Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CO-ORDINATED SCIENCES **0973/22**

Paper 2 Multiple Choice (Extended) **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. Any blank pages are indicated.

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1 Which characteristic occurs in **all** living organisms?

A egestion

B excretion

C photosynthesis

D plasmolysis

2 Which row shows a specialised cell type matched with its function?

	cell type	function
A	ciliated	movement of mucus
B	egg	transport of oxygen
C	red blood	phagocytosis
D	root hair	photosynthesis

3 The mass of a peeled potato is recorded.

The potato is put in a salt solution with a lower water potential than the potato for two hours.

The outside of the potato is then dried and the mass recorded.

Which statement explains what happens to the potato after two hours in the salt solution?

A It gained mass by osmosis as salt moved into the potato from the surrounding solution.

B It gained mass by osmosis as water moved into the potato from the surrounding solution.

C It lost mass by osmosis as water moved from the potato into the surrounding solution.

D It lost mass by osmosis as salt moved from the potato into the surrounding solution.

4 Which row shows a large molecule and the small molecule it is made from?

	large molecule	small molecule
A	glycogen	glucose
B	glycogen	amino acid
C	oil	amino acid
D	oil	glucose

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5 Six test-tubes contain amylase and starch solution. The temperatures of the test-tube contents are different. All other conditions are the same.

The table shows the time taken for the amylase to break down the starch.

temperature / °C	25	30	35	40	45	50
time / seconds	121	87	46	43	72	99

At which temperature is the activity of the amylase greatest?

A 25 °C **B** 35 °C **C** 40 °C **D** 50 °C

6 Which row shows the transport and use of nitrate ions by plants?

	tissue used to transport nitrate ions around plant	nitrate ions used to make
A	phloem	amino acids
B	xylem	glucose
C	phloem	glucose
D	xylem	amino acids

7 Starch is chemically digested into maltose by the enzyme amylase.

What are the properties of the maltose molecules?

A large and insoluble

B large and soluble

C small and insoluble

D small and soluble

8 Which row shows the conditions that will increase the rate of transpiration from a plant?

	temperature	humidity
A	high	low
B	high	high
C	low	high
D	low	low

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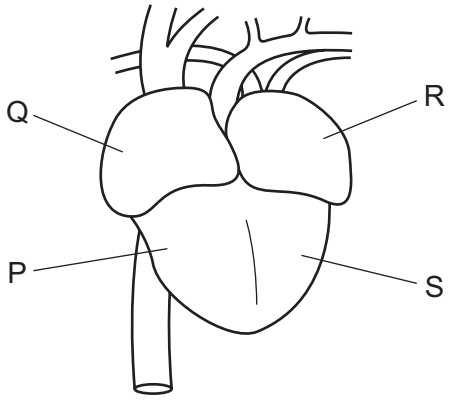
9 The diagram shows a front view of a human heart.



What is the sequence in which a blood cell passes through the four chambers of the heart?

A P → S → R → Q

B Q → P → R → S

C R → Q → P → S

D S → R → Q → P

10 The homeostatic control of body temperature is shown.

constant internal body temperature → increase in body temperature → X → constant internal body temperature

Which processes happen at X?

A vasodilation and increased shivering

B vasodilation and increased sweating

C vasoconstriction and increased shivering

D vasoconstriction and increased sweating

11 Some information about a donkey and a horse is shown.

- The sperm from a donkey is able to fertilise the egg from a horse.
- The nucleus of a body cell from a horse has 64 chromosomes.
- The nucleus of a sperm cell from a donkey has 31 chromosomes.
- The offspring from a cross between a donkey and a horse is called a mule.

How many chromosomes are in the nucleus of a body cell from a mule?

A 31 **B** 63 **C** 64 **D** 95

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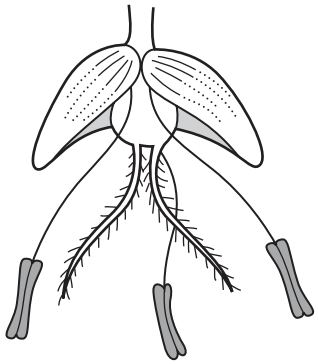
12 The diagram shows a flower.



What is the method of pollination for this flower and the structural adaptation that enables this?

A insect pollination because the anthers are feathery

B insect pollination because the stigmas are feathery

C wind pollination because the anthers are feathery

D wind pollination because the stigmas are feathery

13 Information about a lake is shown.

- Aquatic plants grow in the lake.
- Aquatic plants are eaten by small fish.
- Small fish are eaten by large fish.
- Small fish are eaten by frogs.

Which statement is correct?

A The frogs are primary consumers.

B The large fish are secondary consumers.

C The small fish are at trophic level 1.

D The aquatic plants are herbivores.

14 Which statement explains why metals conduct electricity?

A There is a ‘sea’ of delocalised electrons.

B The positive ions move over each other.

C There is an electrostatic attraction between the oppositely charged particles.

D The particles in a metal vibrate and pass on the electric current.

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15 Ammonia decomposes when heated in a sealed container in the presence of an iron catalyst.

The equation for the reaction is shown.

$$2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$$

40.0 dm^3 of ammonia is heated. After several hours, 21.0 dm^3 of hydrogen is present.

The volumes are measured at r.t.p.

What is the percentage of unreacted ammonia?

A 35.0% **B** 47.5% **C** 52.5% **D** 65.0%

16 The table shows the initial and final temperatures of four different reactions.

reaction	initial temperature / °C	final temperature / °C
1	20	20
2	20	30
3	25	20
4	25	30

Which reactions are exothermic?

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

17 Which processes are physical changes?

1 Hydrogen gas joins with oxygen gas to form steam.

2 Liquid water turns into steam.

3 $Cl_2(g) \rightarrow 2Cl(g)$

4 $CH_4(l) \rightarrow CH_4(g)$

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

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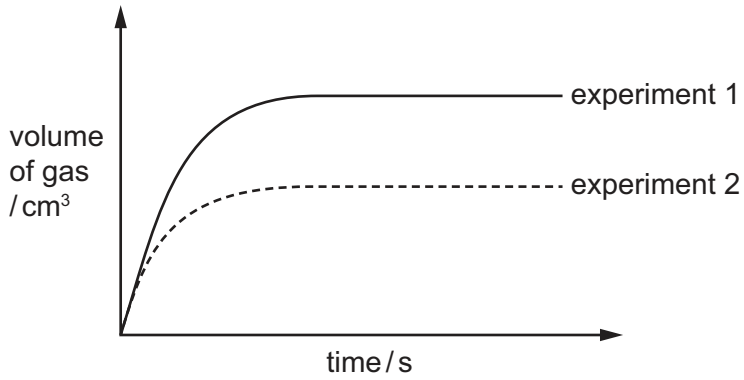
18 Equal masses of limestone pieces are reacted with acid in two experiments.

Only one change to the conditions is made between experiment 1 and experiment 2.

The volume of gas produced is measured over time.

The results are shown.



Which statement about the experiments is correct?

A The concentration of acid used in experiment 2 is higher than in experiment 1.

B The temperature used in experiment 2 is lower than in experiment 1.

C The limestone pieces used in experiment 1 are larger than in experiment 2.

D The volume of acid used in experiment 1 is greater than in experiment 2.

19 Which row describes an element on the left of the Periodic Table and its oxide?

	type of element	type of oxide
A	metallic	basic
B	non-metallic	acidic
C	metallic	acidic
D	non-metallic	basic

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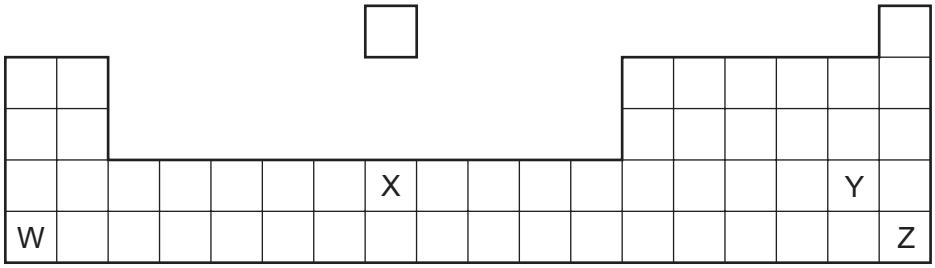
20 Part of the Periodic Table is shown.



Which description is correct?

A W is a soft solid at room temperature. It has a low melting point and it can act as a catalyst.

B X is a solid at room temperature. It has a high melting point and it can act as a catalyst.

C Y is a solid at room temperature. It forms a coloured vapour and it displaces iodide ions.

D Z is a gas at room temperature. It is very reactive and it has a low boiling point.

21 Which statement describes what happens when calcium carbonate is added to the blast furnace during the extraction of iron?

A It burns and provides heat.

B It decomposes and calcium oxide is a product.

C It reacts with silicon dioxide.

D It reduces the iron ore.

22 Which row shows a greenhouse gas and its environmental effect?

	gas	environmental effect
A	methane	acid rain
B	methane	global warming
C	carbon monoxide	acid rain
D	carbon monoxide	global warming

23 Which statement explains how oxides of nitrogen are formed in a car engine?

A Nitrogen from the air reacts with the fuel.

B Oxygen and nitrogen from the air react together.

C Oxygen from the air reacts with sulfur impurities in the fuel.

D Oxygen from the air reacts with the fuel.

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24 A student prepares an insoluble salt by neutralising an acid with an alkali.

Which method is used to separate the salt from the reaction mixture?

A chromatography

B distillation

C evaporation

D filtration

25 A molecule of methane contains one carbon atom and has the formula CH_4.

A molecule of octane contains eight carbon atoms.

How many hydrogen atoms are in a molecule of octane?

A 11 **B** 16 **C** 18 **D** 32

26 Large alkane molecules are cracked to form smaller molecules.

Which equations represent cracking reactions?

1 $C_{18}H_{38} \rightarrow 2C_6H_{14} + C_6H_{12}$

2 $C_{18}H_{38} \rightarrow H_2 + 3C_6H_{12}$

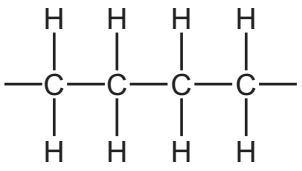
3 $C_{15}H_{32} \rightarrow C_5H_{10} + 2C_5H_{12}$

4 $C_{15}H_{32} \rightarrow C_6H_{14} + C_5H_{10} + C_4H_8$

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

27 Which diagram represents the structure of nylon?

A



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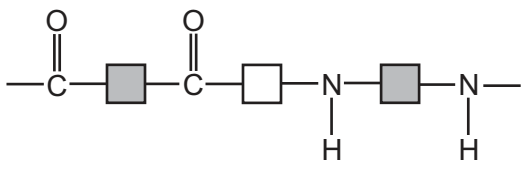

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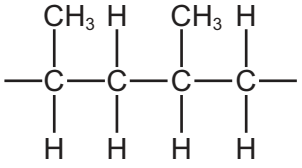

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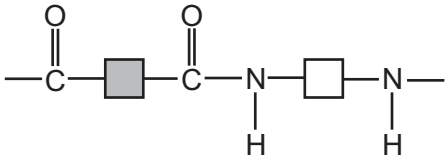

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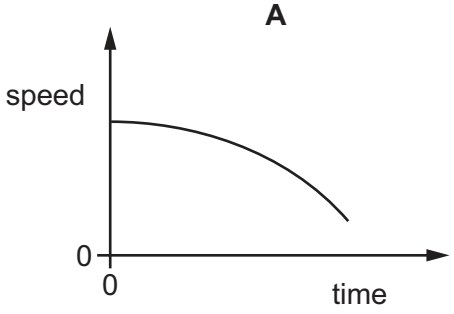
28 In which speed–time graph is acceleration **not** constant or 0?

A



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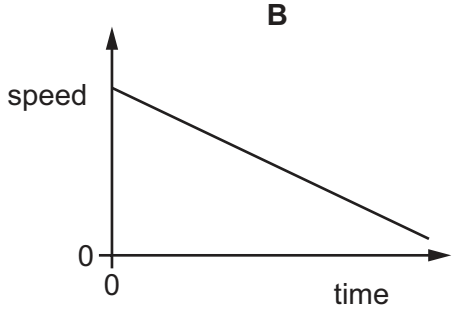

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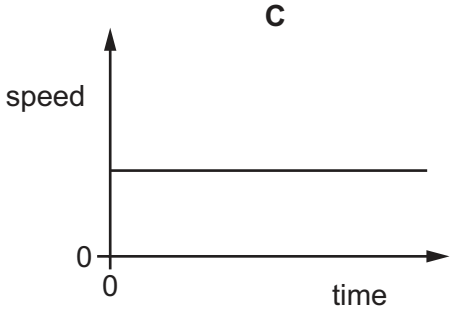

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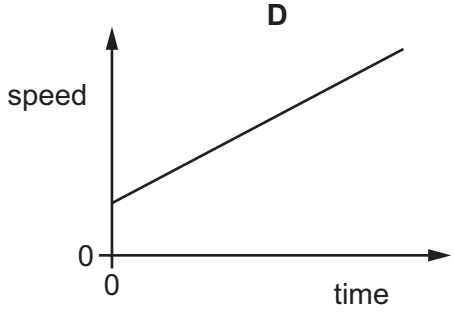

29 A lamp produces 760 J of wasted energy for every 1000 J of energy supplied to it.

What is the efficiency of the lamp?

A 0.24% **B** 0.76% **C** 24% **D** 76%

30 Atmospheric pressure is 1.0×10^5 Pa.

A football pitch is 105 m long and 68 m wide.

What is the total weight of the air above the football pitch?

A 14 N **B** 1.7×10^7 N **C** 3.5×10^7 N **D** 7.1×10^8 N

31 Which surface reflects the most thermal radiation?

A a black, dull surface

B a black, shiny surface

C a white, dull surface

D a white, shiny surface

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32 Liquid water boils at 100 °C to produce steam. The volume of the steam at 100 °C is much greater than the volume of the liquid water.

Which statement explains the increase in volume at 100 °C?

A The water molecules move faster in steam than in liquid water.

B The water molecules are further apart in steam than in liquid water.

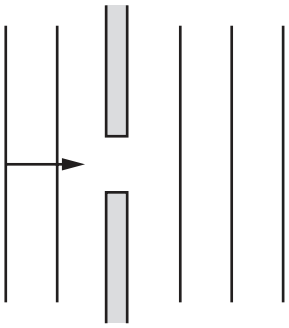
C The water molecules are larger in steam than in liquid water.

D The water molecules are regularly arranged in liquid water but are randomly arranged in steam.

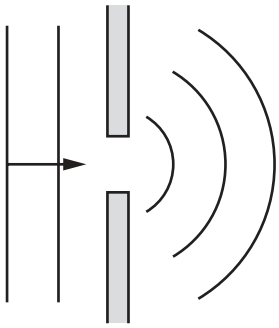
33 A wave approaches a gap in a barrier. The gap is the same size as the wavelength of the wave. The arrow shows the direction of the wave.

Which diagram shows what happens to the wave after it passes through the gap?

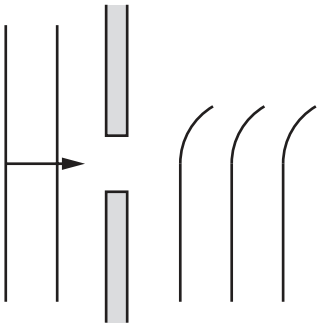
A



B



C



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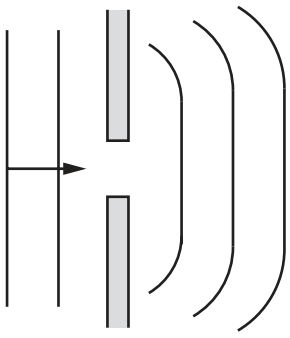

34 What is the difference between a real image and a virtual image?

A A real image can be shown on a screen, but a virtual image cannot.

B A real image is always formed by a magnifying glass.

C A real image is always formed by a plane mirror.

D A virtual image can be shown on a screen, but a real image cannot.

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35 Which row shows the type of electromagnetic wave used in each application?

	television remote controllers	satellite television
A	infrared	microwaves
B	infrared	ultraviolet
C	microwaves	microwaves
D	microwaves	ultraviolet

36 A student makes an electromagnet with a steel core.

There is a problem with the electromagnet.

Which problem with the electromagnet is caused by using a steel core?

A The electromagnet does not become magnetised.

B The electromagnet has the same type of magnetic pole at each end.

C The electromagnet remains magnetised when it is switched off.

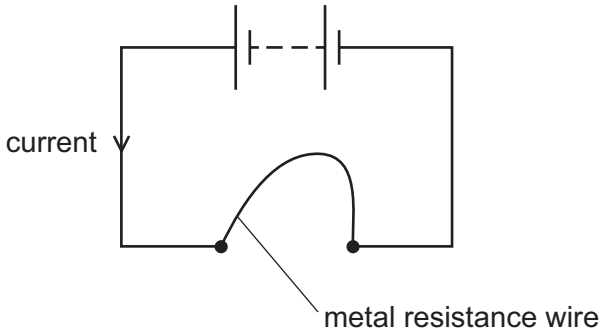
D The electromagnet repels unmagnetised magnetic materials.

37 There is a current of 100 mA in a circuit.

How much charge flows through the circuit in 1.5 minutes?

A 0.15 C **B** 9.0 C **C** 150 C **D** 9000 C

38 A student connects a length of metal resistance wire to a battery.



Which change increases the current in the resistance wire?

A connecting a second wire in series with the first wire

B heating the wire

C making the wire shorter

D making the wire thinner

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39 A nucleus of $^{238}_{92}U$ undergoes radioactive decay to produce a nucleus of thorium (Th) and an alpha particle.

Which equation shows this decay?

A $^{238}_{92}U \rightarrow {}^{238}_{93}Th + {}^{0}_{-1}\alpha$

B $^{238}_{92}U \rightarrow {}^{239}_{92}Th + {}^{-1}_{0}\alpha$

C $^{238}_{92}U \rightarrow {}^{236}_{88}Th + {}^{2}_{4}\alpha$

D $^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^{4}_{2}\alpha$

40 Which process describes how energy is released from a stable star?

A fission of helium into hydrogen

B fission of hydrogen into helium

C fusion of helium into hydrogen

D fusion of hydrogen into helium

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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 –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

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.).