Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CO-ORDINATED SCIENCES **0973/12**

Paper 1 Multiple Choice (Core) **May/June 2024**

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.

This document has **16** pages. Any blank pages are indicated.

1 Which two characteristics of living organisms are demonstrated by gravitropism?

A growth and nutrition

B growth and sensitivity

C respiration and nutrition

D respiration and sensitivity

2 By which process does oxygen pass from the alveoli to the blood capillaries in the lungs?

A diffusion

B osmosis

C secretion

D transpiration

3 What are the products when oils are digested?

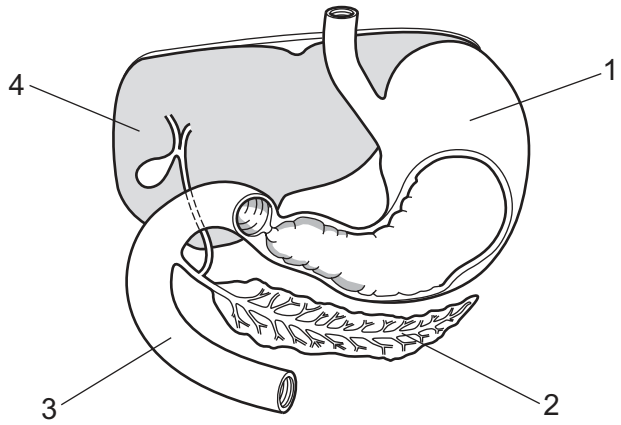
A amino acids and glycerol

B fats and amino acids

C fatty acids and glycerol

D fatty acids and sugars

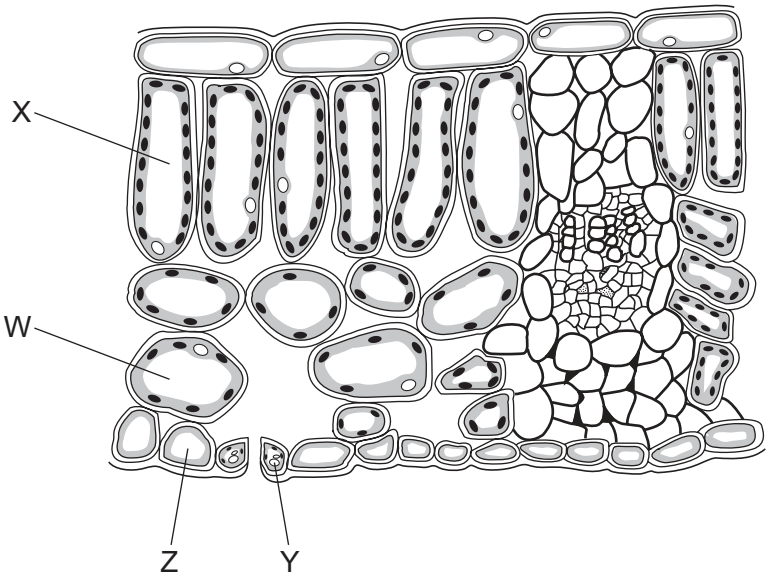
4 The diagram shows part of the human alimentary canal and associated organs.



Which labels identify the liver, pancreas and stomach?

	liver	pancreas	stomach
A	2	1	3
B	2	3	1
C	4	2	3
D	4	2	1

5 The diagram shows the cross-section of part of a leaf with cells labelled W, X, Y and Z.



Which cells lose most water and which cells absorb most carbon dioxide during the daytime?

A W and X **B** X and Y **C** Y and Z **D** W and Z

6 A scientist places equal volumes of starch and saliva into a test-tube.

After 30 minutes, the mixture in the test-tube is tested with iodine solution.

The iodine solution remains brown.

Which process does this experiment demonstrate?

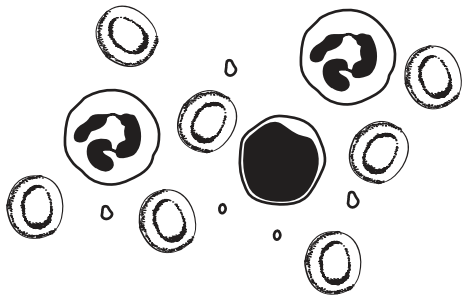
A absorption

B assimilation

C digestion

D ingestion

7 The diagram shows some blood viewed under a light microscope.



How many red blood cells are shown?

A 1 **B** 2 **C** 5 **D** 7

8 Which statement about the composition of expired air, compared with inspired air, is correct?

A The percentage of carbon dioxide is decreased and the percentage of water vapour is increased.

B The percentage of carbon dioxide is increased and the percentage of water vapour is increased.

C The percentage of oxygen is decreased and the percentage of carbon dioxide is decreased.

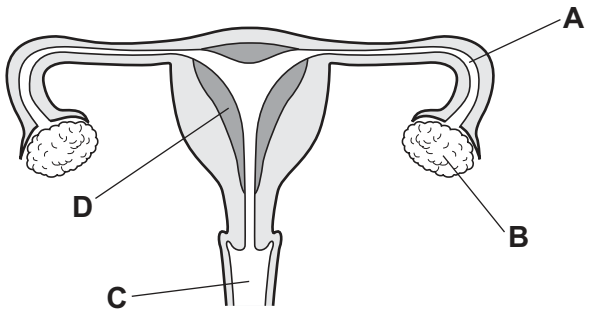
D The percentage of oxygen is increased and the percentage of carbon dioxide is decreased.

9 Which row about hormones is correct?

	means of transport	where produced	site of action
A	alimentary canal	glands	target organs
B	alimentary canal	organs	all organs
C	blood	glands	target organs
D	blood	organs	all organs

10 The diagram shows the human female reproductive system.

Where is the embryo normally implanted to enable it to develop into a healthy fetus?



11 Which statement describes a heterozygous genotype?

A not pure breeding with two different alleles

B not pure breeding with two identical alleles

C pure breeding with two different alleles

D pure breeding with two identical alleles

12 Which statement about organisms in a food chain is correct?

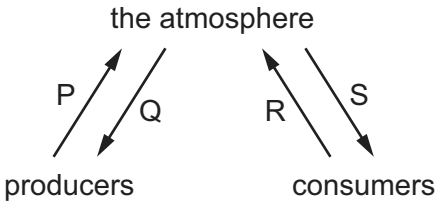
A A carnivore is an organism that gets its energy by eating plants.

B A consumer is an organism that gets its energy by eating other organisms.

C A herbivore is an organism that gets its energy by eating animals.

D A producer is an organism that gets its energy from dead or waste matter.

13 The diagram shows gas exchange by two groups of organisms during the hours of darkness.



Which letters represent gases that are part of the carbon cycle?

A P and Q **B** P and R **C** P and S **D** Q and S

14 Which statement about atoms is correct?

A All atoms contain equal numbers of neutrons and protons.

B All atoms of the same element have the same number of neutrons.

C The Periodic Table lists atoms in order of increasing mass number.

D The smallest unit of an element is an atom.

15 Which substances exist as covalent molecules?

1 helium

2 chlorine

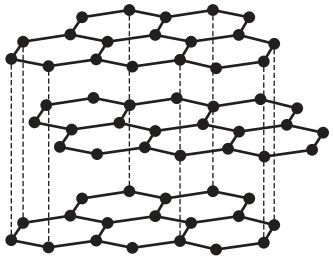
3 sodium chloride

4 ethanol

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

16 Which diagram shows the structure of graphite?

A



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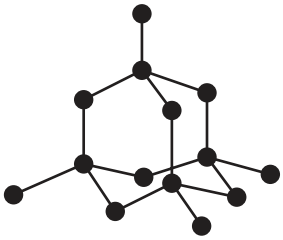

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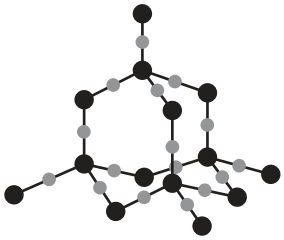

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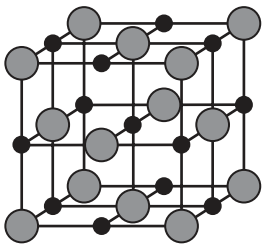


17 Which oxides of nitrogen have the same ratio of nitrogen atoms to oxygen atoms?

1 N_2O

2 NO

3 NO_2

4 N_2O_4

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

18 Hydrogen gas is given off when zinc reacts with dilute sulfuric acid.

Which piece of apparatus is used to collect the hydrogen gas and measure its volume?

A balance

B gas syringe

C pipette

D test-tube

19 The equation for the reaction between iron(III) oxide, Fe_2O_3, and carbon is shown.

$$2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$$

Which statement about this reaction is correct?

A C is oxidised.

B CO_2 is reduced.

C Fe is oxidised.

D Fe_2O_3 is oxidised.

20 The waste from a factory is acidic. The factory treats the waste with limestone.

Which row shows the pH of the waste before and after treatment?

	before	after
A	6	5
B	6	7
C	8	7
D	8	9

21 White solid X reacts with dilute hydrochloric acid. A gas is produced which turns limewater milky.

A flame test is done on solid X and produces a red coloured flame.

What is X?

A lithium carbonate

B lithium chloride

C potassium carbonate

D potassium chloride

22 Different minerals contain different elements.

Which mineral contains three non-metallic elements?

	mineral	formula
A	chalcopyrite	$CuFeS_2$
B	cryolite	$Na_3Al F_6$
C	gypsum	$CaSO_4 \cdot 2H_2O$
D	ilmenite	$FeTiO_3$

23 Manganese is a transition element.

What is a property of manganese?

A high melting point

B low density

C thermal insulator

D transparent

24 Which process is used to increase the hardness of a metal?

A Mix the metal with a gas.

B Mix the metal with another element.

C Mix the metal with a polymer.

D Mix the metal with its ore.

25 Which compound contains two of the three elements needed in a fertiliser used for plant growth?

A potassium carbonate

B potassium chloride

C potassium nitrate

D potassium sulfate

26 Which type of reaction is used to manufacture lime from limestone?

A addition polymerisation

B cracking

C neutralisation

D thermal decomposition

27 Poly(ethene) is made from ethene by addition polymerisation.

Which word describes ethene in this process?

A fuel

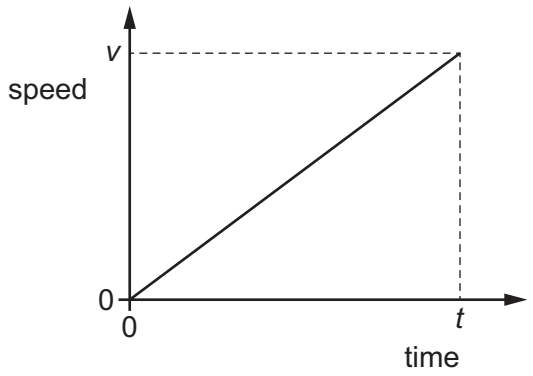
B catalyst

C monomer

D solvent

28 The graph shows how the speed of an object varies with time.

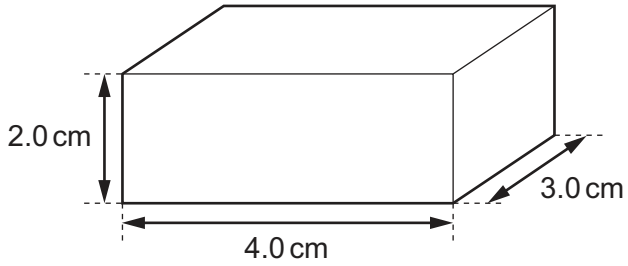
The speed of the object is v at time t.



Which expression gives the distance travelled by the object in time t?

A $\frac{1}{2}\left(\frac{v}{t}\right)$ **B** $\frac{v}{t}$ **C** $\frac{1}{2}vt$ **D** vt

29 The diagram shows a block of metal of mass 72 g.



What is the density of the metal?

A $3.0\,g/cm^3$ **B** $6.0\,g/cm^3$ **C** $9.0\,g/cm^3$ **D** $12\,g/cm^3$

30 Which statement about a resultant force is correct?

A An object must have a resultant force acting on it if it is moving.

B An object must have a resultant force acting on it if it is slowing down.

C Two forces must be in the same direction to produce a resultant force.

D Two forces must have the same magnitude to produce a resultant force.

31 What is the energy source for a wind turbine that is producing electricity?

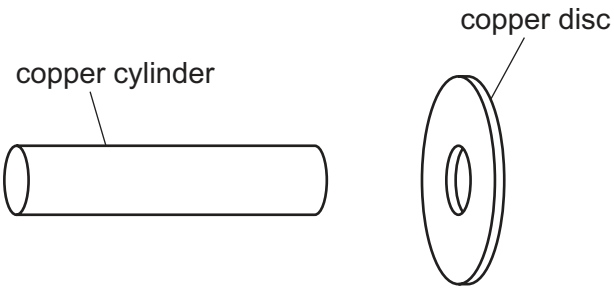
A chemical potential energy of wind

B gravitational potential energy of wind

C kinetic energy of wind

D thermal energy of wind

32 A copper disc has a hole at its centre that is slightly too small to fit over a copper cylinder.



How can the disc be fitted over the cylinder?

A Cool the disc and then fit it over the cylinder.

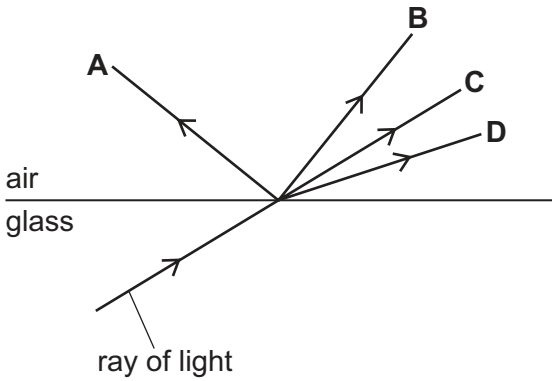
B Cool the disc, heat the cylinder and then fit the disc over the cylinder.

C Heat the cylinder and then fit it through the hole in the disc.

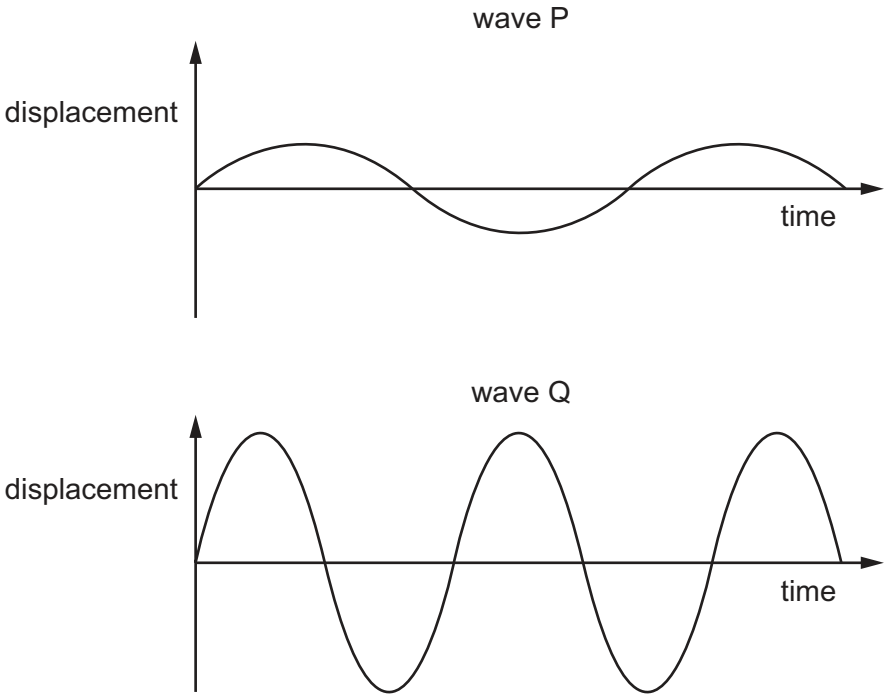
D Heat the disc and then fit it over the cylinder.

33 The diagram shows a ray of light travelling from glass into air.

Which labelled arrow shows the path of the light in the air?



34 The diagrams represent two different sound waves, P and Q, drawn to the same scale.



How do the loudness and the pitch of the sounds compare?

	louder sound	higher-pitched sound
A	P	P
B	P	Q
C	Q	P
D	Q	Q

35 When two different, uncharged, insulating materials are rubbed together, one becomes positively charged and the other becomes negatively charged.

What happens to cause the materials to become charged?

	positively charged material	negatively charged material
A	gains protons	gains electrons
B	gains protons	loses protons
C	loses electrons	gains electrons
D	loses electrons	loses protons

[Turn over

36 For which quantities is the unit the volt?

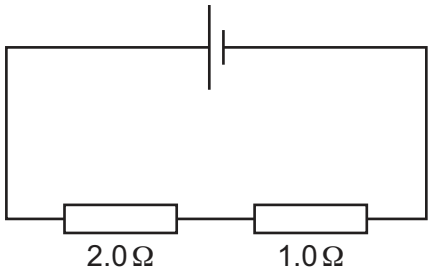
A current and potential difference (p.d.)

B electromotive force (e.m.f.) and potential difference (p.d.)

C electromotive force (e.m.f.) and resistance

D potential difference (p.d.) and resistance

37 A 2.0 Ω resistor and a 1.0 Ω resistor are connected in series with a cell.



Which statement about current in the circuit is correct?

A The current in the 2.0 Ω resistor is double the current in the 1.0 Ω resistor.

B The current in the 2.0 Ω resistor is equal to the current in the 1.0 Ω resistor.

C The current in the 2.0 Ω resistor is half the current in the 1.0 Ω resistor.

D The current in the cell is larger than the current in either resistor.

38 A coil lies between the poles of a magnet. There is a current in the coil and this causes a turning effect.

Which change does **not** increase the turning effect on the coil?

A changing the direction of the current

B increasing the current

C using a stronger magnet

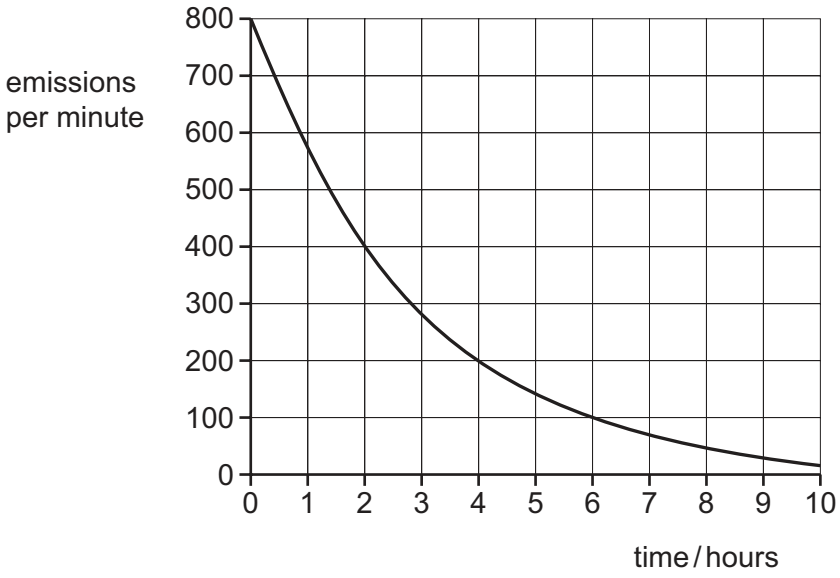
D using more turns in the coil

39 An atom of an isotope of strontium (Sr) has a proton number of 38 and contains 52 neutrons.

What is the nuclide notation for this isotope?

A $^{52}_{38}\mathrm{Sr}$ **B** $^{90}_{38}\mathrm{Sr}$ **C** $^{38}_{52}\mathrm{Sr}$ **D** $^{90}_{52}\mathrm{Sr}$

40 The graph shows the decay curve for a radioactive substance.



What is the half-life of this substance?

A 2.0 hours

B 3.2 hours

C 5.0 hours

D 10 hours

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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.).