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CAMBRIDGE
International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/22**

Paper 2 Multiple Choice (Extended) **February/March 2026**

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 or tape.
- 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.

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1 What is a characteristic of all living organisms?

A breathing

B decomposition

C digestion

D nutrition

2 How does oxygen move into a plant cell?

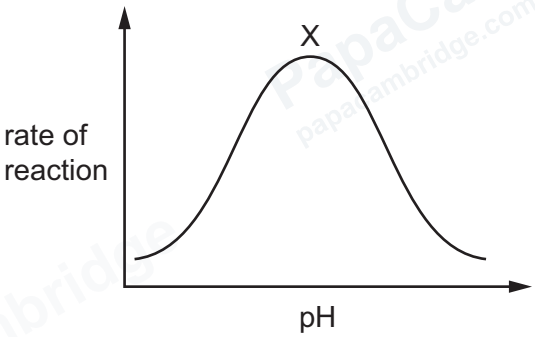
A diffusion through the cell membrane into the cytoplasm

B diffusion from the vacuole into the cytoplasm

C osmosis through the cell membrane into the cytoplasm

D osmosis from the vacuole into the cytoplasm

3 The diagram shows the effect of increasing the pH of an enzyme-controlled reaction.



What happens at point X?

1 denaturation

2 greatest number of enzyme–substrate complexes form

3 kinetic energy increases

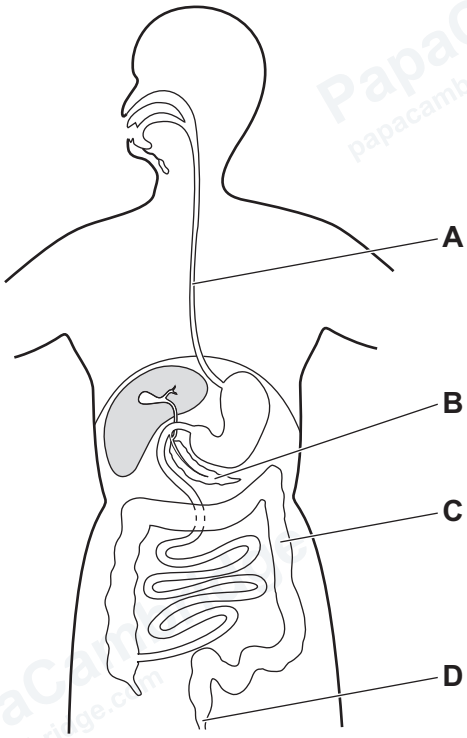
A 1 and 3 **B** 1 only **C** 2 and 3 **D** 2 only

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4 The diagram shows the human digestive system.

Which label shows where amylase is secreted from?



5 How are root hair cells adapted for absorption of water?

A large surface area

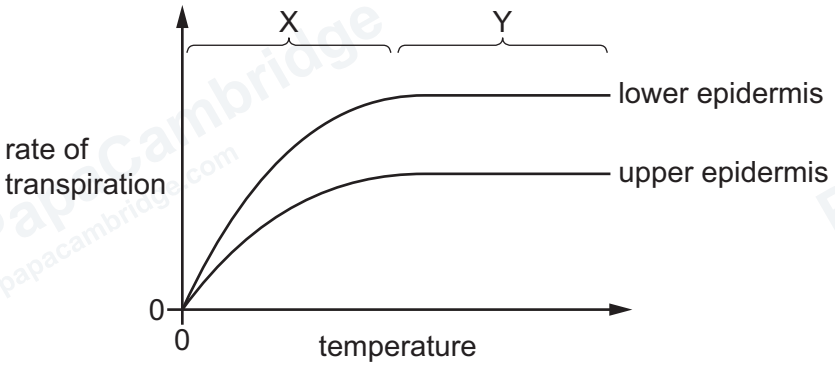
B thick cell wall

C many chloroplasts

D no nucleus

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6 A scientist investigates the effect of temperature on the rate of transpiration for both the upper epidermis and the lower epidermis of a leaf.



Which statements about the graph are correct?

1 In temperature range X, the rate of transpiration increases for the upper epidermis and the lower epidermis as temperature increases.

2 The lower epidermis and upper epidermis have equal rates of transpiration in temperature range Y.

3 The lower epidermis loses water vapour faster than the upper epidermis in both temperature ranges X and Y.

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

7 At one stage in a heart beat, the valves between the atria and the ventricles are closed and the valves at the base of the main arteries leading away from the heart are open.

Which row describes the muscles in the walls of the atria and the ventricles at this stage in the heart beat?

	atria	**ventricles**
A	contracted	contracted
B	contracted	relaxed
C	relaxed	contracted
D	relaxed	relaxed

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8 The list shows methods that pathogens are transmitted by.

1 from contaminated surfaces

2 from air

3 through blood

4 through other body fluids

What are indirect methods of transmission of pathogens?

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

9 Which row describes the effect of increasing the depth and rate of breathing on gas exchange in humans?

	effect of increasing the depth of breathing		**effect of increasing the rate of breathing**	
	blood supply to alveoli	**ventilation**	**blood supply to alveoli**	**ventilation**
A	does **not** change	increases	does **not** change	increases
B	does **not** change	decreases	increases	does **not** change
C	increases	increases	does **not** change	increases
D	increases	decreases	increases	does **not** change

10 Which statement about aerobic respiration is correct?

A It exchanges gases through the walls of the alveoli.

B It expels carbon dioxide from the lungs.

C It releases energy and only produces carbon dioxide.

D It uses oxygen to release energy from glucose.

11 How can the development of resistant bacteria such as MRSA be limited?

A Use antibiotics for all infections.

B Use antibiotics only when essential.

C Use antibodies for all infections.

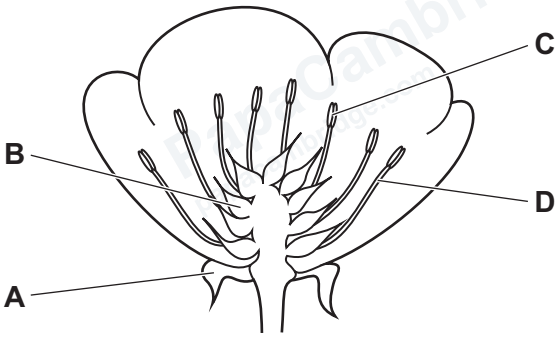
D Use antibodies only when essential.

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12 The diagram shows a section through a buttercup flower.

Which structure produces pollen grains?



13 Which statements are benefits of successful captive breeding programmes?

1 Extinction of a species is prevented.

2 Habitat destruction is prevented.

3 The captive breeding programme educates people about endangered species.

4 Species can be reintroduced to their original habitat after the captive breeding programme.

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

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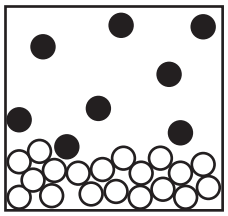
14 The melting point and boiling point of oxygen and nitrogen are shown.

	melting point / °C	**boiling point / °C**
oxygen	–219	–183
nitrogen	–210	–196

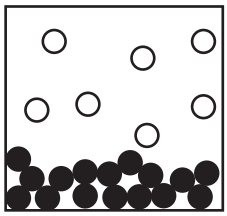
A sealed flask contains a mixture of oxygen and nitrogen.

Which diagram shows the arrangement of oxygen and nitrogen particles at –190 °C?

A



B

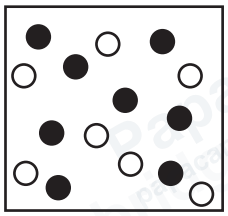


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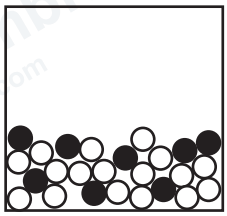
● nitrogen molecules

○ oxygen molecules

C



D



15 P^{3+} and Q^{2+} are positive ions.

R^{-} and S^{2-} are negative ions.

Four formulas are listed.

1 PS

2 QS

3 PR_3

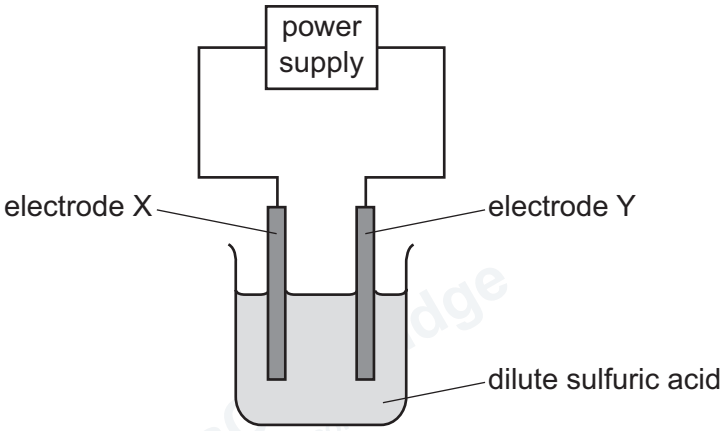
4 Q_2R

Which formulas are correct?

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

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16 The apparatus used for the electrolysis of dilute sulfuric acid using inert electrodes is shown.



Hydrogen gas is produced at electrode X.

Which row identifies the anode, the cathode and the gas produced at electrode Y?

	anode	cathode	gas at electrode Y
A	X	Y	sulfur dioxide
B	X	Y	oxygen
C	Y	X	sulfur dioxide
D	Y	X	oxygen

17 Which statements about chemical energetics are correct?

1 Bond breaking is an exothermic process.

2 Bond making transfers thermal energy to the surroundings.

3 The temperature of the surroundings decreases in an exothermic reaction.

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

18 Equal masses of four different metals react with excess dilute hydrochloric acid.

In each experiment, hydrogen gas is produced.

Which measurements can be used to put these metals in order of reactivity?

1 the mass of solid remaining after one minute of reaction

2 the number of bubbles of gas produced in one minute

3 the time taken to produce a fixed volume of gas

4 the total volume of gas produced by each metal

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

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19 Two aqueous substances react together.

The reaction is repeated using half the initial concentration of each reactant.

The initial temperature is the same.

Which statement about the repeated reaction is correct?

A There are more particles with the minimum energy to react.

B The frequency of collisions between reacting particles is less.

C The total number of collisions between reacting particles is greater.

D The number of particles with the activation energy is greater.

20 Which element forms an acidic oxide?

A argon

B calcium

C carbon

D sodium

21 Which statement about reactions of halogens and aqueous halide ions is correct?

A Bromine reacts with aqueous sodium chloride to produce a pale yellow-green gas.

B Bromine reacts with aqueous sodium iodide to produce a colourless solution.

C Chlorine reacts with aqueous sodium iodide to produce a brown solution.

D Iodine reacts with aqueous sodium bromide to produce an orange-brown gas.

22 Which statements about substances and their uses are correct?

1 Copper is used in electrical wiring because it allows an electric current to pass through it.

2 Brass is an alloy of copper and iron and it is useful because it is resistant to corrosion.

3 Aluminium is more suitable than steel to make aircraft wings because 1 cm^3 of aluminium has a lower density than 1 cm^3 of steel.

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

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23 Which statement describes why chlorine is used in the treatment of the domestic water supply?

A to improve the taste of the water

B to kill microbes

C to make the water pure

D to remove solids

24 Which statement about the fractional distillation of petroleum is correct?

A The boiling point of the fractions increases when the molecules in the fractions get larger.

B The fraction obtained from the bottom of the fractionating column has the largest molecules and these molecules contain oxygen.

C The fraction obtained from the top of the fractionating column has the largest molecules and the lowest boiling point.

D The molecules within a fraction have the same molecular formula.

25 Which statement about hydrocarbons is correct?

A Alkanes are produced by cracking alkenes.

B Alkanes decolourise bromine water.

C Alkenes are saturated hydrocarbons.

D Alkenes contain a double bond.

26 Which equation represents an addition reaction?

A $C_4H_{10} \rightarrow C_2H_4 + C_2H_6$

B $C_2H_4 + H_2O \rightarrow C_2H_5OH$

C $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

D $C_2H_6 \rightarrow C_2H_4 + H_2$

27 During a chromatography investigation, colour X moves 4.5 cm up the chromatography paper from the baseline.

The R_f value of colour X is 0.59.

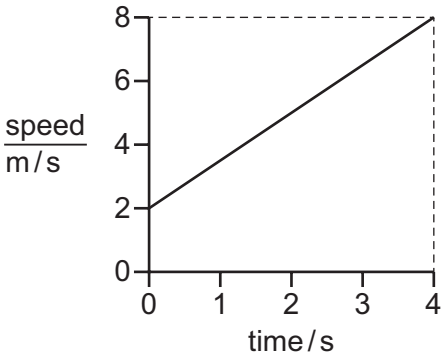
What is the distance moved by the solvent in this experiment?

A 2.7 cm **B** 4.5 cm **C** 7.6 cm **D** 10.3 cm

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28 The diagram shows the speed–time graph for an object that is accelerating.



Which row shows the acceleration of the object and the distance it travels in 4.0 s?

	acceleration **m / s²**	**distance / m**
A	1.5	20
B	1.5	32
C	2.0	20
D	2.0	32

29 An object has a weight of 68 N when it is in a gravitational field of strength 3.7 N / kg.

The object is moved to a second place where the gravitational field strength is greater.

Which row shows the mass of the object and how its weight is different in the second place?

	mass / kg	**weight in the second place**
A	250	smaller
B	250	larger
C	18	smaller
D	18	larger

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30 A train travels along a straight, horizontal track at constant speed.

The train travels a measured distance and the work done by the train is determined.

Which quantity can be calculated using only the distance travelled and the work done by the train?

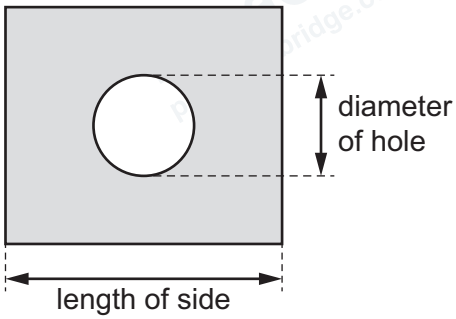
A force exerted by the train

B speed of the train

C time taken to travel this distance

D weight of the train

31 A sheet of metal has a circular hole at its centre.



The sheet is heated.

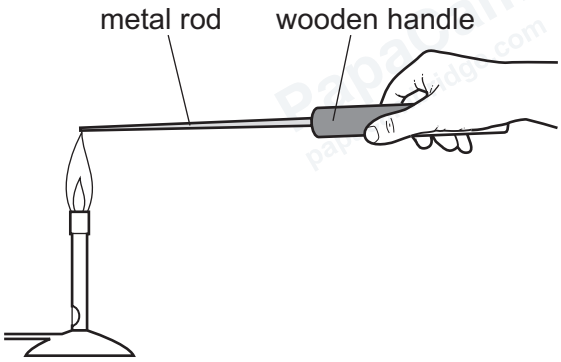
Which row shows what happens to the length of the side and the diameter of the hole as the temperature increases?

	length of side	diameter of hole
A	increases	increases
B	increases	stays the same
C	stays the same	increases
D	stays the same	decreases

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32 A metal rod with a wooden handle is placed with the end of the metal rod in a flame.



Which row shows how thermal energy passes through the metal and through the wood?

	through the metal	through the wood
A	by atomic vibrations only	by molecular vibrations only
B	by movement of delocalised electrons only	by movement of delocalised electrons and by molecular vibrations
C	by movement of delocalised electrons and by atomic vibrations	by molecular vibrations only
D	by movement of delocalised electrons and by atomic vibrations	by movement of delocalised electrons and by molecular vibrations

33 A wave has a speed of 16 m / s and a frequency of 4.0 Hz.

What is its wavelength?

A 0.25 m **B** 4.0 m **C** 20 m **D** 64 m

34 Radio waves and gamma rays are travelling in a vacuum.

Which row compares the frequencies and the speeds of the radio waves and the gamma rays?

	frequencies	speeds
A	equal	equal
B	equal	different
C	different	equal
D	different	different

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35 Which row describes a sound wave?

	type of wave	speed of sound in air
A	longitudinal	greater than speed in a metal
B	longitudinal	less than speed in a metal
C	transverse	greater than speed in a metal
D	transverse	less than speed in a metal

36 A battery produces an electric current in a wire.

What is an electric current?

A a flow of electrons towards the negative terminal of the battery

B a flow of electrons towards the positive terminal of the battery

C a flow of positive ions towards the negative terminal of the battery

D a flow of positive ions towards the positive terminal of the battery

37 What is the unit of electromotive force (e.m.f.)?

A J **B** N **C** Ω **D** V

38 A wire has a length of 1.0 m and a cross-sectional area of 0.20 mm^2.

The resistance of the wire is 2.0 Ω.

A second wire of the same material has a length of 8.0 m and a cross-sectional area of 0.40 mm^2.

What is the resistance of the second wire?

A 0.50 Ω **B** 8.0 Ω **C** 16 Ω **D** 32 Ω

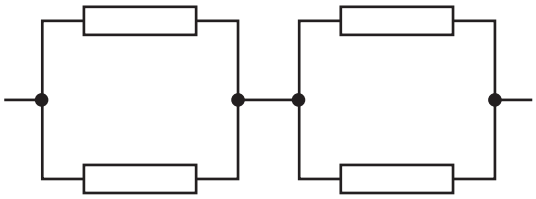
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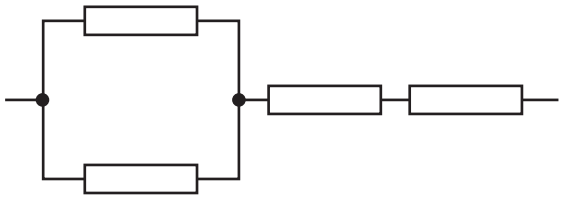
39 The diagrams show four identical resistors connected in different combinations.

Which diagram shows the combination with the greatest combined resistance?

A



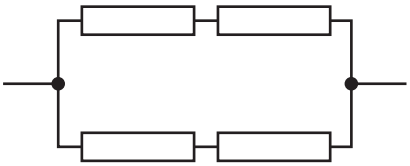
B



C



D



40 Which object is **not** found in the Solar System?

A an asteroid

B a dwarf planet

C a star

D a white dwarf

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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.).

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