



Cambridge O Level

COMBINED SCIENCE

5129/12

Paper 1 Multiple Choice

October/November 2020

1 hour

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.

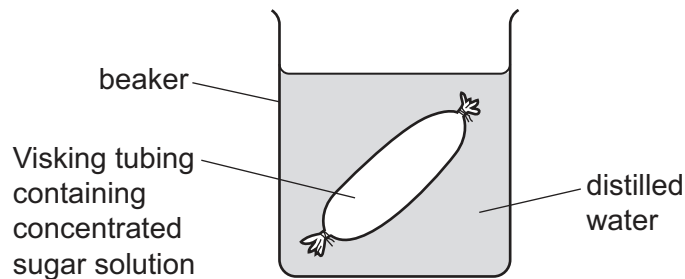


1 Which cell structure is found in plant cells but **not** in animal cells?

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

2 Visking tubing is a partially permeable membrane.

Some Visking tubing containing a concentrated sugar solution is weighed and placed in distilled water, as shown.

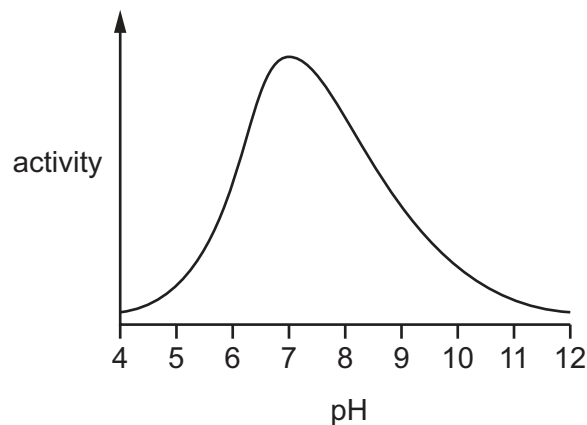


After two hours the Visking tubing is removed and re-weighed.

What happens to the mass and why?

- A It decreases because sugar moves out.
- B It decreases because water moves out.
- C It increases because sugar moves in.
- D It increases because water moves in.

3 The graph shows the activity of an enzyme at different pH values.

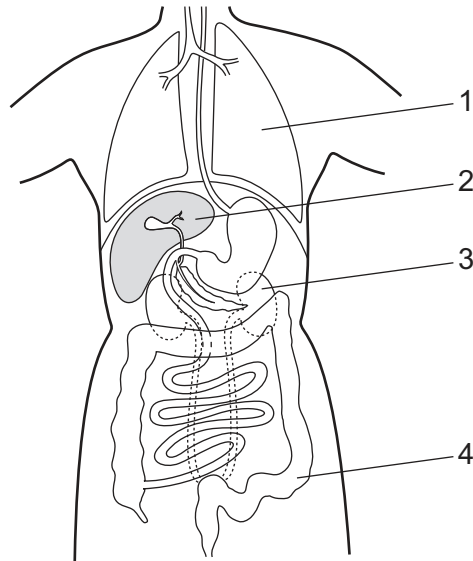


What is the pH value at which this enzyme works most quickly?

- A 4
- B 6
- C 7
- D 9

- 4 Which statement about chewing is correct?
- A It absorbs the products of digestion.
 - B It adds amino acids to the food.
 - C It destroys microbes in the food.
 - D It reduces the size of the food particles.
- 5 Why do plants wilt?
- A Sugars are made by photosynthesis faster than water is lost by transpiration.
 - B Sugars move down the phloem faster than water is absorbed through root hair cells.
 - C Water is lost by transpiration faster than water is absorbed by root hair cells.
 - D Water moves up the xylem faster than sugars move down the phloem.
- 6 Which change in lifestyle is most likely to increase the risk of coronary heart disease?
- A drinking more alcohol
 - B eating more fruit and vegetables
 - C exercising more frequently
 - D giving up smoking
- 7 In a 10 km race, an athlete runs steadily for most of the distance to keep up with the other athletes. In the final 400 m, the athlete runs as fast as possible to win the race.
- Which substances are produced by respiration in the athlete's muscles during this race?
- A carbon dioxide and water only
 - B lactic acid only
 - C lactic acid and carbon dioxide only
 - D water, carbon dioxide and lactic acid

- 8 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?

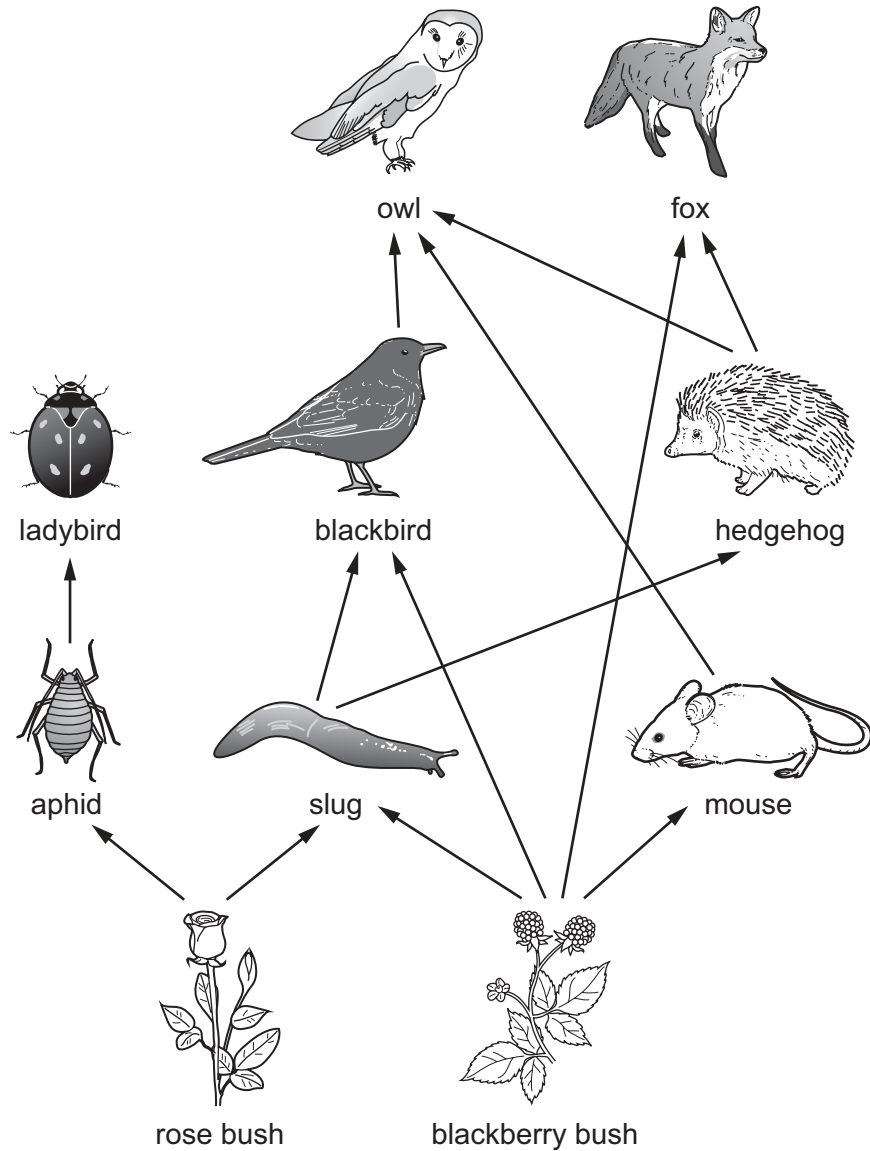
	urea	carbon dioxide
A	2	1
B	2	4
C	3	1
D	3	4

- 9 Which organ destroys hormones released within the body?
- A** duodenum
 - B** kidney
 - C** liver
 - D** pancreas

- 10 What are the effects of alcohol and heroin on the body?

	alcohol	heroin
A	depressant	depressant
B	depressant	stimulant
C	stimulant	depressant
D	stimulant	stimulant

11 The diagram shows an example of a woodland food web.



There are two different organisms at the first trophic level (producers).

How many different organisms are found at the third trophic level?

- A** 2 **B** 3 **C** 4 **D** 5

12 Which row describes asexual reproduction?

	number of parents	offspring are genetically identical
A	1	no
B	1	yes
C	2	no
D	2	yes

13 What do seeds need for germination to occur?

- A cold, dry conditions and oxygen
- B cold, wet conditions and carbon dioxide
- C warm, dry conditions and carbon dioxide
- D warm, wet conditions and oxygen

14 Which methods are used to test the purity of a substance?

- 1 filtration
- 2 measurement of boiling point
- 3 distillation
- 4 chromatography

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

15 The compositions of the nuclei of four different atoms are shown. The letters are not the symbols of the elements.



Which atoms are isotopes?

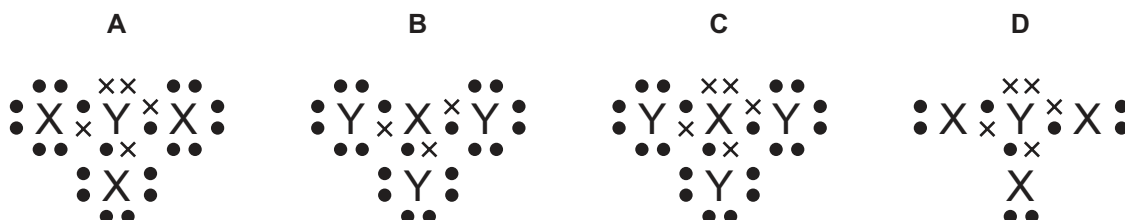
- A W and X B W and Z C X and Y D Y and Z

16 Which particle contains the same number of electrons as an atom of neon?

- A Cl^{-} B Li C Li^{+} D O^{2-}

17 X is an element in Group III and Y is an element in Group VII of the Periodic Table.

Which diagram shows the outer electron arrangement of the covalent compound formed between X and Y?



18 The equation for the decomposition of calcium carbonate is shown.



Which mass of calcium oxide is produced from 10.0 g of calcium carbonate?

- A 4.4 g B 5.0 g C 5.6 g D 10.0 g

19 Carbon dioxide emitted by burning fossil fuels dissolves in rain.

The rainwater turns universal indicator yellow.

What is the pH of the rainwater?

- A 2 B 5 C 7 D 9

20 Which statement about the elements in Group VII is **not** correct?

- A Their boiling point increases down the group.
 B Their colour gets darker down the group.
 C They are all diatomic non-metals.
 D They become more reactive down the group.

21 Four different metals are reacted separately with cold water, steam and dilute hydrochloric acid.

The results are shown.

metal	reaction with cold water	reaction with steam	reaction with dilute hydrochloric acid
W	no reaction	reacts slowly	reacts vigorously
X	no reaction	no reaction	reacts slowly
Y	reacts slowly	reacts vigorously	reacts explosively
Z	reacts slowly	reacts slowly	reacts vigorously

What is the order of reactivity of the four metals?

	least reactive \longrightarrow most reactive			
A	X	W	Z	Y
B	X	Z	W	Y
C	Y	W	Z	X
D	Y	Z	W	X

22 Which row shows why copper is used for electrical wiring?

	melting point	conductivity	reactivity
A	high	high	low
B	high	low	high
C	low	high	high
D	low	low	low

23 Why is chlorine used to purify water supplies?

- A** It kills any bacteria in the water.
- B** It neutralises any acidity in the water.
- C** It removes solids from the water.
- D** It removes tastes and smells.

24 Magnesium reacts with dilute sulfuric acid. A gas is made in the reaction.

Which row shows the correct test and result for the gas?

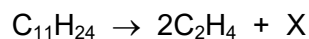
	test	result
A	glowing splint	pops
B	glowing splint	relights
C	lighted splint	goes out
D	lighted splint	pops

25 Petroleum is separated into useful fractions by fractional distillation.

Which row about the fractions is correct?

	fraction	use
A	bitumen	making waxes
B	gasoline	for oil stoves
C	kerosene	fuel for buses and lorries
D	oils	making polishes

26 The equation shows the cracking of a hydrocarbon.



What is X?

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

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?

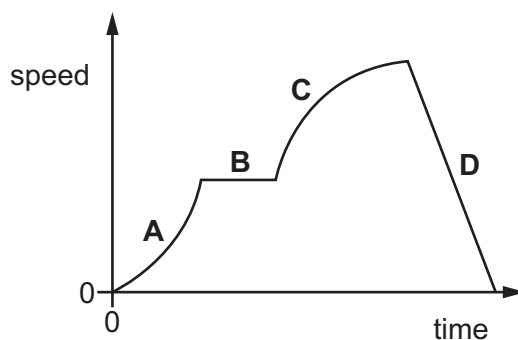
- A Fermentation is a faster process than reacting ethene and steam.
 B Fermentation produces ethanol from a renewable source.
 C Reacting ethene with steam produces impure ethanol.
 D Reacting ethene with steam uses very little energy.

28 A car accelerates steadily from rest at 2.0 m/s^2 for 8.0 seconds.

What is the **average** velocity of the car?

- A 2.0 m/s B 4.0 m/s C 8.0 m/s D 16.0 m/s

29 Which part of the speed–time graph shows constant non-zero acceleration?



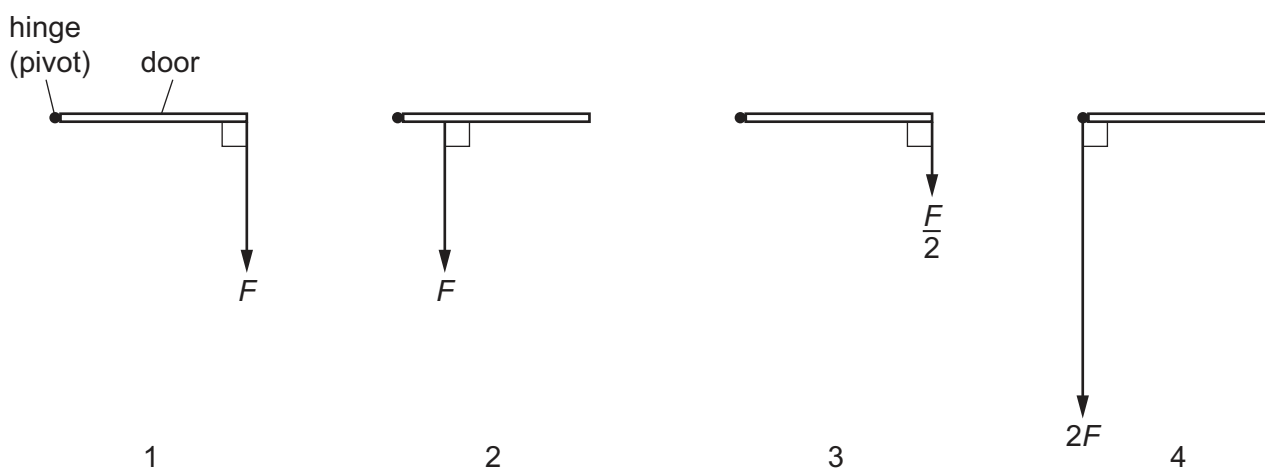
30 A man has a mass of 60 kg on Earth. The Earth's gravitational field strength is 10 N/kg .

The Moon's gravitational field strength is 1.6 N/kg .

What is the man's weight on the Moon?

- A 60 kg B 60 N C 96 kg D 96 N

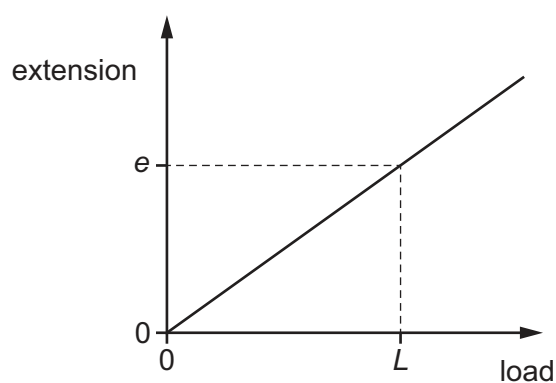
- 31 The diagrams show four possible arrangements of different forces applied to open the same door.



Which row compares the turning effect of each force correctly?

	greatest turning effect		least turning effect	
	→			
A	1	2	3	4
B	1	3	2	4
C	4	1	2	3
D	4	1	3	2

- 32 The diagram shows an extension–load graph for an elastic object.



A load of L produces an extension of e .

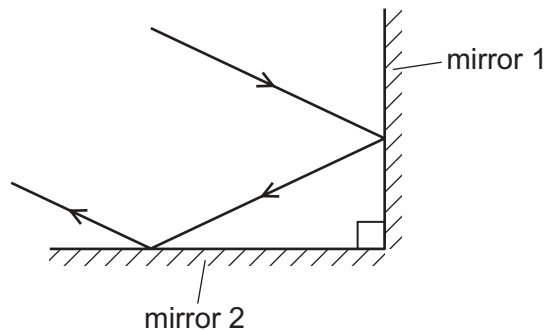
What happens when the load L is removed?

- A** The extension continues to increase.
- B** The extension reduces but does not return to zero.
- C** The extension stays at e .
- D** The extension returns to zero.

33 What is **not** a consequence of thermal expansion?

- A the cracking of a cold plate when put into a very hot oven
- B the distortion of metal train tracks in very hot weather
- C the distortion suffered by a football when kicked
- D the water circulation in a heated saucepan

34 A ray of light is incident on mirror 1 as shown. Mirror 2 is at right angles to mirror 1.



The path of the ray reflected from mirror 2 is parallel to the incident ray.

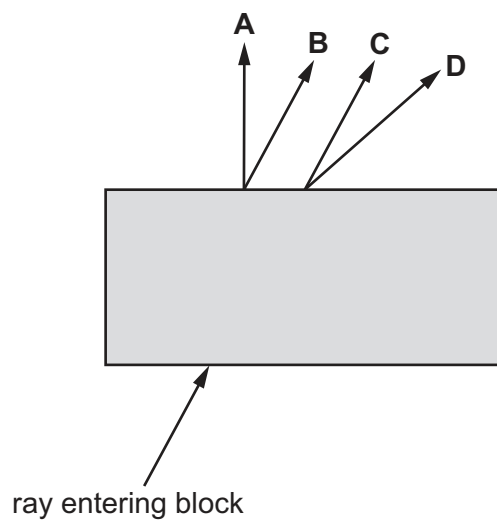
The angle of incidence at mirror 1 is 25° .

What is the angle of reflection from mirror 2?

- A 25°
- B 65°
- C 90°
- D 130°

35 The diagram shows a ray of light incident on a rectangular glass block.

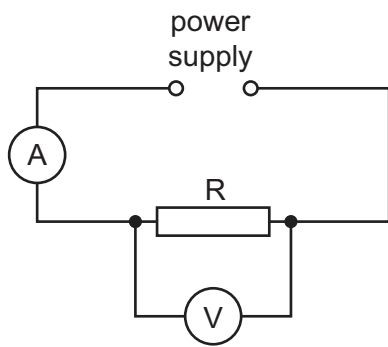
Which arrow shows the correct path for the ray of light leaving the block?



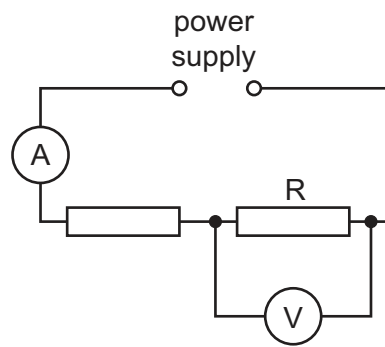
36 Which units are suitable for measuring e.m.f.?

- A C/J
- B C/s
- C J/C
- D J/s

37 Identical power supplies are used in the circuits shown.



circuit 1



circuit 2

Which statement is correct?

- A The current in circuit 2 is equal to the current in circuit 1.
- B The current in circuit 2 is lower than the current in circuit 1.
- C The voltmeter reading is larger in circuit 2.
- D The voltmeter reading is the same in both circuits.

38 A lighting circuit used in a house contains 15 lamps connected in parallel.

This is the maximum number of lamps that can be used safely.

When more lamps are connected in parallel, the circuit stops working.

Why does the circuit stop working?

- A The circuit is doubly insulated.
- B The connecting wires melt.
- C The fuse wire melts.
- D The lamps burn out.

39 How many electrons are there in an atom of ${}_{53}^{127}\text{I}$?

- A 53
- B 74
- C 127
- D 180

- 40 How do the ionising abilities of beta-particles and gamma-rays compare with the ionising ability of alpha-particles?

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

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

The Periodic Table of Elements

Group																																																																																																																																																																																																				
I	II	III	IV	V	VI	VII	VIII																																																																																																																																																																																													
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	Key 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 ununquadradeium —	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 ununtriacontium —	149 Uuq ununtriacontium —	150 Uuo ununtriacontium —	151 Uuq ununtriacontium —	152 Uuo ununtriacontium —	153 Uuq ununtriacontium —	154 Uuo ununtriacontium —	155 Uuq ununtriacontium —	156 Uuo ununtriacontium —	157 Uuq ununtriacontium —	158 Uuo ununtriacontium —	159 Uuq ununtriacontium —	160 Uuo ununtriacontium —	161 Uuq ununtriacontium —	162 Uuo ununtriacontium —	163 Uuq ununtriacontium —	164 Uuo ununtriacontium —	165 Uuq ununtriacontium —	166 Uuo ununtriacontium —	167 Uuq ununtriacontium —	168 Uuo ununtriacontium —	169 Uuq ununtriacontium —	170 Uuo ununtriacontium —	171 Uuq ununtriacontium —	172 Uuo ununtriacontium —	173 Uuq ununtriacontium —	174 Uuo ununtriacontium —	175 Uuq ununtriacontium —	176 Uuo ununtriacontium —	177 Uuq ununtriacontium —	178 Uuo ununtriacontium —	179 Uuq ununtriacontium —	180 Uuo ununtriacontium —	181 Uuq ununtriacontium —	182 Uuo ununtriacontium —	183 Uuq ununtriacontium —	184 Uuo ununtriacontium —	185 Uuq ununtriacontium —	186 Uuo ununtriacontium —	187 Uuq ununtriacontium —	188 Uuo ununtriacontium —	189 Uuq ununtriacontium —	190 Uuo ununtriacontium —	191 Uuq ununtriacontium —	192 Uuo ununtriacontium —	193 Uuq ununtriacontium —	194 Uuo ununtriacontium —	195 Uuq ununtriacontium —	196 Uuo ununtriacontium —	197 Uuq ununtriacontium —	198 Uuo ununtriacontium —	199 Uuq ununtriacontium —	200 Uuo ununtriacontium —	201 Uuq ununtriacontium —	202 Uuo ununtriacontium —	203 Uuq ununtriacontium —	204 Uuo ununtriacontium —	205 Uuq ununtriacontium —	206 Uuo ununtriacontium —	207 Uuq ununtriacontium —	208 Uuo ununtriacontium —	209 Uuq ununtriacontium —	210 Uuo ununtriacontium —	211 Uuq ununtriacontium —	212 Uuo ununtriacontium —	213 Uuq ununtriacontium —	214 Uuo ununtriacontium —	215 Uuq ununtriacontium —	216 Uuo ununtriacontium —	217 Uuq ununtriacontium —	218 Uuo ununtriacontium —	219 Uuq ununtriacontium —	220 Uuo ununtriacontium —	221 Uuq ununtriacontium —	222 Uuo ununtriacontium —	223 Uuq ununtriacontium —	224 Uuo ununtriacontium —	225 Uuq ununtriacontium —	226 Uuo ununtriacontium —	227 Uuq ununtriacontium —	228 Uuo ununtriacontium —	229 Uuq ununtriacontium —	230 Uuo ununtriacontium —	231 Uuq ununtriacontium —	232 Uuo ununtriacontium —	233 Uuq ununtriacontium —	234 Uuo ununtriacontium —	235 Uuq ununtriacontium —	236 Uuo ununtriacontium —	237 Uuq ununtriacontium —	238 Uuo ununtriacontium —	239 Uuq ununtriacontium —	240 Uuo ununtriacontium —	241 Uuq ununtriacontium —	242 Uuo ununtriacontium —	243 Uuq ununtriacontium —	244 Uuo ununtriacontium —	245 Uuq ununtriacontium —	246 Uuo ununtriacontium —	247 Uuq ununtriacontium —	248 Uuo ununtriacontium —	249 Uuq ununtriacontium —	250 Uuo ununtriacontium —	251 Uuq ununtriacontium —	252 Uuo ununtriacontium —	253 Uuq ununtriacontium —	254 Uuo ununtriacontium —	255 Uuq ununtriacontium —	256 Uuo ununtriacontium —	257 Uuq ununtriacontium —	258 Uuo ununtriacontium —	259 Uuq ununtriacontium —	260 Uuo ununtriacontium —	261 Uuq ununtriacontium —	262 Uuo ununtriacontium —	263 Uuq ununtriacontium —	264 Uuo ununtriacontium —	265 Uuq ununtriacontium —	266 Uuo ununtriacontium —	267 Uuq ununtriacontium —	268 Uuo ununtriacontium —	269 Uuq ununtriacontium —	270 Uuo ununtriacontium —	271 Uuq ununtriacontium —	272 Uuo ununtriacontium —	273 Uuq ununtriacontium —	274 Uuo ununtriacontium —	275 Uuq ununtriacontium —	276 Uuo ununtriacontium —	277 Uuq ununtriacontium —	278 Uuo ununtriacontium —	279 Uuq ununtriacontium —	280 Uuo ununtriacontium —	281 Uuq ununtriacontium —	282 Uuo ununtriacontium —	283 Uuq ununtriacontium —	284 Uuo ununtriacontium —	285 Uuq ununtriacontium —	286 Uuo ununtriacontium —	287 Uuq ununtriacontium —	288 Uuo ununtriacontium —	289 Uuq ununtriacontium —	290 Uuo ununtriacontium —	291 Uuq ununtriacontium —	292 Uuo ununtriacontium —	293 Uuq ununtriacontium —	294 Uuo ununtriacontium —	295 Uuq ununtriacontium —	296 Uuo ununtriacontium —	297 Uuq ununtriacontium —	298 Uuo ununtriacontium —	299 Uuq ununtriacontium —	300 Uuo ununtriacontium —

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 dm³ at room temperature and pressure (r.t.p.).