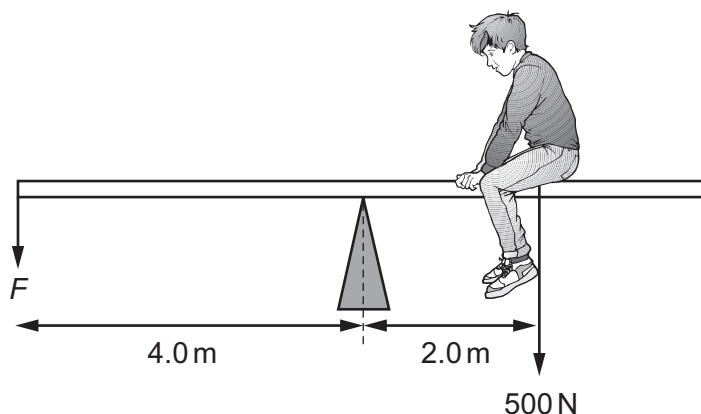
What are the quantities on the horizontal and vertical axes of this graph?

	quantity on horizontal axis	quantity on vertical axis
A	speed	distance
B	speed	time
C	time	distance
D	time	speed

29 Which statement concerning the mass of a body is **incorrect**?

- A Mass can be measured using an appropriate balance.
- B Mass experiences a force due to gravitational attraction.
- C Mass is a measure of the amount of substance in a body.
- D Mass is varied by changes in the strength of a gravitational field.

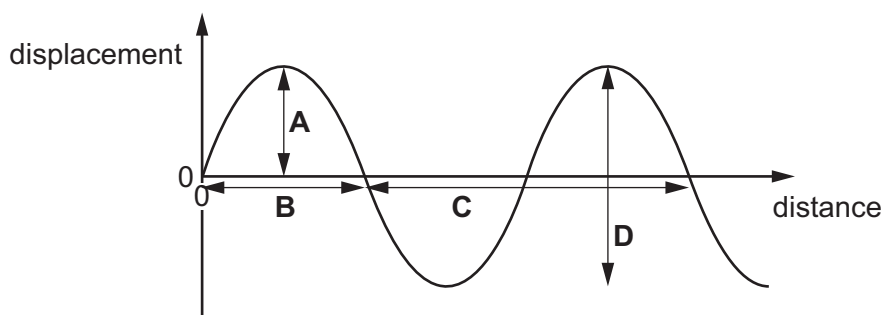
- 30 The diagram shows a boy of weight 500 N sitting on a see-saw. He sits 2.0 m from the pivot.



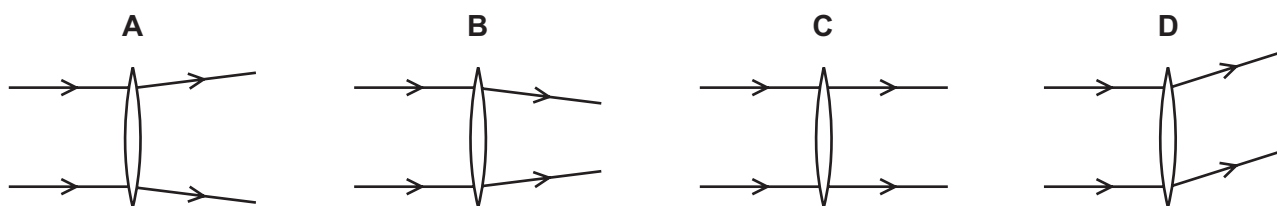
What is the force  $F$  needed to balance the see-saw?

- A** 250 N      **B** 750 N      **C** 1000 N      **D** 3000 N
- 31 How much work is done in lifting a mass of 70 g vertically through a distance of 6 m? (gravitational field strength is 10 N/kg.)
- A** 0.42 J      **B** 4.2 J      **C** 420 J      **D** 4200 J
- 32 What makes the metal mercury a suitable liquid for use in a thermometer?
- A** It expands uniformly when heated.  
**B** It is a poor conductor of heat.  
**C** It is more dense than glass.  
**D** It reacts slowly to changes in a temperature.
- 33 The diagram shows the displacement of the particles in a wave.

Which value is multiplied by the frequency to give the speed of the wave?



- 34 Which diagram correctly shows the path of two rays of light after they pass through a thin converging lens?



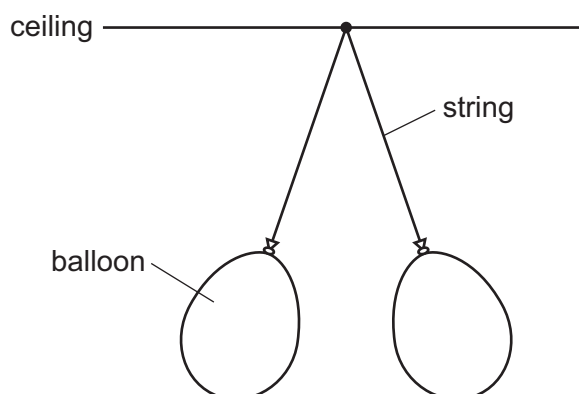
- 35 The diagram shows the main components of the electromagnetic spectrum.

P	X-rays	Q	visible light	infra-red	R	radio waves
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What are the components P, Q and R?

	P	Q	R
<b>A</b>	gamma-rays	microwaves	ultra-violet
<b>B</b>	gamma-rays	ultra-violet	microwaves
<b>C</b>	microwaves	gamma-rays	ultra-violet
<b>D</b>	microwaves	ultra-violet	gamma-rays

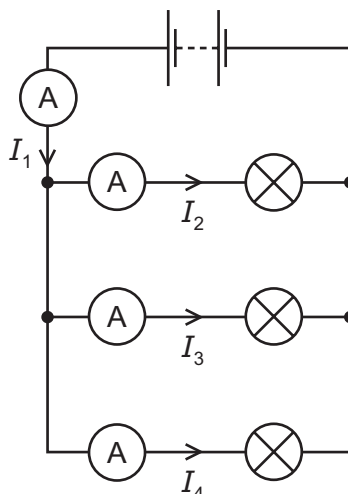
- 36 Two balloons are suspended from the ceiling by string and have moved apart as shown.



Which statement is correct?

- A** One is charged and the other is uncharged.
- B** They are uncharged.
- C** They have like charges.
- D** They have unlike charges.

37 A student sets up the circuit shown.



The currents measured by the ammeters are shown.

Which equation is correct?

**A**  $I_1 = I_2 + I_3 + I_4$

**B**  $I_1 = I_2 = I_3 = I_4$

**C**  $I_2 + I_3 = I_4 + I_1$

**D**  $I_4 = I_3 + I_2 + I_1$

38 A 5W electric night light is used for 8 hours per day over a period of 7 days.

How much electrical energy is transferred to the night light?

**A** 280 J

**B** 16 800 J

**C** 144 000 J

**D** 1 008 000 J

39 In a simple a.c. generator, a coil is rotated in a uniform magnetic field.

Which action would **not** increase the size of the maximum e.m.f. generated?

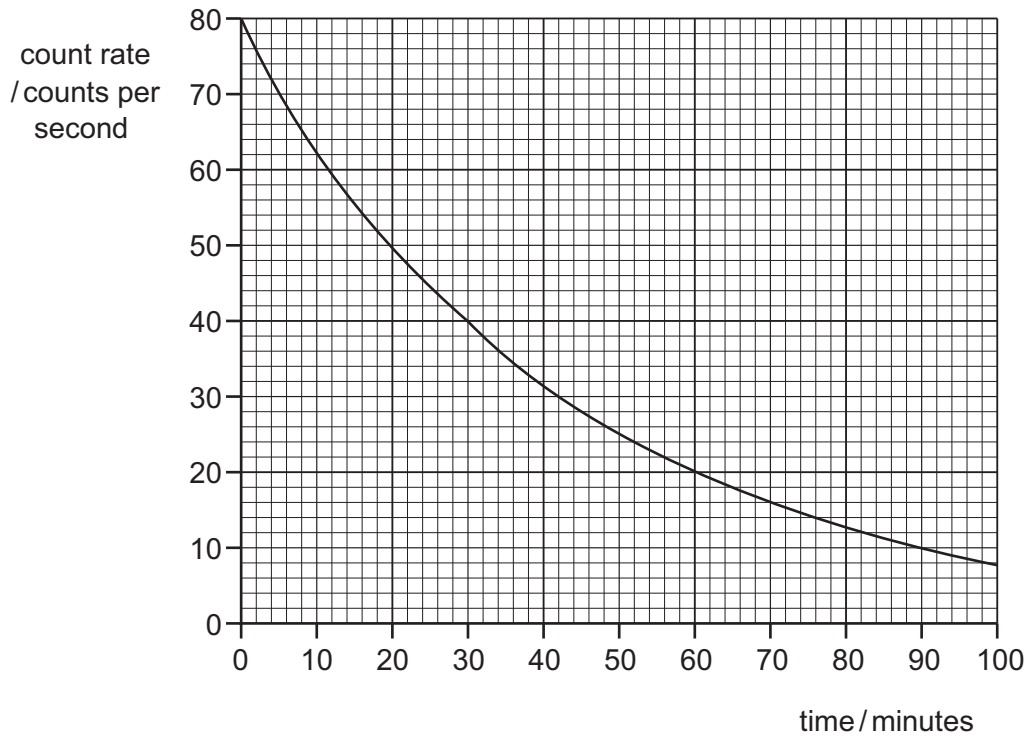
**A** increasing the number of turns of the coil

**B** increasing the rate of rotation of the coil

**C** increasing the resistance of the coil

**D** increasing the strength of the magnetic field

40 The graph shows how the count rate measured from a radioactive nuclide changes with time.



What is the half-life of this nuclide?

- A** 17 minutes    **B** 25 minutes    **C** 30 minutes    **D** 50 minutes

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## The Periodic Table of Elements

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3 Li lithium 7	4 Be beryllium 9	1 H hydrogen 1	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	<b>Key</b> atomic number atomic symbol name relative atomic mass		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 —	118 Og oganeson —	119 Uue unbinilium —	120 Uub ununilium —	121 Uut unununium —	122 Uuq ununquadium —	123 Uup ununpentium —	124 Uuq ununhexium —	125 Uuh ununheptium —	126 Uuo ununoctium —	127 Uuq ununnonium —	128 Uuo unundecium —	129 Uuq ununduodecium —	130 Uuo ununtridecium —	131 Uuq ununquadradecium —	132 Uuo ununpentadecium —	133 Uuq ununhexadecium —	134 Uuo ununseptadecium —	135 Uuq ununoctadecium —	136 Uuo ununnonadecium —	137 Uuq ununtriacontium —	138 Uuo ununtriacontium —	139 Uuq ununtriacontium —	140 Uuo ununtriacontium —	141 Uuq ununtriacontium —	142 Uuo ununtriacontium —	143 Uuq ununtriacontium —	144 Uuo ununtriacontium —	145 Uuq ununtriacontium —	146 Uuo ununtriacontium —	147 Uuq ununtriacontium —	148 Uuo 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ununtriacontium —	339 Uuq ununtriacontium —	340 Uuo ununtriacontium —	341 Uuq ununtriacontium —	342 Uuo ununtriacontium —	343 Uuq ununtriacontium —	344 Uuo ununtriacontium —	345 Uuq ununtriacontium —	346 Uuo ununtriacontium —	347 Uuq ununtriacontium —	348 Uuo ununtriacontium —	349 Uuq ununtriacontium —	350 Uuo ununtriacontium —	351 Uuq ununtriacontium —	352 Uuo ununtriacontium —	353 Uuq ununtriacontium —	354 Uuo ununtriacontium —	355 Uuq ununtriacontium —	356 Uuo ununtriacontium —	357 Uuq ununtriacontium —	358 Uuo ununtriacontium —	359 Uuq ununtriacontium —	360 Uuo ununtriacontium —	361 Uuq ununtriacontium —	362 Uuo ununtriacontium —	363 Uuq ununtriacontium —	364 Uuo ununtriacontium —	365 Uuq ununtriacontium —	366 Uuo ununtriacontium —	367 Uuq ununtriacontium —	368 Uuo ununtriacontium —	369 Uuq ununtriacontium —	370 Uuo ununtriacontium —	371 Uuq ununtriacontium —	372 Uuo ununtriacontium —	373 Uuq ununtriacontium —	374 Uuo ununtriacontium —	375 Uuq ununtriacontium —	376 Uuo ununtriacontium —	377 Uuq ununtriacontium —	378 Uuo ununtriacontium —	379 Uuq ununtriacontium —	380 Uuo ununtriacontium —	381 Uuq ununtriacontium —	382 Uuo ununtriacontium —	383 Uuq ununtriacontium —	384 Uuo ununtriacontium —	385 Uuq ununtriacontium —	386 Uuo ununtriacontium —	387 Uuq ununtriacontium —	388 Uuo ununtriacontium —	389 Uuq ununtriacontium —	390 Uuo ununtriacontium —	391 Uuq ununtriacontium —	392 Uuo ununtriacontium —	393 Uuq ununtriacontium —	394 Uuo ununtriacontium —	395 Uuq ununtriacontium —	396 Uuo ununtriacontium —	397 Uuq ununtriacontium —	398 Uuo ununtriacontium —	399 Uuq ununtriacontium —	400 Uuo ununtriacontium —	401 Uuq ununtriacontium —	402 Uuo ununtriacontium —	403 Uuq ununtriacontium —	404 Uuo ununtriacontium —	405 Uuq ununtriacontium —	406 Uuo ununtriacontium —	407 Uuq ununtriacontium —	408 Uuo ununtriacontium —	409 Uuq ununtriacontium —	410 Uuo ununtriacontium —	411 Uuq ununtriacontium —	412 Uuo ununtriacontium —	413 Uuq ununtriacontium —	414 Uuo ununtriacontium —	415 Uuq ununtriacontium —	416 Uuo ununtriacontium —	417 Uuq ununtriacontium —	418 Uuo ununtriacontium —	419 Uuq ununtriacontium —	420 Uuo ununtriacontium —	421 Uuq ununtriacontium —	422 Uuo ununtriacontium —	423 Uuq ununtriacontium —	424 Uuo ununtriacontium —	425 Uuq ununtriacontium —	426 Uuo ununtriacontium —	427 Uuq ununtriacontium —	428 Uuo ununtriacontium —	429 Uuq ununtriacontium —	430 Uuo ununtriacontium —	431 Uuq ununtriacontium —	432 Uuo ununtriacontium —	433 Uuq ununtriacontium —	434 Uuo ununtriacontium —	435 Uuq ununtriacontium —	436 Uuo ununtriacontium —	437 Uuq ununtriacontium —	438 Uuo ununtriacontium —	439 Uuq ununtriacontium —	440 Uuo ununtriacontium —	441 Uuq ununtriacontium —	442 Uuo ununtriacontium —	443 Uuq ununtriacontium —	444 Uuo ununtriacontium —	445 Uuq ununtriacontium —	446 Uuo ununtriacontium —	447 Uuq ununtriacontium —	448 Uuo ununtriacontium —	449 Uuq ununtriacontium —	450 Uuo ununtriacontium —	451 Uuq ununtriacontium —	452 Uuo ununtriacontium —	453 Uuq ununtriacontium —	454 Uuo ununtriacontium —	455 Uuq ununtriacontium —	456 Uuo ununtriacontium —	457 Uuq ununtriacontium —	458 Uuo ununtriacontium —	459 Uuq ununtriacontium —	460 Uuo ununtriacontium —	461 Uuq ununtriacontium —	462 Uuo ununtriacontium —	463 Uuq ununtriacontium —	464 Uuo ununtriacontium —	465 Uuq ununtriacontium —	466 Uuo ununtriacontium —	467 Uuq ununtriacontium —	468 Uuo ununtriacontium —	469 Uuq ununtriacontium —	470 Uuo ununtriacontium —	471 Uuq ununtriacontium —	472 Uuo ununtriacontium —	473 Uuq ununtriacontium —	474 Uuo ununtriacontium —	475 Uuq ununtriacontium —	476 Uuo ununtriacontium —	477 Uuq ununtriacontium —	478 Uuo ununtriacontium —	479 Uuq ununtriacontium —	480 Uuo ununtriacontium —	481 Uuq ununtriacontium —	482 Uuo ununtriacontium —	483 Uuq ununtriacontium —	484 Uuo ununtriacontium —	485 Uuq ununtriacontium —	486 Uuo ununtriacontium —	487 Uuq ununtriacontium —	488 Uuo ununtriacontium —	489 Uuq ununtriacontium —	490 Uuo 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lanthanoids

actinoids

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