

Cambridge IGCSE™

CO-ORDINATED SCIENCES

0654/12

Paper 1 Multiple Choice (Core)

May/June 2025

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

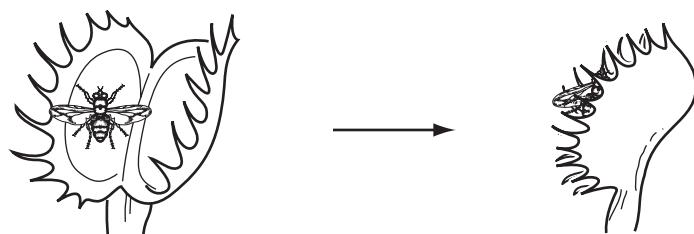
- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the 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.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall = 9.8 m/s^2).

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.

This document has **16** pages.

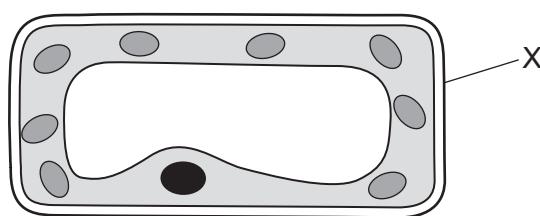
1 The Venus fly trap is a plant that catches insects.



Which characteristic of living organisms is shown in the diagram?

- A excretion
- B growth
- C reproduction
- D sensitivity

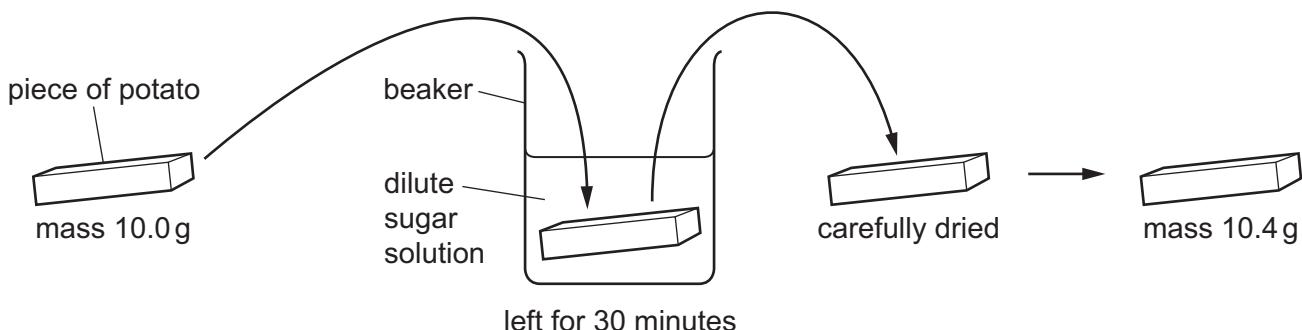
2 The diagram shows a plant cell.



Which row names X and describes its function?

	name	function
A	cell membrane	controls which substances enter or leave the cell
B	cell membrane	maintains cell shape
C	cell wall	controls which substances enter or leave the cell
D	cell wall	maintains cell shape

3 The diagram shows the stages of an experiment.



Which statement explains the increase in mass?

- A Sugar has moved into the cells of the potato by osmosis.
- B Sugar has moved out of the cells of the potato by osmosis.
- C Water has moved into the cells of the potato by osmosis.
- D Water has moved out of the cells of the potato by osmosis.

4 Which statements about enzymes are correct?

- 1 Enzymes are biological catalysts.
- 2 Enzymes are made of fat.
- 3 Enzymes are made of protein.

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

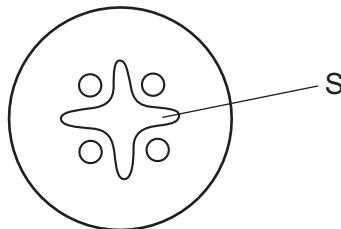
5 Which statement about photosynthesis is correct?

- A A plant uses carbon dioxide and glucose to produce oxygen and water.
- B A plant uses carbon dioxide and water to produce glucose and oxygen.
- C A plant uses glucose and oxygen to produce carbon dioxide and water.
- D A plant uses oxygen and water to produce glucose and carbon dioxide.

6 Which food helps prevent scurvy?

- A bread
- B cheese
- C eggs
- D lemons

7 The diagram shows a cross-section of a plant root.



Which row is correct for tissue S?

	name of tissue	substance transported
A	phloem	amino acids and sucrose
B	phloem	water
C	xylem	amino acids and sucrose
D	xylem	water

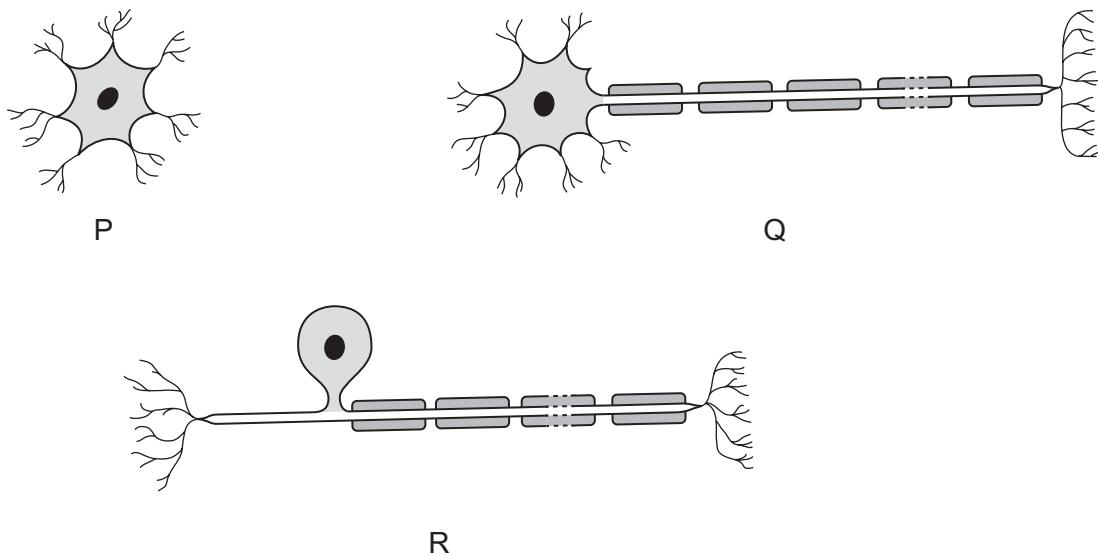
8 What increases the risk of coronary heart disease?

- A reduced salt diet
- B relaxation therapy
- C regular exercise
- D smoking tobacco

9 Which row shows the percentages for inspired air and expired air?

	inspired air/%		expired air/%	
	oxygen	carbon dioxide	oxygen	carbon dioxide
A	21	0.04	17	4
B	21	0.04	21	0.04
C	17	4	17	4
D	17	4	21	0.04

10 The diagram shows three types of neurone.



Which order do impulses pass through the neurones in a reflex action?

- A P → R → Q
- B Q → P → R
- C R → P → Q
- D R → Q → P

11 Which statement about reproduction is correct?

- A Sexual reproduction involves the fusion of two gamete nuclei.
- B Sexual reproduction results in the production of genetically identical offspring.
- C Asexual reproduction involves the fusion of two gamete nuclei.
- D Asexual reproduction results in the production of genetically different offspring.

12 Which row is correct for a human gamete?

	name of gamete	chromosome carried by gamete	where gamete is produced
A	egg cell	X	testes
B	egg cell	Y	ovaries
C	sperm	X	testes
D	sperm	Y	ovaries

13 Which statement describes a producer?

- A an organism that obtains its energy from dead or waste organic matter
- B an organism that makes its own organic nutrients using energy from sunlight
- C an organism that obtains its energy from feeding on other organisms
- D an animal that obtains its energy from eating plants

14 Which row describes particles present in $^{25}_{12}\text{Mg}^{2+}$?

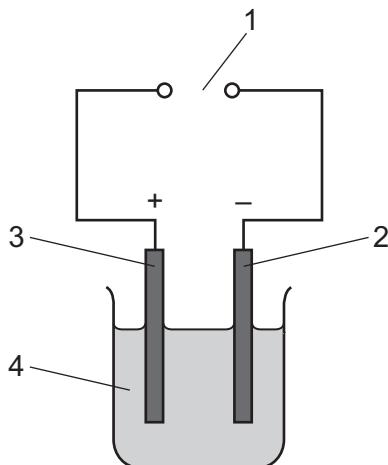
	neutrons	electrons
A	12	10
B	12	12
C	13	12
D	13	10

15 The formula of ethanol is $\text{C}_2\text{H}_5\text{OH}$.

How many different elements are present in ethanol?

- A 1
- B 3
- C 4
- D 9

16 The apparatus used in the electrolysis of concentrated aqueous sodium chloride is shown.



Which row identifies the electrolyte and the cathode?

	electrolyte	cathode
A	1	2
B	1	3
C	4	2
D	4	3

17 Which statements about endothermic reactions are correct?

- 1 Thermal energy is taken in from the surroundings.
- 2 Thermal energy is released to the surroundings.
- 3 The temperature of the reaction mixture decreases.
- 4 The temperature of the reaction mixture increases.

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

18 Which element causes a compound to be coloured?

- A** a Group I element
- B** a Group II element
- C** a Group VIII element
- D** a transition element

19 Which property explains why aluminium is used to make food containers?

- A low density
- B high strength
- C resistant to corrosion
- D shiny

20 What is an alloy?

- A a compound
- B a mixture
- C a metallic element
- D a non-metallic element

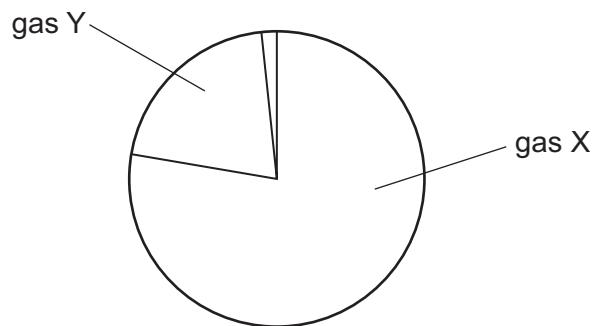
21 Which row describes the order of reactivity of the metals?

	most reactive → least reactive			
A	copper	calcium	zinc	potassium
B	copper	zinc	calcium	potassium
C	potassium	calcium	zinc	copper
D	potassium	zinc	calcium	copper

22 Which row shows the colour of copper(II) sulfate and of cobalt(II) chloride when they are added to water?

	copper(II) sulfate	cobalt(II) chloride
A	blue	blue
B	blue	pink
C	white	blue
D	white	pink

23 The diagram represents the composition of clean, dry air.



Which row identifies gas X and gas Y?

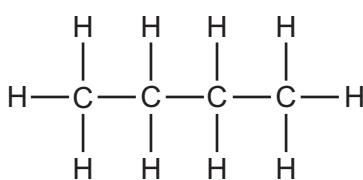
	gas X	gas Y
A	nitrogen	oxygen
B	oxygen	nitrogen
C	oxygen	carbon dioxide
D	carbon dioxide	nitrogen

24 Which property allows petroleum to be separated by fractional distillation?

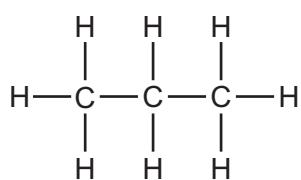
- A** boiling point
- B** colour
- C** density
- D** melting point

25 Which compound is the main constituent of natural gas?

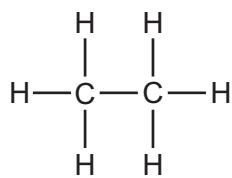
A



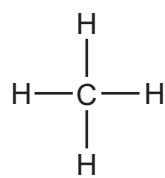
B



C



D



26 Which statement about alkanes is correct?

- A They contain one double covalent bond.
- B They contain only single covalent bonds.
- C They form polymers.
- D They react with aqueous bromine.

27 When aqueous copper(II) sulfate reacts with aqueous sodium hydroxide, a blue precipitate forms.

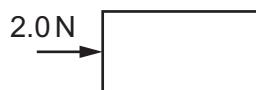
Which method is used to remove the precipitate from the reaction mixture?

- A chromatography
- B distillation
- C filtration
- D crystallisation

28 The diagrams show the only forces acting on each of four objects moving in a straight line.

Which object is moving at constant speed in a straight line?

A



B



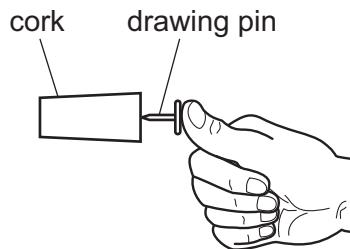
C



D



29 A person pushes a drawing pin into a cork with their thumb.



Which statement explains why the pin goes into the cork and **not** into the thumb?

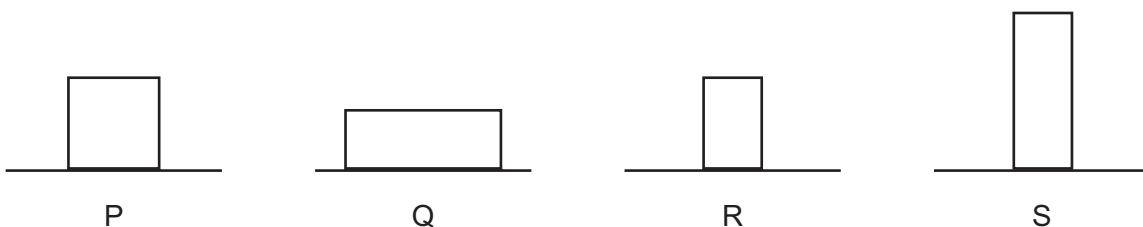
A The force on the cork is greater than the force on the thumb.

B The force on the cork is less than the force on the thumb.

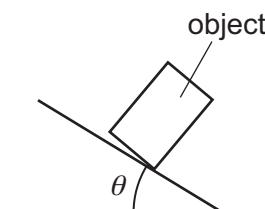
C The pressure on the cork is greater than the pressure on the thumb.

D The pressure on the cork is less than the pressure on the thumb.

30 The diagram shows four objects, P, Q, R and S, with uniform density, resting on different horizontal surfaces. The objects are all drawn to the same scale.



The surfaces are slowly tilted through an angle θ until the object falls over.



For which object is the value of θ the greatest?

A object P

B object Q

C object R

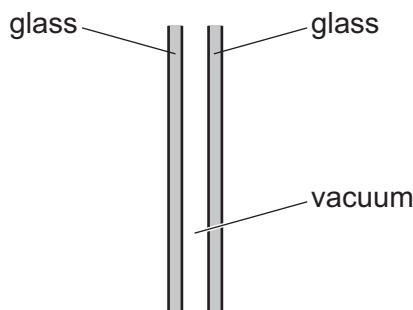
D object S

31 Liquid in a beaker evaporates quickly.

Which row shows what happens to the mass and to the temperature of the liquid remaining in the beaker?

	mass	temperature
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

32 The diagram shows a type of double glazing in a window. The double glazing consists of two sheets of glass separated by a vacuum.



Which methods of energy transfer are prevented by the vacuum?

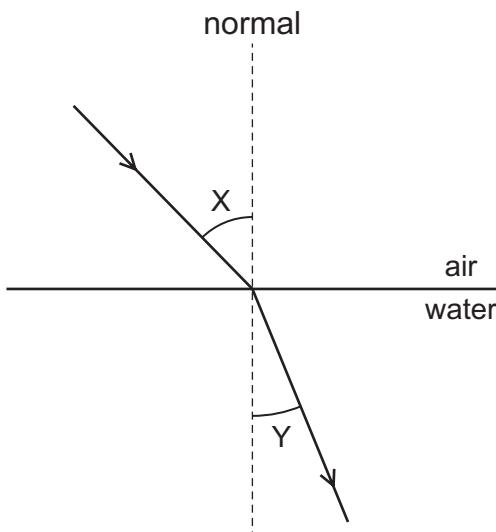
- A conduction and convection only
- B conduction and radiation only
- C convection and radiation only
- D conduction, convection and radiation

33 A student investigates the motion of a small ball that is floating on water in a tank. A wave passes along the water surface from left to right.

What happens to the ball?

- A It does not move.
- B It moves only to the left.
- C It moves only to the right.
- D It moves up and down.

34 Light travels from air into water.



What are the names of angle X and angle Y?

	angle X	angle Y
A	angle of incidence	angle of reflection
B	angle of incidence	angle of refraction
C	angle of refraction	angle of incidence
D	angle of refraction	angle of reflection

35 The table shows the highest frequency of sound heard by different animals.

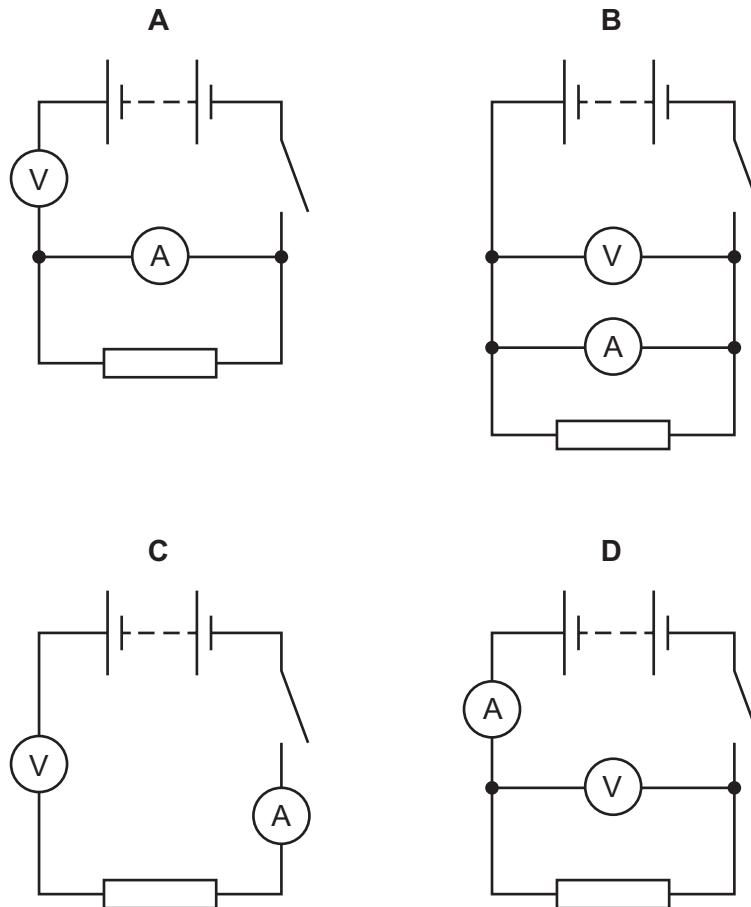
animal	highest frequency heard/kHz
bat	200
bird	10
cat	79

The highest frequency sound that a healthy human ear can hear is f .

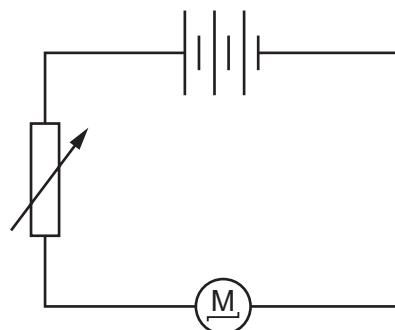
Which animals **cannot** hear sound of frequency f ?

- A** a bird only
- B** a bird and a cat only
- C** a bat, a bird and a cat
- D** none of the animals in the table

36 Which circuit is suitable for determining the resistance of the fixed resistor?



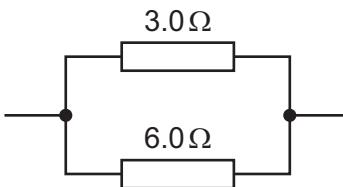
37 The diagram shows a circuit containing three cells, a variable resistor and an electric motor.



Which actions together **must** increase the speed of the motor?

- A decreasing the number of cells and decreasing the resistance of the variable resistor
- B decreasing the number of cells and increasing the resistance of the variable resistor
- C increasing the number of cells and decreasing the resistance of the variable resistor
- D increasing the number of cells and increasing the resistance of the variable resistor

38 The diagram shows a 3.0Ω resistor connected to a 6.0Ω resistor.



What is a possible combined resistance of the two resistors?

A 2.0Ω B 3.0Ω C 4.5Ω D 9.0Ω

39 A scientist works with a radioactive source that emits gamma (γ)-rays. The scientist takes several precautions.

Which precaution does **not** give the scientist any protection?

A Keep a lead screen between the scientist and the source.
 B Use a detector to measure the count rate of the source.
 C Only use the source for a short period of time.
 D Have a large distance between the scientist and the source.

40 The orbit of a planet lies between the orbit of Venus and the orbit of Mars.

What is the planet?

A Saturn
 B Jupiter
 C Earth
 D Uranus

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The Periodic Table of Elements

I		II		Group																								
				I						II			III		IV		V		VI		VII		VIII					
3	Li	4	Be	5	Sc	6	Ti	7	V	8	Cr	9	Mn	10	Fe	11	Co	12	C	13	B	14	Li	15	H	16		
7	lithium	9	beryllium	11	scandium	12	titanium	13	vanadium	14	chromium	15	manganese	16	iron	17	cobalt	18	nitrogen	19	O	20	nitrogen	21	oxygen	22		
11	Na	12	Mg	13	Al	14	Si	15	Aluminum	16	silicon	17	phosphorus	18	phosphorus	19	silicon	20	sulfur	21	S	22	chlorine	23	fluorine	24		
23	Na	24	Mg	25	Sc	26	Ti	27	V	28	Cr	29	Mn	30	Fe	31	Co	32	N	33	O	34	F	35	He	36		
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Zn	30	Ge	31	Ne	32		
39	K	40	Ca	41	Sc	42	Ti	43	V	44	Cr	45	Mn	46	Fe	47	Co	48	Ni	49	Zn	50	Ge	51	Neon	52		
37	Rb	38	Sr	39	Y	40	Zr	41	Nb	42	Mo	43	Ru	44	Rh	45	Pd	46	Ag	47	Cd	48	Sb	49	Kr	50		
85	Rb	86	Sr	87	Yttrium	88	Zirconium	89	Niobium	90	Molybdenum	91	Ruthenium	92	Rhodium	93	Palladium	94	Silver	95	Indium	96	Cadmium	97	Antimony	98	Krypton	99
56	Cs	57	Ba	58	La	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69		
133	Cs	137	Ba	139	Lanthanum	140	Praseodymium	141	Neodymium	144	Promethium	145	Samarium	150	Europium	152	Gadolinium	157	Terbium	159	Dysprosium	163	Holmium	165	Erbium	167	Ytterbium	173
87	Fr	88	Ra	89	Ac	90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Fm	100	Md	101
—	francium	—	radium	—	actinium	—	Thorium	231	Dubnium	238	Bohrium	—	Neptunium	—	Plutonium	—	Americium	—	Curium	—	Berkelium	—	Einsteinium	—	Mendelevium	—	No	102

16

57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71
139	Lanthanum	140	Cerium	141	Praseodymium	142	Neodymium	144	Promethium	—	Samarium	150	Europium	152	Gadolinium	157	Terbium	159	Dysprosium	163	Holmium	165	Erbium	167	Thulium	169	Ytterbium	173
89	Ac	90	Th	91	Pa	92	U	93	Np	94	Uranium	95	Plutonium	96	Americium	97	Curium	98	Berkelium	99	Einsteinium	100	Fermium	101	Mendelevium	102	No	103
—	actinium	—	Thorium	232	Dubnium	238	Bohrium	—	Neptunium	—	Darmstadtium	—	Plutonium	—	Americium	—	Curium	—	Berkelium	—	Einsteinium	—	Mendelevium	—	No	104		

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