

Cambridge IGCSE™

CO-ORDINATED SCIENCES

0654/11

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.

- 1 Which characteristic of living organisms involves a permanent increase in size?
- A excretion
B growth
C respiration
D sensitivity

- 2 The photograph shows a caterpillar.

The length of line PQ is 90 mm.

The actual length of the caterpillar is 30 mm.



What is the magnification of the photograph?

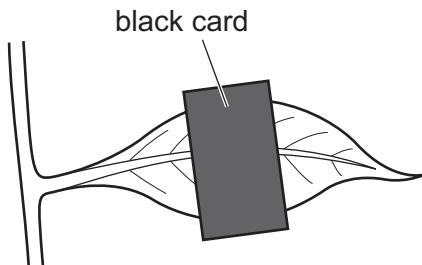
- A $\times 0.33$ B $\times 3.0$ C $\times 27$ D $\times 2700$
- 3 What is the name of the process where water passes into and out of cells through a partially permeable membrane?
- A diffusion
B evaporation
C osmosis
D transpiration
- 4 Which molecules make up fats and oils?
- A amino acids and glycerol
B fatty acids and glycerol
C glucose and amino acids
D glucose and fatty acids

5 Which type of molecules are enzymes?

- A carbohydrates
- B fats
- C hormones
- D proteins

6 The starch in a plant is removed.

One part of a leaf of the plant is covered with black card.



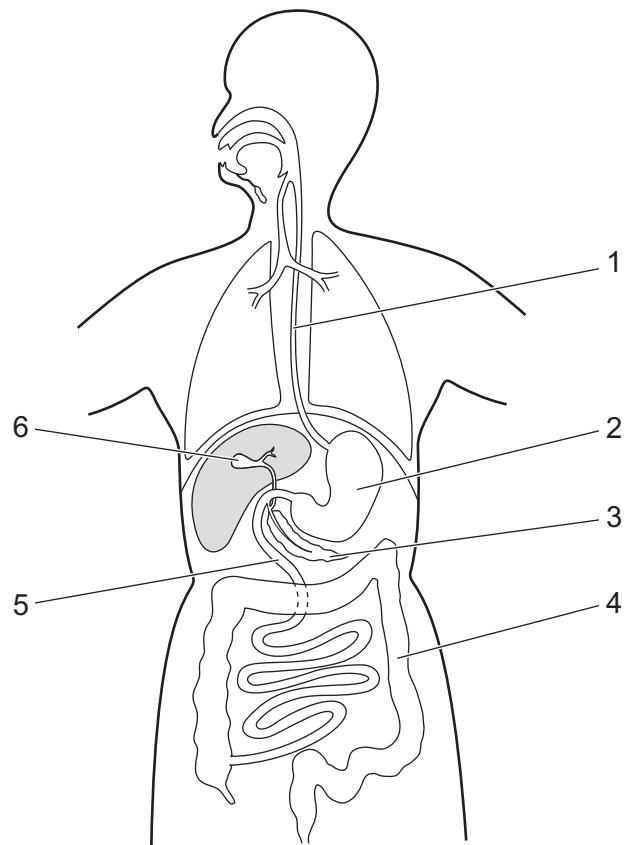
The plant is then put in the light for six hours.

The card is removed and the leaf is tested for starch using iodine solution.

Which row shows the colours of the iodine solution after it is added to different parts of the leaf?

	part of leaf	
	not covered by card	covered by card
A	blue-black	blue-black
B	blue-black	yellow
C	yellow	blue-black
D	yellow	yellow

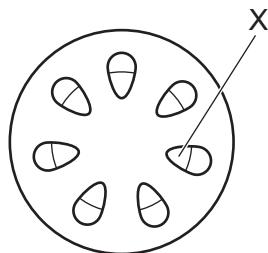
- 7 The diagram shows the human alimentary canal and other organs.



Which row shows the route of food through the alimentary canal?

	first	→	last
A	1	2	3
B	1	2	5
C	2	4	3
D	2	4	5

- 8 The diagram shows a cross-section of a plant stem.



Which tissue is X?

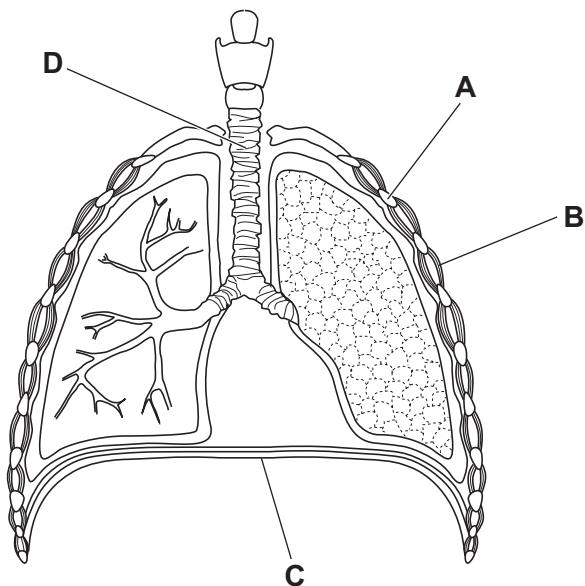
- A cortex
 - B mesophyll
 - C phloem
 - D xylem
- 9 Veins contain valves along their length.

What is the function of these valves?

- A to allow gas exchange
- B to carry blood under high pressure
- C to ensure one-way flow of blood
- D to transport blood to capillaries

- 10 The diagram shows the human gas exchange system.

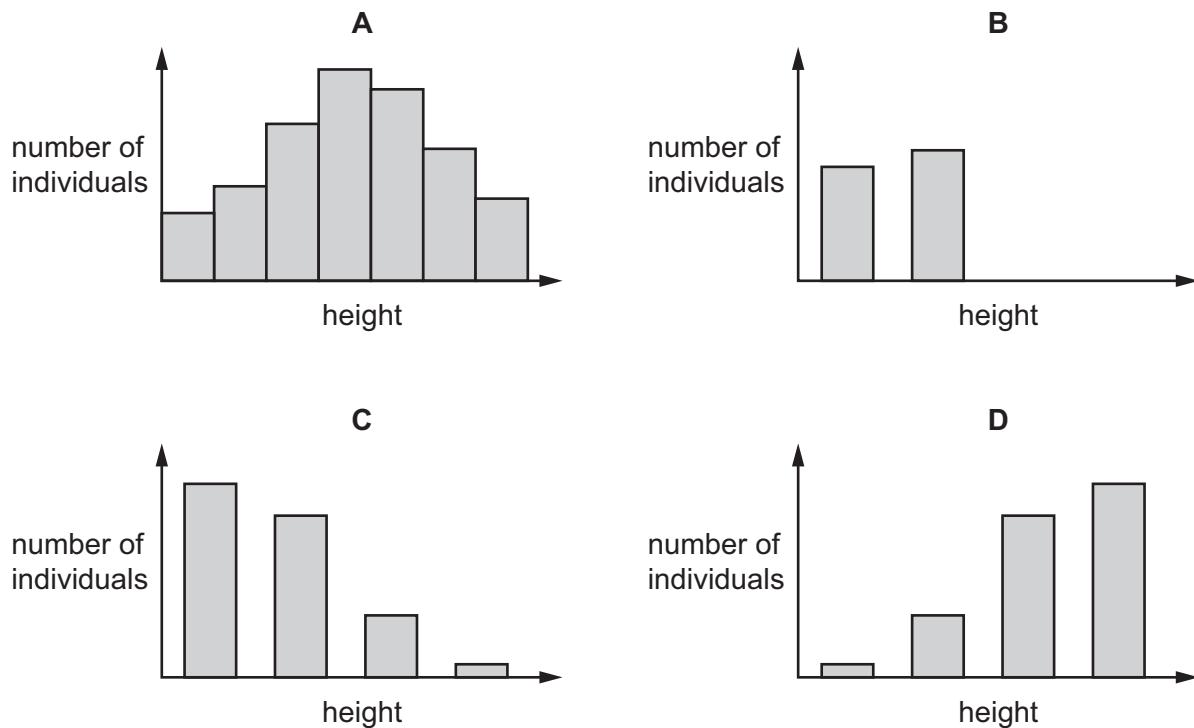
Which label shows the diaphragm?



11 Which row shows effects of adrenaline?

	heart rate	pupil diameter
A	increases	increases
B	increases	no effect
C	decreases	increases
D	no effect	increases

12 Which graph represents variation in the height of humans?



13 A food chain is shown.

tree → insect → mouse → owl

Which statement about this food chain is correct?

- A** The insect is a carnivore.
- B** The mouse is a herbivore.
- C** The owl is a secondary consumer.
- D** The tree is a producer.

- 14 Which change of state results in the greatest increase in the separation of particles?

 - A gas to liquid
 - B liquid to gas
 - C liquid to solid
 - D solid to liquid

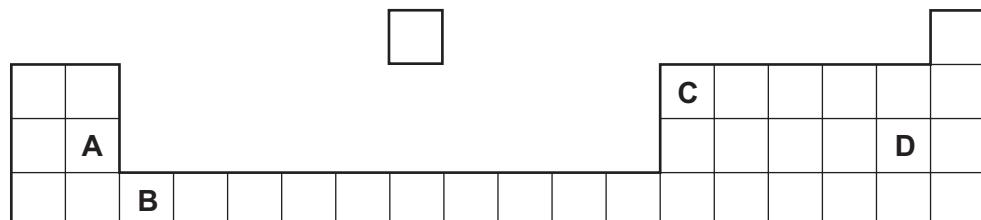
- 15 An atom of phosphorus has a nucleon number of 31 and a proton number of 15.

How many neutrons are there in this atom?

- A** 15 **B** 16 **C** 31 **D** 46

- 16 The diagram shows the positions of some elements in the Periodic Table.

Which element is in Group II and Period 3?



- 17 What happens to a tellurium atom when it forms a tellurium ion, Te^{2-} ?

- A It gains two electrons.
 - B It gains two protons.
 - C It loses two electrons.
 - D It loses two protons.

- 18 In which molecule are **all** the outer-shell electrons of the atoms used to form the covalent bonds?

- A** HCl **B** H_2O **C** NH_3 **D** CH_4

- 19 Molten lead(II) bromide is electrolysed using inert electrodes.

Which row describes the products of this electrolysis?

	a grey metal forms at the positive electrode	a red-brown gas forms at the negative electrode	lead and bromine are the only products
A	yes	no	no
B	yes	yes	yes
C	no	no	yes
D	no	yes	no

- 20 Equal masses of four substances are added separately to different samples of 10 cm³ of dilute hydrochloric acid at 22 °C.

The final temperature of each reaction mixture is measured.

Which reaction is most endothermic?

	final temperature / °C
A	29
B	27
C	20
D	17

- 21 Solid zinc carbonate reacts with excess dilute hydrochloric acid.

Which changes in the conditions increase the rate of this reaction?

- 1 Increase the concentration of hydrochloric acid.
- 2 Increase the temperature of the reaction mixture.
- 3 Increase the volume of hydrochloric acid.
- 4 Use larger pieces of zinc carbonate.

A 1 and 2

B 1 and 3

C 2 and 4

D 3 and 4

22 Which equation shows the oxidation of a metal?

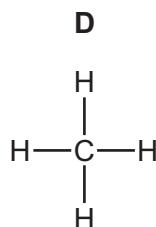
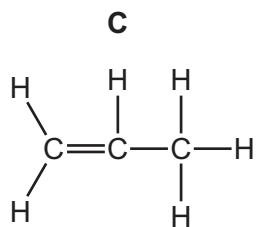
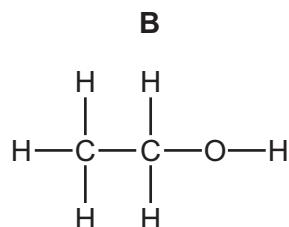
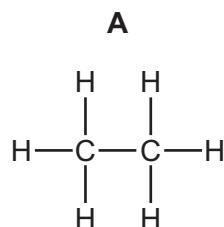
- A** $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
 - B** $\text{CuO} + \text{Zn} \rightarrow \text{Cu} + \text{ZnO}$
 - C** $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
 - D** $2\text{ZnO} + \text{C} \rightarrow 2\text{Zn} + \text{CO}_2$

23 Four liquids are tested with universal indicator and with anhydrous copper(II) sulfate.

Which row shows the observations for pure water?

	universal indicator	anhydrous copper(II) sulfate
A	turns blue	turns blue
B	turns blue	turns white
C	turns green	turns blue
D	turns green	turns white

24 Which compound is an alkene?



25 Which statement describes poly(ethene)?

- A It is formed from monomer molecules which each contain two atoms.
 - B It is formed from a saturated hydrocarbon monomer.
 - C It is formed in an addition reaction.
 - D It is a polymer consisting of C, H and O atoms.

26 Naphtha is obtained from petroleum.

What is a use for naphtha?

- A cooking
- B heating
- C making roads
- D making chemicals

27 Aqueous ammonia is separately added dropwise and then in excess to four different aqueous cations.

Which cations give a precipitate that then dissolves?

- 1 Ca^{2+}
- 2 Cu^{2+}
- 3 Fe^{2+}
- 4 Zn^{2+}

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

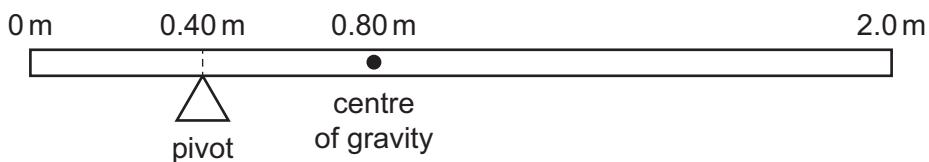
28 The total thickness of 500 sheets of paper is 4.5 cm.

What is the thickness of 1 sheet of paper in mm?

- A 0.0090 mm
- B 0.090 mm
- C 0.90 mm
- D 9.0 mm

29 A metal bar has weight 50 N and length 2.0 m. The centre of gravity of the bar is 0.80 m from the left-hand end.

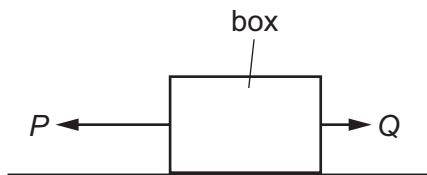
The bar is placed on a pivot at a point 0.40 m from the left-hand end.



What is the moment of the weight of the bar about the pivot?

- A 20 N m
- B 40 N m
- C 60 N m
- D 80 N m

- 30 The diagram shows a large force of magnitude P and a small force of magnitude Q acting on a box.

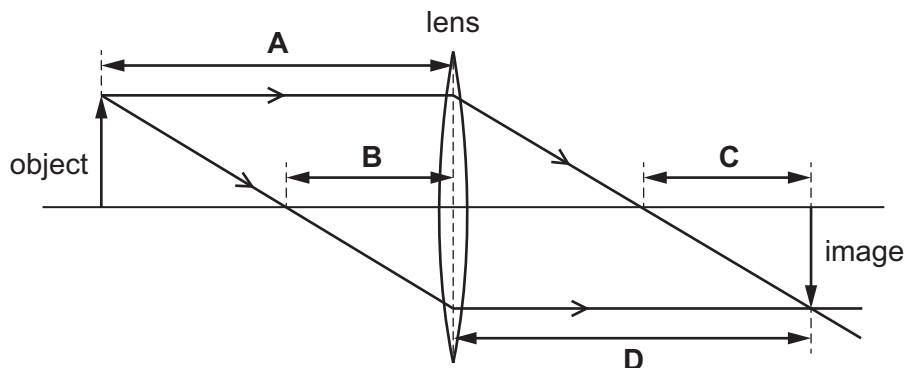


Which expression gives the magnitude of the resultant force on the box?

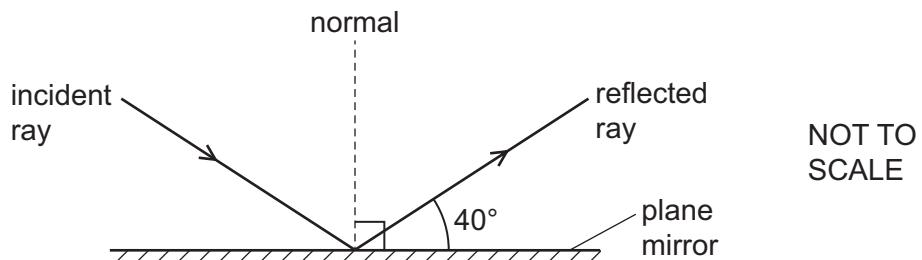
- A** $\frac{P}{Q}$ **B** $P \times Q$ **C** $P - Q$ **D** $P + Q$
- 31 Which statement about the transfer of thermal energy is correct?
- A** Thermal energy transfer by radiation involves mainly ultraviolet radiation.
- B** Thermal energy transfer by radiation requires a medium to travel through.
- C** The main method of thermal energy transfer through gases is conduction.
- D** The main method of thermal energy transfer through liquids is convection.
- 32 Which pair consists of one good thermal conductor and one bad thermal conductor?
- A** aluminium and wood
- B** brass and copper
- C** glass and plastic
- D** iron and steel
- 33 What is the name of the distance between one wave crest and the next wave crest?
- A** amplitude
- B** frequency
- C** speed
- D** wavelength

- 34 The diagram shows two rays of light passing through a thin converging lens to form an image of an object. Four distances are labelled.

Which labelled distance is the focal length of the lens?

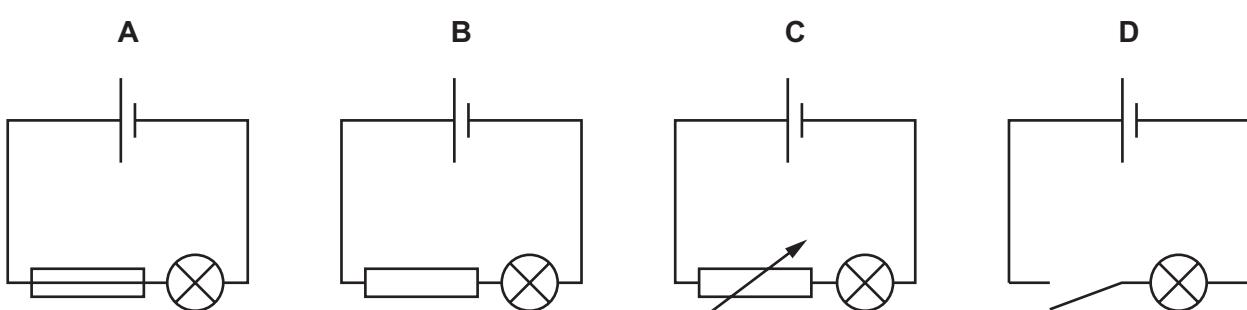


- 35 The diagram shows light hitting a plane mirror.



What is the angle of incidence?

- A** 40° **B** 50° **C** 80° **D** 100°
- 36 In which circuit can the brightness of the lamp be varied continuously?



- 37 A 12Ω resistor is connected in parallel with a 17Ω resistor.

Which statement about the combined resistance of the two resistors is correct?

- A It must be equal to 29Ω .
- B It must be greater than 12Ω but less than 17Ω .
- C It must be greater than 17Ω but less than 29Ω .
- D It must be less than 12Ω .

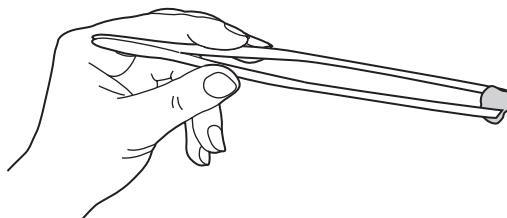
- 38 The voltage across an electric heater is 240 V and the current in the heater is 3.0 A.

The heater is connected in a circuit with a fuse.

Which fuse rating is the most suitable?

- A 1 A
- B 2 A
- C 5 A
- D 240 A

- 39 A teacher handles a radioactive source with tongs that are 10 cm long.



Using the tongs protects the teacher from one type of ionising radiation.

Which type of radiation from the source is the teacher protected from?

- A alpha (α)-particles
- B beta (β)-particles
- C gamma (γ)-rays
- D X-rays

- 40 What is between the orbits of Mars and Jupiter?

- A the asteroid belt
- B the orbit of Saturn
- C the orbit of the Earth
- D the orbit of Venus

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 Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

The Periodic Table of Elements

		Group																			
		I				II		III				IV		V		VI		VII			
		1		H		2		He		He		Ne		Ne		Ne		Ne			
		3	4	Be	beryllium	5	6	C	7	N	8	O	9	F	10	Ne	neon	20	He	helium	
Group		Li	lithium	7	9	B	carbon	11	12	nitrogen	14	16	19	17	18	19	20	21	He	4	
Key		Na	sodium	23	24	Al	aluminum	27	28	phosphorus	31	32	33	34	35	36	37	38	He	4	
		K	potassium	39	40	Ca	calcium	40	41	Sc	scandium	45	46	47	48	49	50	51	52	He	4
		Ca	calcium	40	41	Ti	titanium	48	51	V	vanadium	51	52	53	54	55	56	57	58	He	4
		Sc	scandium	45	49	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Al	aluminum	27	28	Fe	iron	56	59	Co	cobalt	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Nb	niobium	93	96	Mo	molybdenum	96	97	98	99	100	101	102	103	He	4
		Sc	scandium	45	49	Zr	zirconium	91	93	Tc	technetium	—	—	—	—	—	—	—	—	He	4
		Al	aluminum	27	28	Rh	rhodium	103	106	Ru	ruthenium	106	107	108	109	110	111	112	113	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	64	65	66	He	4
		Ca	calcium	40	41	Cr	chromium	52	55	Mn	manganese	55	56	57	58	59	60	61	62	He	4
		Sc	scandium	45	49	V	vanadium	51	54	Fe	iron	56	57	58	59	60	61	62	63	He	4
		Al	aluminum	27	28	Co	cobalt	59	62	Ni	nickel	59	60	61	62	63	6				

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