



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

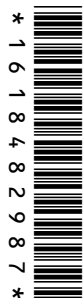
0653/23

Paper 2 Multiple Choice (Extended)

October/November 2018

45 minutes

Additional Materials: Multiple Choice Answer Sheet
 Soft clean eraser
 Soft pencil (type B or HB is recommended)



READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

DO NOT WRITE IN ANY BARCODES.

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 separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

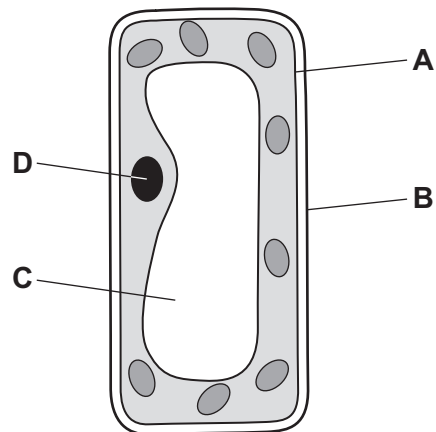
A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

This document consists of **16** printed pages.

1 The diagram shows a typical plant cell.

Which part of the cell contains the genetic information of the cell?



2 Which process depends on diffusion?

- A circulation
- B digestion
- C gaseous exchange
- D phagocytosis

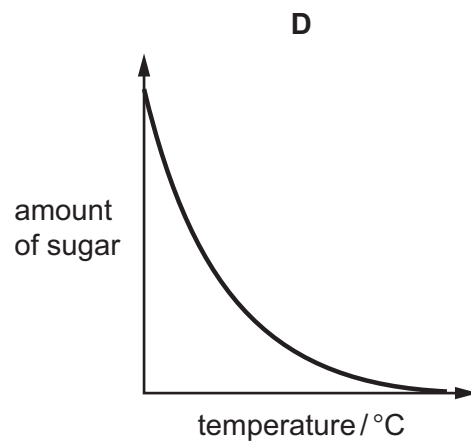
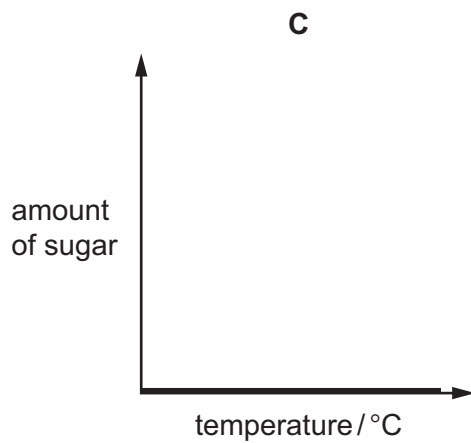
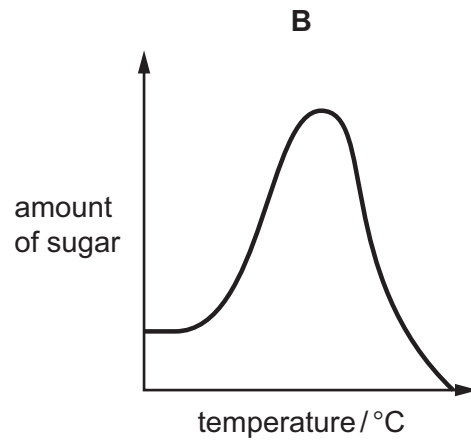
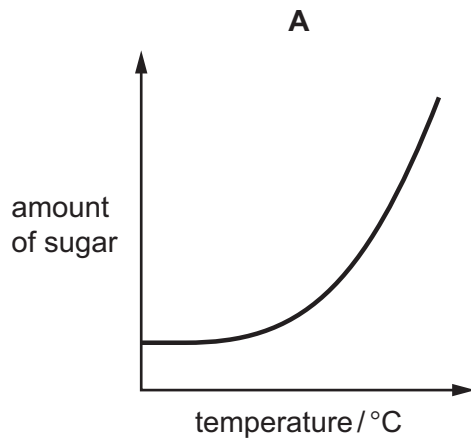
3

3 A human enzyme breaks down starch into simple sugars.

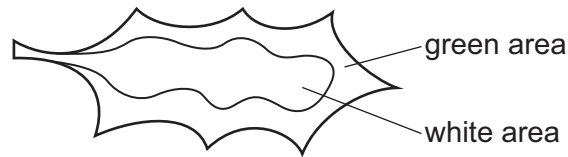
A solution of this human enzyme was heated to 90 °C for 30 minutes.

2 cm³ of this human enzyme solution was added to starch solution in several different test-tubes. The test-tubes were kept at different temperatures for 15 minutes.

Which graph shows the amount of sugar produced in the test-tubes?



- 4 The diagram shows a leaf that was tested for starch using iodine solution.



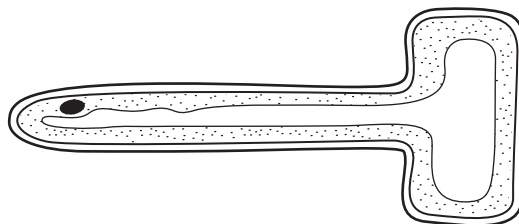
Which row shows the results for this leaf and explains the results?

	green area of leaf after test	white area of leaf after test	explanation
A	blue-black	blue-black	chlorophyll is found in all parts of the leaf
B	blue-black	brown	chlorophyll is found in only part of the leaf
C	brown	brown	chlorophyll is found in all parts of the leaf
D	brown	blue-black	chlorophyll is found in only part of the leaf

- 5 A doctor advises a man to change his diet and reduce his intake of saturated fat and salt.

Which condition is the man most likely to be suffering from?

- A** constipation
 - B** coronary heart disease
 - C** dental decay
 - D** starvation
- 6 The diagram shows a cross-section of a root hair cell.

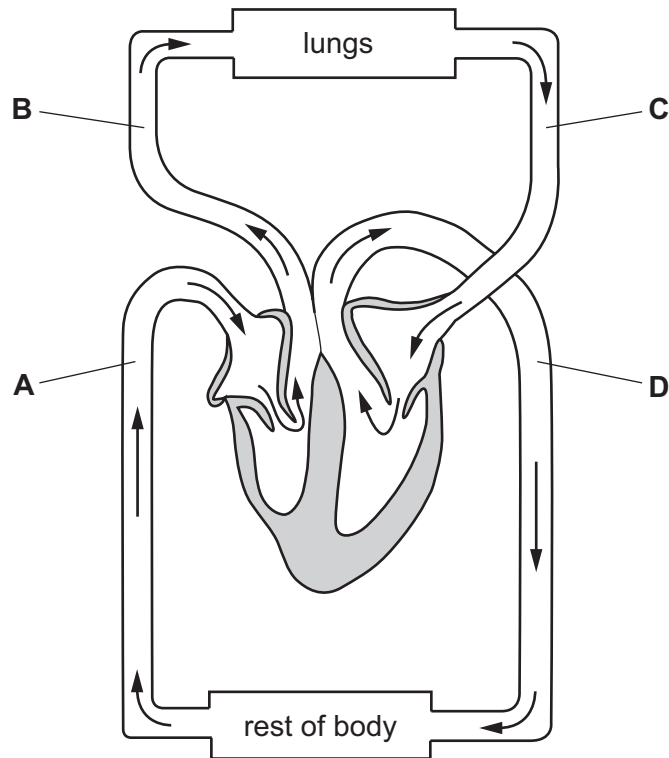


Which row describes the root hair cell and its function?

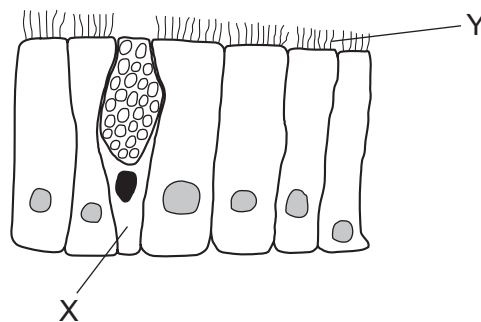
	animal cell or plant cell	function
A	animal cell	water and glucose uptake
B	animal cell	water and ion uptake
C	plant cell	water and glucose uptake
D	plant cell	water and ion uptake

5

7 Which blood vessel contains blood at the highest pressure?



8 The diagram shows two different types of cell which line the trachea in the gas exchange system.



What is the role of X and Y?

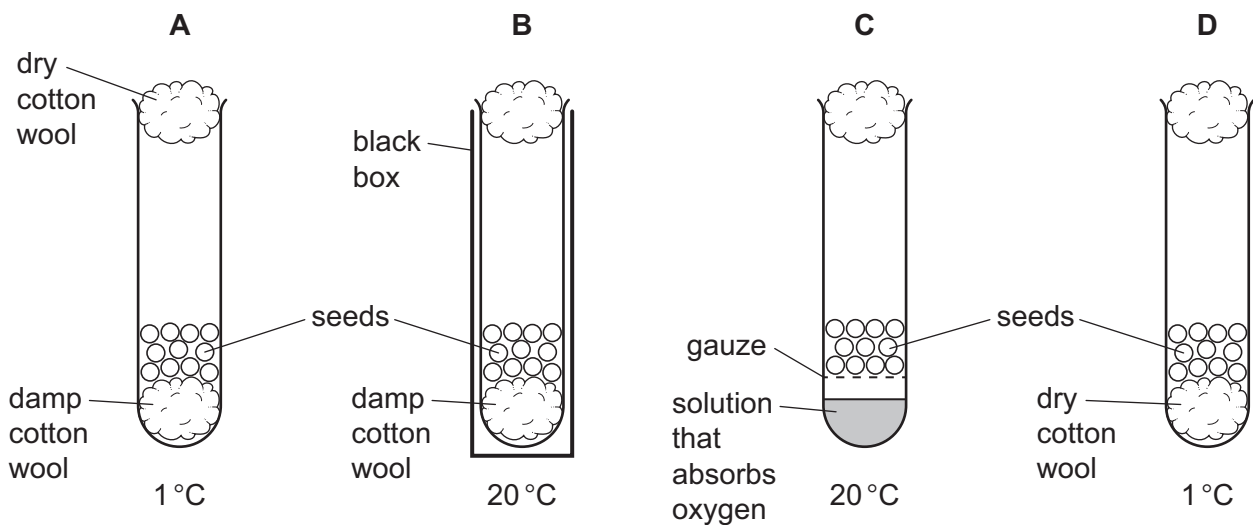
	X	Y
A	produces mucus	traps pathogens
B	produces mucus	moves pathogens towards the mouth
C	moves pathogens towards the mouth	traps pathogens
D	moves pathogens towards the mouth	moves pathogens towards the mouth

9 Which statement about adrenaline is **not** correct?

- A It decreases blood glucose concentration.
- B It is carried by the blood.
- C It is produced by a gland.
- D The heart is one of its target organs.

10 In an investigation, four test-tubes containing seeds were set up as shown in the diagram.

After several days, which test-tube will contain the most germinated seeds?



11 During pregnancy in humans, gas exchange occurs between a mother and her fetus.

Where does this gas exchange occur?

- A amniotic fluid
- B amniotic sac
- C placenta
- D umbilical cord

12 What is the definition of a trophic level?

- A It shows how an organism loses energy.
- B It shows the position of an organism in a food chain.
- C It shows the consumers of an organism.
- D It shows the food eaten by an organism.

13 Which are possible harmful effects of deforestation?

	global warming	species extinction
A	✓	✓
B	✓	x
C	x	✓
D	x	x

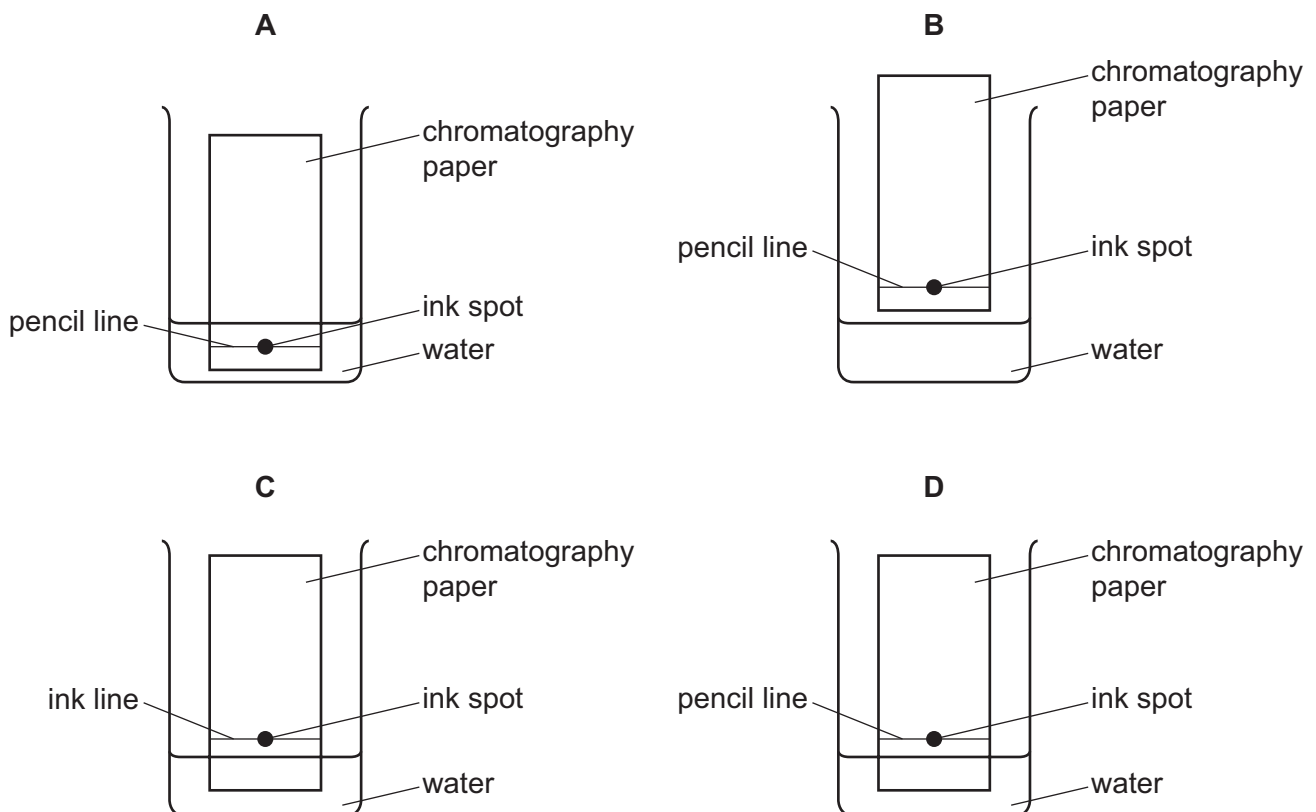
14 Sucrose is a covalent compound.

It is a solid at room temperature.

Which statement about sucrose is correct?

- A** It is made of atoms that are close together and in continuous random motion.
- B** It is made of atoms that are far apart and vibrating about a fixed point.
- C** It is made of molecules that are close together and vibrating about a fixed point.
- D** It is made of molecules that are far apart and in continuous random motion.

15 Which diagram shows how apparatus is used to separate the different colours in an ink?



- 16 Which is the electronic structure of a noble gas?
- A 2,6 B 2,8 C 2,8,1 D 2,8,7
- 17 What is the formula of nitric acid?
- A HCl B HNO₃ C NaOH D NH₃
- 18 During the electrolysis of molten potassium chloride, which particles in the electrolyte move towards the cathode?
- A electrons
B chloride ions
C chlorine molecules
D potassium ions
- 19 The temperature of some water is recorded.
- Sodium chloride is dissolved in the water and the temperature of the solution is recorded.
- temperature of water = 20 °C
temperature of solution = 18 °C
- Which statement about the process is correct?
- A It is endothermic because chemical energy is changed into heat energy.
B It is endothermic because heat energy is changed into chemical energy.
C It is exothermic because chemical energy is changed into heat energy.
D It is exothermic because heat energy is changed into chemical energy.
- 20 Substance X increases the rate of a chemical reaction, but it remains unchanged at the end of the reaction.
- Which word describes substance X?
- A catalyst
B electrolyte
C product
D unreactive

21 Iron oxide reacts with carbon monoxide.

The word equation for the reaction is:



Which statement is **not** correct?

- A Carbon is neither oxidised nor reduced.
- B Carbon is oxidised.
- C Iron is reduced.
- D This is a redox reaction.

22 Rubidium is an element below potassium in Group I of the Periodic Table.

Which property of rubidium is **not** correct?

- A Rubidium is a soft metal.
- B Rubidium is less reactive than potassium.
- C Rubidium melts at a lower temperature than potassium.
- D Rubidium reacts with water forming hydrogen.

23 The positions of four elements are shown in the outline of the Periodic Table.

Which element has a high melting point and forms coloured compounds?

C	D							A										B

24 Which gas is used to fill weather balloons?

- A argon
- B carbon dioxide
- C helium
- D nitrogen

25 What is observed when magnesium ribbon is placed into aqueous copper sulfate?

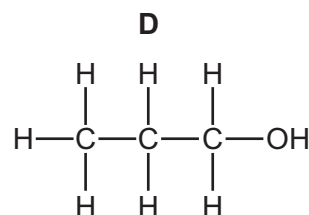
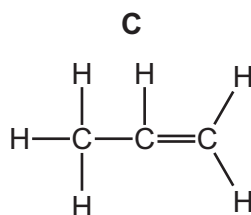
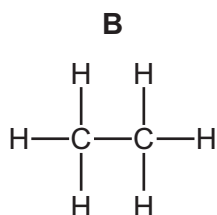
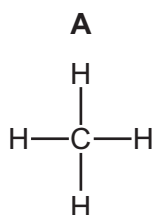
- A The blue solution gets darker and a brown solid appears.
- B The blue solution gets darker and no solid is visible.
- C The blue solution gets paler and a brown solid appears.
- D The blue solution gets paler and no solid is visible.

26 Gasoline is a hydrocarbon fuel obtained from petroleum.

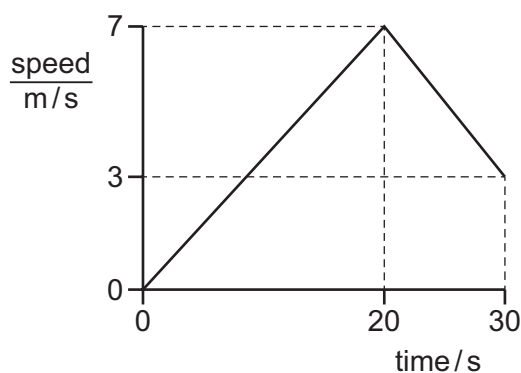
Which statement is correct?

- A Gasoline burns to form carbon dioxide and water.
- B Gasoline contains the elements carbon, hydrogen and oxygen.
- C Gasoline is used as a fuel in diesel engines.
- D The combustion of gasoline is an endothermic reaction.

27 Which substance rapidly decolourises bromine?



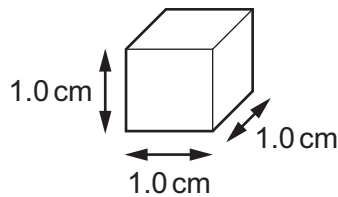
28 The graph shows the motion of a cyclist over a period of 30 s.



Which distance does she travel?

- A 90 m
- B 105 m
- C 115 m
- D 120 m

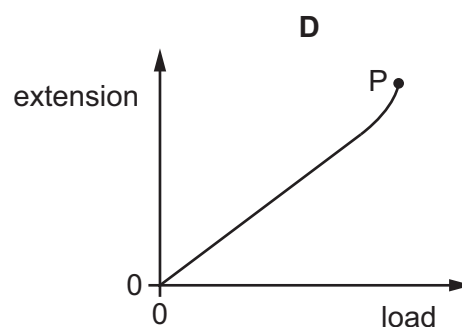
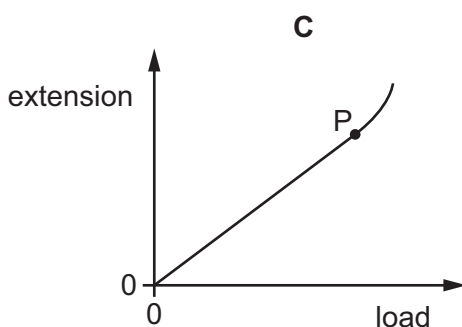
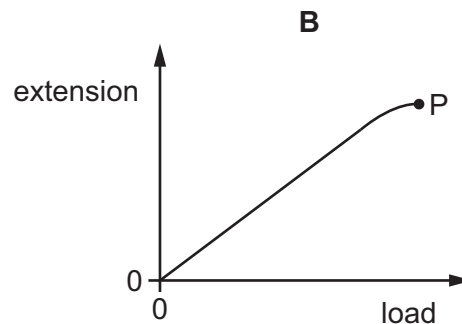
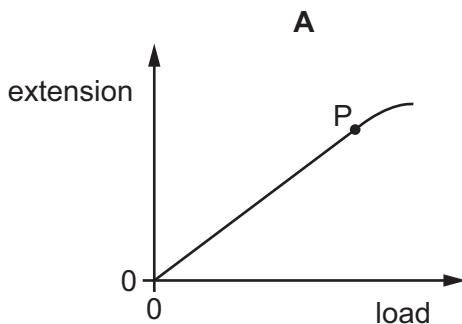
- 29 A cube of aluminium has sides of length 1.0 cm.



Compared with this cube, which statement about a cube of aluminium with sides of 2.0 cm is correct?

- A It has the same density.
 B It has the same mass.
 C It has twice the density.
 D It has twice the mass.
- 30 A stretching force is applied to a copper wire. The wire obeys Hooke's Law until it reaches the limit of proportionality.

Which is the extension-load graph for the wire and shows the limit of proportionality labelled P?



- 31** A brick of mass 4.0 kg rests on a window ledge. It falls off the window ledge and drops through a height of 5.0 m to the ground. The acceleration of free fall g is 10 m/s^2 .

Air resistance can be ignored.

Which row states the kinetic energy and the speed of the brick just before it hits the ground?

	kinetic energy of brick/J	<u>speed of brick</u> m/s
A	20	2.2
B	20	3.2
C	200	7.1
D	200	10

- 32** A liquid evaporates when molecules leave its surface.

Which molecules leave the surface, and what happens to the temperature of the remaining liquid?

- A** The more energetic molecules leave and the temperature falls.
 - B** The more energetic molecules leave and the temperature rises.
 - C** The less energetic molecules leave and the temperature falls.
 - D** The less energetic molecules leave and the temperature rises.
- 33** Convection is a process by which thermal energy is transferred from one place to another.

Where can convection take place?

- A** in a gas and in a vacuum
- B** in a liquid and in a gas
- C** in a liquid and in a solid
- D** in a solid and in a vacuum

- 34 A musical instrument produces a note of frequency 170 Hz. The sound wave produced travels through the air at a speed of 340 m/s.

Which row describes the sound wave?

	nature of wave	wavelength / m
A	longitudinal	0.50
B	longitudinal	2.0
C	transverse	0.50
D	transverse	2.0

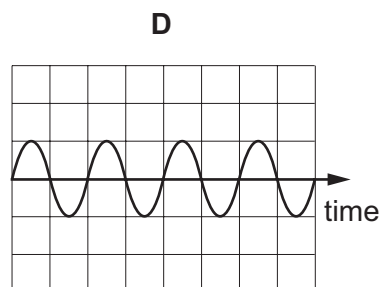
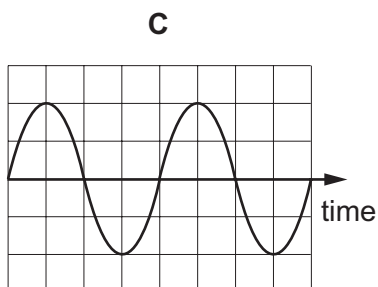
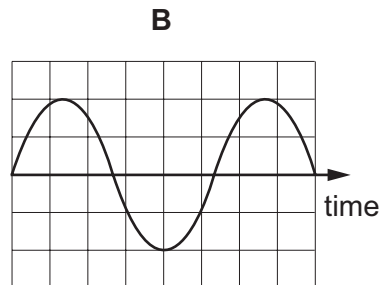
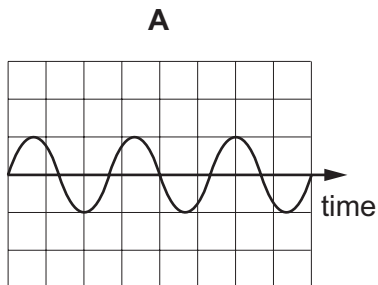
- 35 A girl stands in front of a plane mirror and observes her image. She walks 2.0 m towards the mirror.

What is the change in the distance between the girl and her image?

- A** 0 m **B** 1.0 m **C** 2.0 m **D** 4.0 m

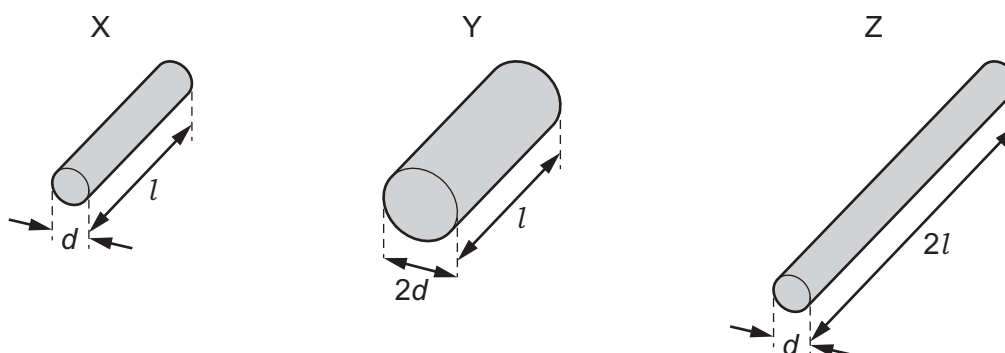
- 36 The diagrams represent four different sound waves. The scales are the same in all the diagrams.

Which sound has the lowest pitch?



37 Three pieces of resistance wire X, Y and Z are made of the same metal.

The diagram shows the lengths and the diameters of the wires.



What is the order of the wires when they are placed in order of increasing resistance, least resistance first?

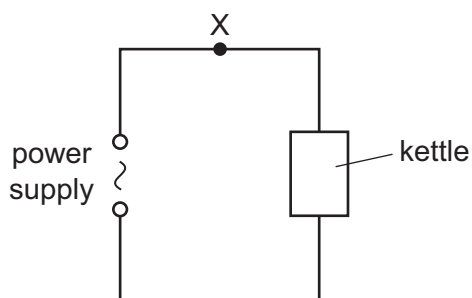
- A** $Y \rightarrow X \rightarrow Z$ **B** $Y \rightarrow Z \rightarrow X$ **C** $Z \rightarrow X \rightarrow Y$ **D** $Z \rightarrow Y \rightarrow X$

38 A lamp has a potential difference V across it that causes a current I in it.

Which equation gives the power P produced by the lamp?

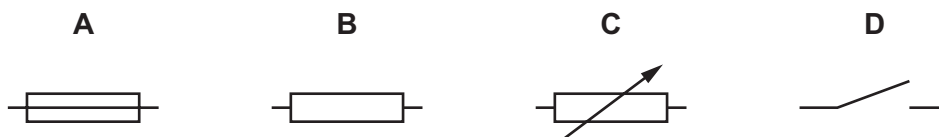
- A** $P = \frac{I}{V}$ **B** $P = \frac{V}{I}$ **C** $P = IV$ **D** $P = I + V$

39 A kettle is connected to a power supply as shown.

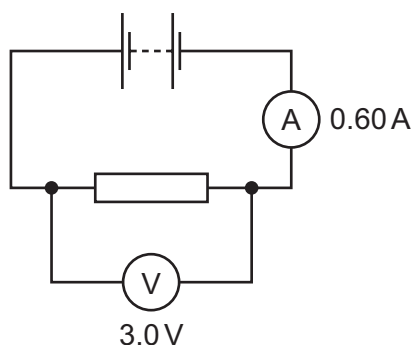


If too much current flows, a component connected at X automatically disconnects the power supply.

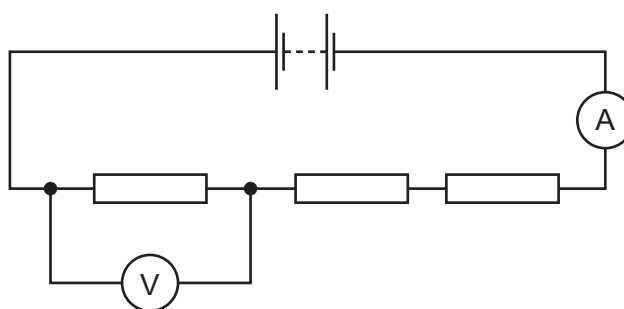
Which symbol represents the component at X?



- 40 A student sets up the circuit shown in the diagram. The ammeter reads 0.60 A and the voltmeter reads 3.0 V.



The student now takes two resistors that are identical to the original resistor. She connects them in series with the original resistor.



What are the new readings on the ammeter and the voltmeter?

	ammeter / A	voltmeter / V
A	0.20	1.0
B	0.20	3.0
C	0.60	1.0
D	0.60	3.0

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The Periodic Table of Elements

		Group															
I	II							III	IV	V	VI	VII	VIII				
3 Li lithium 7	4 Be beryllium 9	Key atomic number atomic symbol name relative atomic mass						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							1 H hydrogen 1	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 —	114 Fl flerovium —	116 Lv livermorium —	—	—	—	—

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 dm³ at room temperature and pressure (r.t.p.).