Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice (Core) **May/June 2021**

45 minutes

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.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

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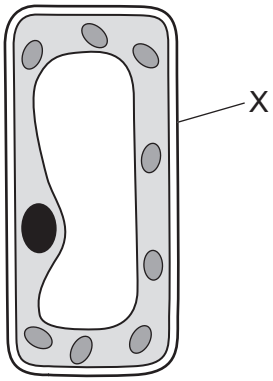
1 The diagram shows a plant cell as seen under a light microscope.



What is the function of the part labelled X?

A photosynthesis

B site of chemical reactions

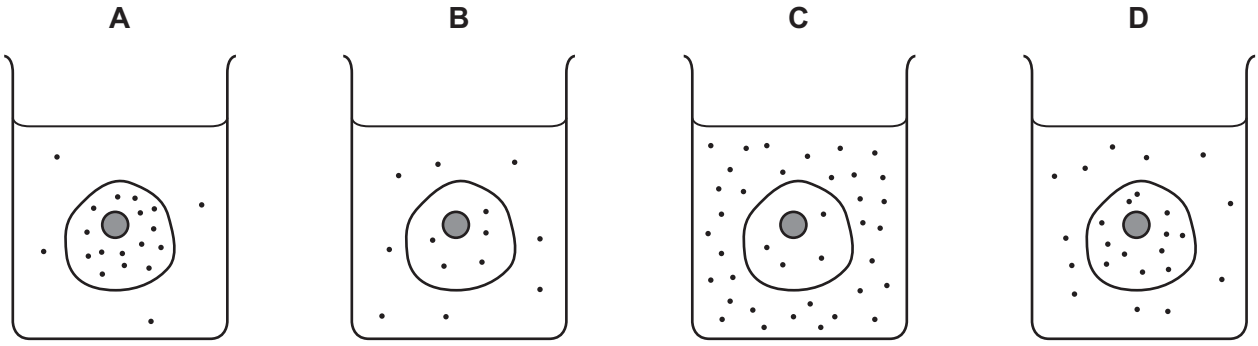
C stores DNA

D supports the cell

2 The diagrams represent four similar animal cells immersed in blood plasma.

The black dots represent molecules of dissolved oxygen.

Which cell will have oxygen molecules diffusing into it most rapidly?



3 A student tests an unknown substance with biuret reagent.

It produces a violet colour.

What is the unknown substance an example of?

A fat

B protein

C reducing sugar

D starch

4 Which name is given to biological catalysts?

A antibodies

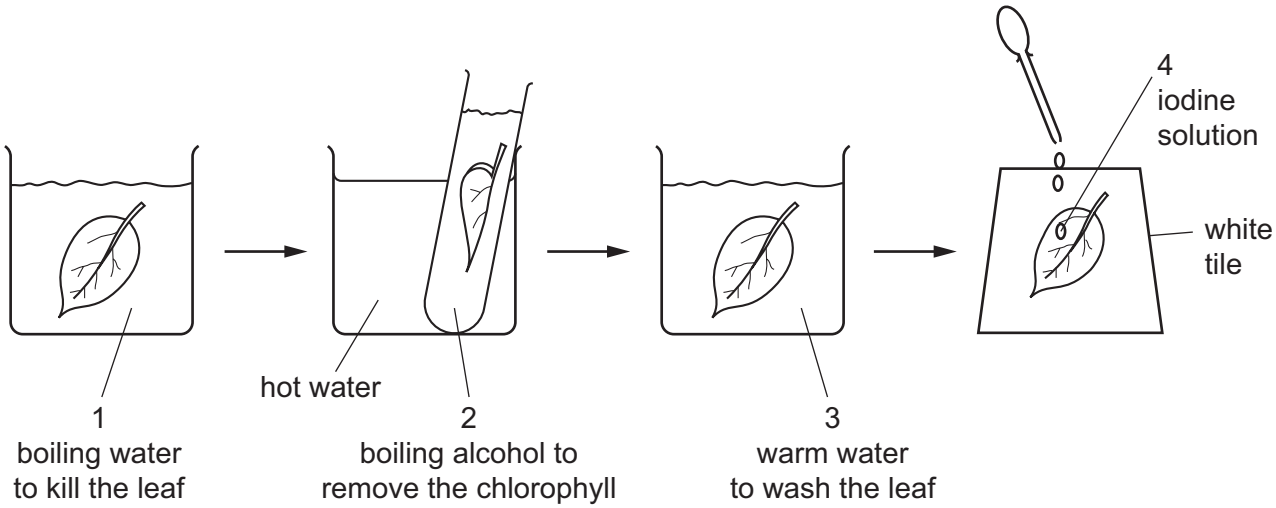
B enzymes

C hormones

D platelets

5 The flow diagram shows the stages in testing a green leaf for starch.

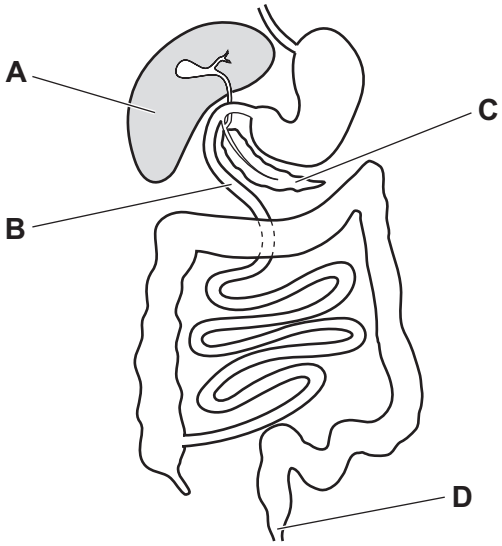
1, 2, 3 and 4 are all liquids.



What are the colours of liquids 2 and 4 for a leaf that contains starch?

	2	4
A	green	blue / black
B	colourless	brown
C	colourless	blue / black
D	green	brown

6 Which part of the alimentary canal carries out digestion **and** absorption?



7 Which statement describes chemical digestion?

A food particles passing along the alimentary canal

B large food molecules being broken down into smaller molecules

C large pieces of food being broken down into smaller pieces

D nutrients passing through the wall of the small intestine

8 What can be used to test for the presence of carbon dioxide?

A Benedict's solution

B ethanol

C iodine solution

D limewater

9 Which equation represents aerobic respiration?

A carbon dioxide + glucose → oxygen + water

B carbon dioxide + water → glucose + oxygen

C glucose + oxygen → carbon dioxide + water

D glucose + water → carbon dioxide + oxygen

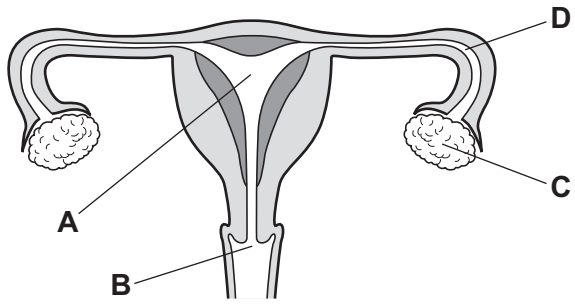
10 When the hormone adrenaline is released in humans it causes changes in breathing rate and pupil size.

What are the correct changes?

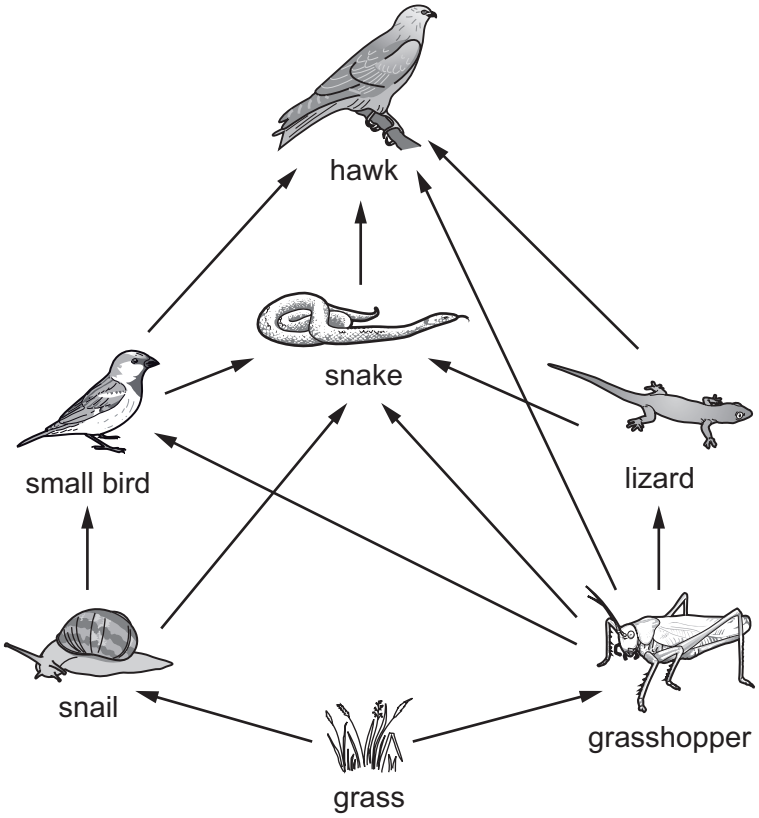
	breathing rate	pupil size
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

11 The diagram shows the human female reproductive system.

Where does fertilisation usually take place?



12 The diagram shows a food web.



Which statement about the snake is correct?

A It is a consumer and it is a carnivore.

B It is a producer and it is a carnivore.

C It is a consumer and it is a herbivore.

D It is a producer and it is a herbivore.

13 Which process takes carbon dioxide out of the air?

A combustion

B decomposition

C photosynthesis

D plant respiration

14 What is an example of a physical change?

A carbon dioxide turning limewater milky

B the crystallisation of copper(II) sulfate from solution

C the electrolysis of molten lead(II) bromide

D the thermal decomposition of calcium carbonate

15 Which substances are mixtures?

1 air

2 brass

3 sodium chloride

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

16 Which statement about the particles is correct?

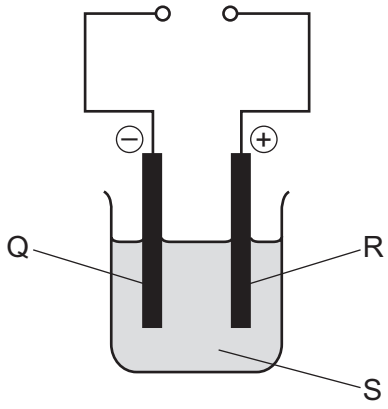
A $^{1}_{1}H$ has the same number of protons as neutrons.

B $^{2}_{1}H^{+}$ has the same number of electrons as neutrons.

C OH^{-} contains more protons than electrons.

D NH_3 has the same number of protons as electrons.

17 The apparatus used in an electrolysis experiment is shown.



Which row identifies Q, R and S?

	Q	R	S
A	anode	cathode	electrode
B	cathode	anode	electrode
C	anode	cathode	electrolyte
D	cathode	anode	electrolyte

[Turn over

18 Some calcium carbonate and dilute hydrochloric acid start to react. Water is then added to the reaction mixture.

What happens to the rate of the reaction?

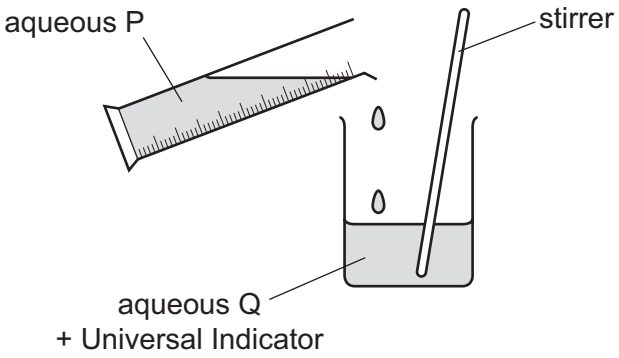
A It decreases.

B It increases.

C It stays the same.

D It stops.

19 The diagram shows an experiment to prepare a salt from compounds P and Q.



Aqueous Q has a pH value of 1.

Aqueous P is added until the pH value of the mixture reaches 7.

What are the formulae of compounds P and Q?

	compound P	compound Q
A	HCl	NaOH
B	HNO_3	H_2SO_4
C	KOH	HCl
D	NaOH	NH_3

20 Which two substances form a white precipitate when they are mixed?

A barium chloride and hydrochloric acid

B barium chloride and nitric acid

C silver nitrate and hydrochloric acid

D silver nitrate and nitric acid

21 Which statement describes how the elements change across a period in the Periodic Table from left to right?

A They change from elements to compounds.

B They change from metals to non-metals.

C They change from gases to solids.

D They change from non-metals to metals.

22 Which row shows the properties of a transition element?

	melting point	electrical conductivity	colour of chloride	catalytic properties
A	high	high	white	no
B	high	low	white	no
C	high	high	green	yes
D	low	low	blue	yes

23 Which words describe a noble gas?

A compound, colourless, does not burn in air

B element, colourless, burns in air

C element, colourless, does not burn in air

D element, green, does not burn in air

24 Which compound can oxidise carbon?

A aluminium oxide

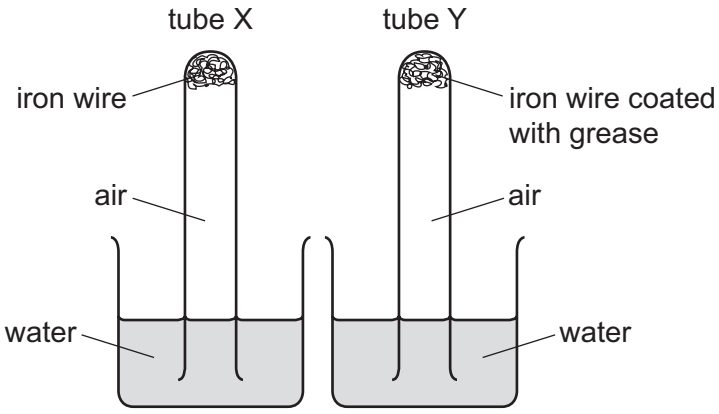
B copper oxide

C magnesium oxide

D potassium oxide

[Turn over

25 An experiment is set up to show the effect of air and water on iron.



The experiment is left for one week.

What happens to the water level in each tube?

	tube X	tube Y
A	falls	falls
B	no change	rises
C	rises	rises
D	rises	no change

26 Which type of compound contains only carbon and hydrogen?

A carbohydrate

B carbonate

C hydrocarbon

D hydroxide

27 Which process produces alkenes?

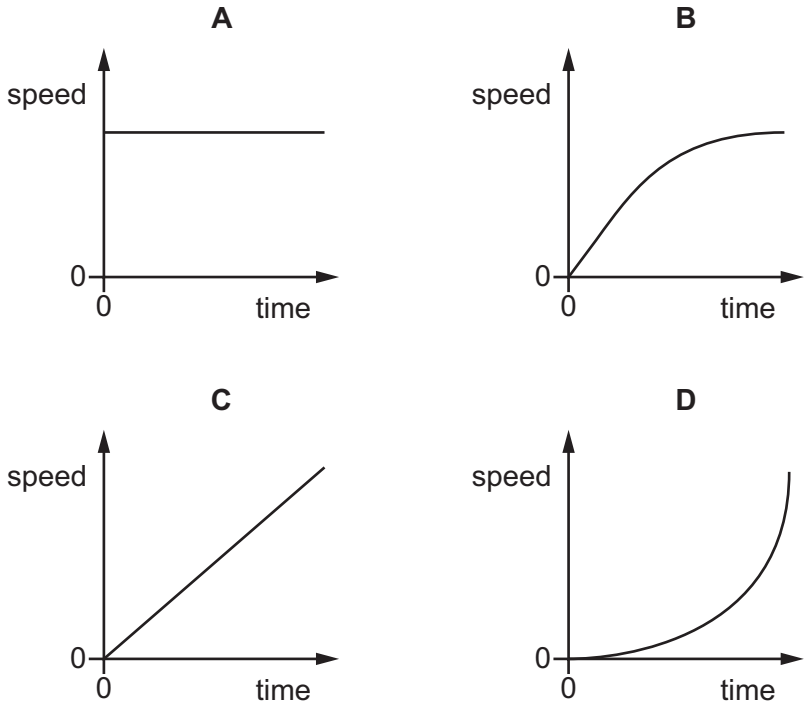
A cracking

B fractional distillation

C polymerisation

D reduction

28 Which speed–time graph represents the motion of an object with constant, non-zero acceleration?



29 The gravitational field strength *g* on the surface of the Earth is 10 N / kg.

What is the weight of a 500 g mass on the surface of the Earth?

A 5.0 kg **B** 5.0 N **C** 5000 kg **D** 5000 N

30 Which row shows apparatus used to measure length, time and volume?

	length	time	volume
A	measuring cylinder	metre rule	stop-clock
B	measuring cylinder	stop-clock	metre rule
C	metre rule	measuring cylinder	stop-clock
D	metre rule	stop-clock	measuring cylinder

[Turn over

31 A block is placed on the ground causing a pressure on the ground.

Which row shows a pair of changes that **must** increase the pressure on the ground?

	weight of block	area of contact with ground
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

32 A student applies a force to an object, causing the object to move in the same direction as the force.

She measures the size of the force and the distance moved by the object.

Which quantity can she now calculate?

A the acceleration of the object

B the power she produces

C the speed of the object

D the work done on the object

33 Cold water evaporates as molecules leave it.

Which molecules leave the water and from which part of the water do they leave?

	molecules that leave the water	where they leave from
A	least energetic	the surface only
B	least energetic	throughout the water
C	most energetic	the surface only
D	most energetic	throughout the water

34 Which material is a good conductor of heat?

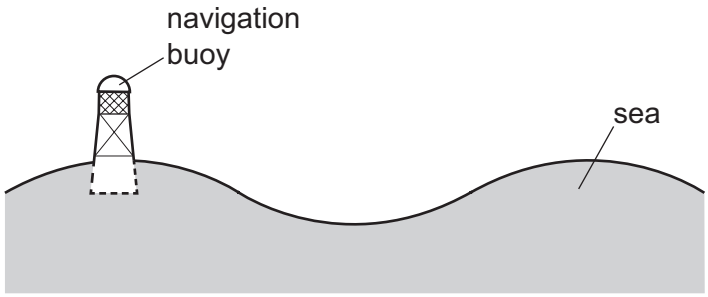
A copper

B glass

C plastic

D wood

35 A navigation buoy floating on the sea oscillates up and down as a wave passes.

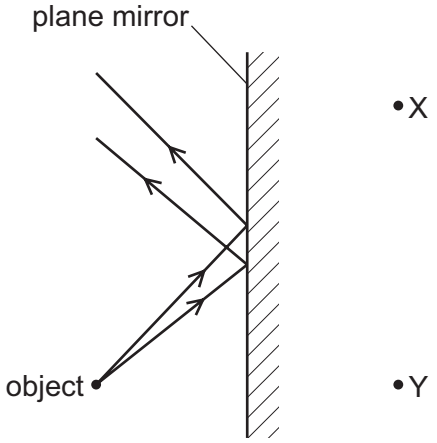


In 2.0 minutes, 6.0 wavelengths pass the buoy.

What is the frequency of the waves?

A 0.050 Hz **B** 0.33 Hz **C** 3.0 Hz **D** 20 Hz

36 The diagram shows rays of light from an object being reflected by a plane mirror.

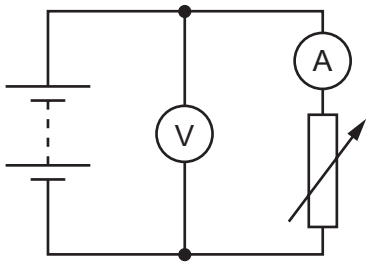


At which labelled point is the image formed, and is the image real or virtual?

	image	real or virtual
A	at X	real
B	at X	virtual
C	at Y	real
D	at Y	virtual

[Turn over

37 The diagram represents a circuit that includes a battery, an ammeter, a voltmeter and a variable resistor.

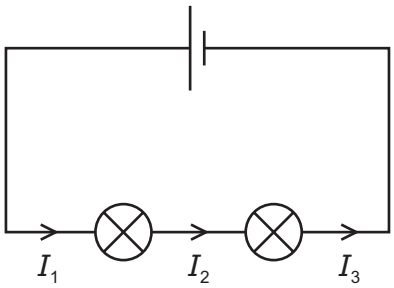


What happens to the readings on the meters as the resistance of the variable resistor is increased?

	ammeter reading	voltmeter reading
A	decreases	decreases
B	decreases	stays constant
C	increases	decreases
D	increases	stays constant

38 Two lamps are connected in the circuit shown.

The currents at three points are labelled I_1, I_2 and I_3.



How are I_1, I_2 and I_3 related? Use the key to help you.

key
< less than
> greater than
= equal to

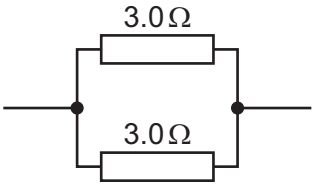
A $I_1 < I_2 < I_3$

B $I_1 = I_2 = I_3$

C $I_1 > I_2$ and $I_1 = I_3$

D $I_1 > I_2 > I_3$

39 Two resistors are connected as shown.



What is the combined resistance of the two resistors?

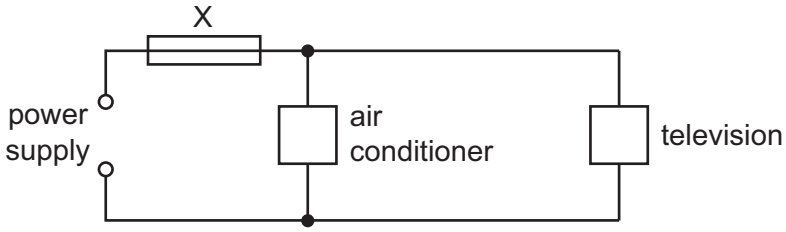
A less than 3.0 Ω

B 3.0 Ω

C 6.0 Ω

D 9.0 Ω

40 An air conditioner and a television are both connected to the same electrical circuit.



The current in the air conditioner is 9.0 A and the current in the television is 2.0 A.

Several different fuses are available.

Which fuse should be connected at X?

A 1 A **B** 3 A **C** 7 A **D** 13 A

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.).