



COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice

October/November 2014

45 minutes

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

* 5 5 1 6 2 3 3 9 5 3 *

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 20.

Electronic calculators may be used.

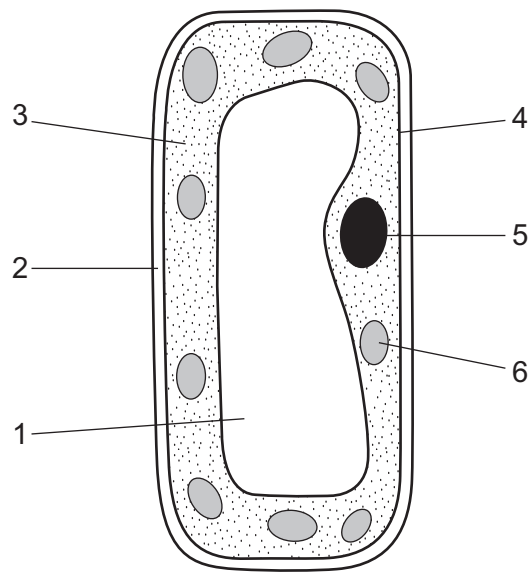
This document consists of **18** printed pages and **2** blank pages.

1 A car enters a garage, is filled with fuel and is driven away.

Which characteristic of living organisms is **not** matched by the car in this situation?

- A excretion
- B growth
- C movement
- D respiration

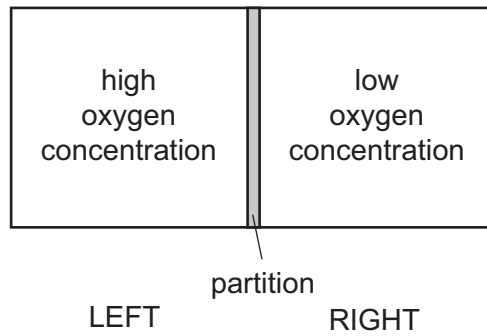
2 The diagram shows a cell from the leaf of a plant.



Which parts are found in animal cells?

- A 1, 2 and 3
- B 2, 3 and 4
- C 3, 4 and 5
- D 4, 5 and 6

- 3 Two samples of air are placed in a sealed container, as shown.

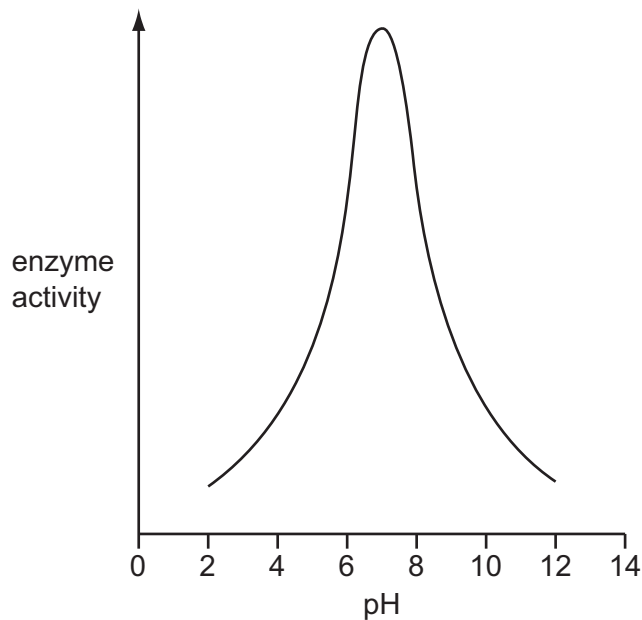


The partition is removed.

What will be the situation in the container one hour later?

- A All the oxygen molecules have stopped moving.
 - B Oxygen molecules are moving in all directions.
 - C There will be a higher concentration of oxygen on the left than on the right.
 - D There will be a higher concentration of oxygen on the right than on the left.
- 4 An experiment is carried out to investigate the effect of pH on the activity of an enzyme.

The graph shows the results.



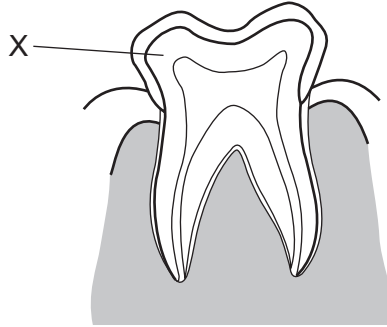
At which pH is this enzyme most active?

- A 2
- B 5
- C 7
- D 12

5 In leaves, which type of cells surround stomata?

- A guard cells
- B palisade cells
- C phloem
- D xylem

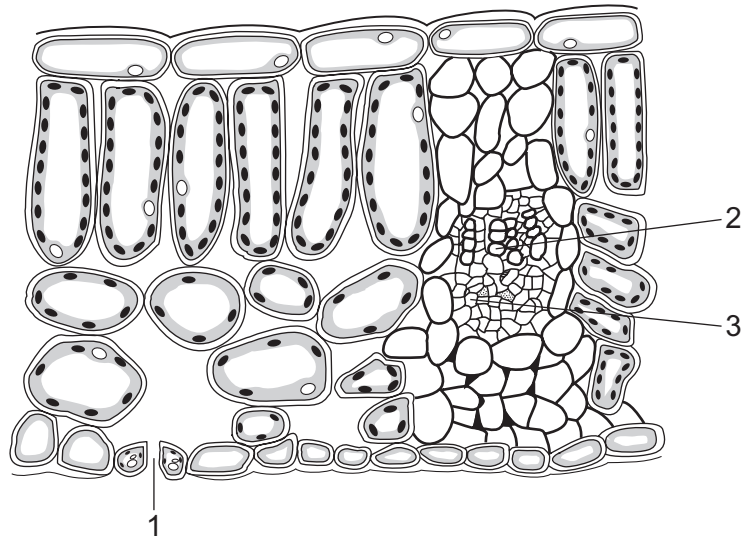
6 The diagram shows a section through a tooth.



What is part X?

- A cement
- B dentine
- C enamel
- D pulp

7 The diagram shows a section through a leaf.

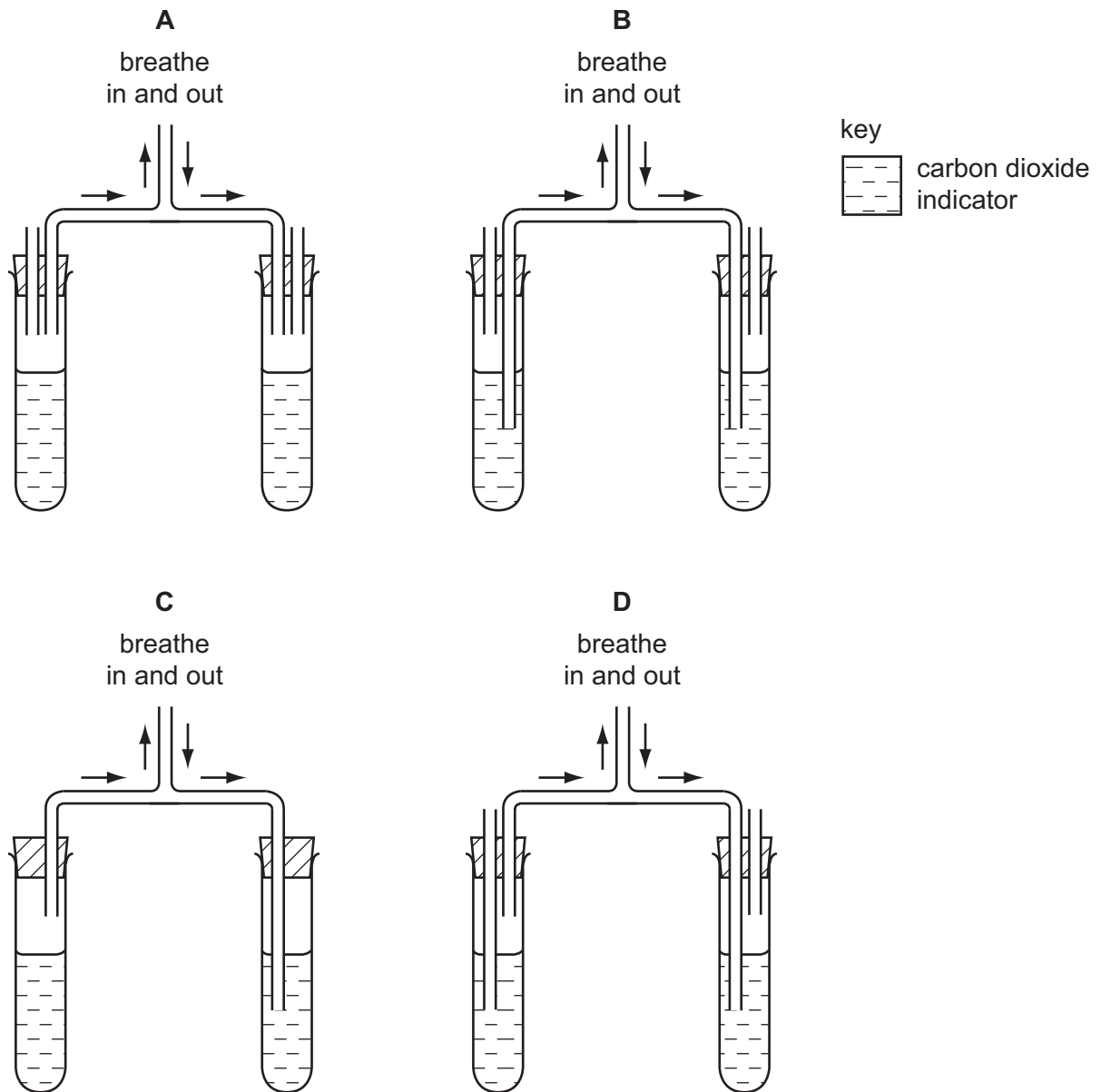


Which part brings water to the leaf and through which part does water leave?

	brings water	water leaves
A	1	2
B	1	3
C	2	1
D	3	1

- 8 Four students assembled apparatus intended to show that air breathed out contains more carbon dioxide than air breathed in.

Which apparatus is assembled correctly?



- 9 What are the reactants in aerobic respiration?

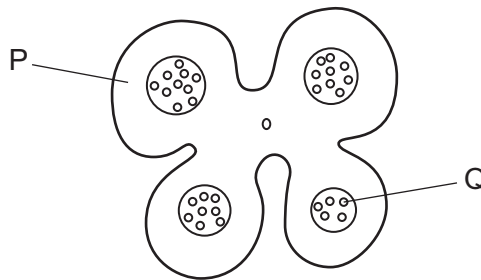
- A** carbon dioxide and oxygen
B carbon dioxide and water
C glucose and oxygen
D glucose and water

10 Insulin is a hormone that is secreted into the blood to control blood sugar.

What happens to insulin after it has done its work?

- A It builds up in the blood.
- B It is absorbed by the sugar.
- C It is destroyed by the pancreas.
- D It is removed by the liver.

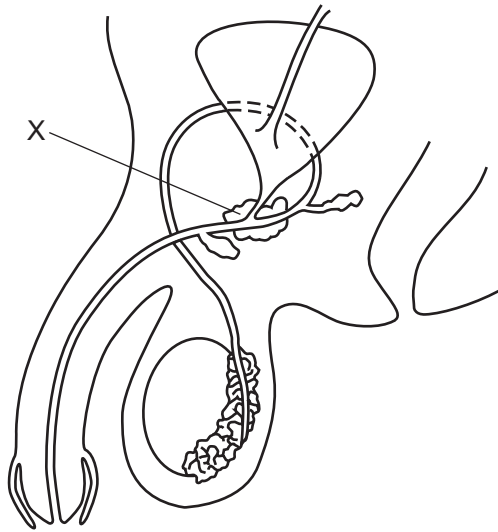
11 The diagram shows a cross-section through part of a stamen of a plant.



Which row identifies P and Q?

	P	Q
A	anther	egg
B	anther	pollen grain
C	stigma	egg
D	stigma	pollen grain

12 The diagram shows the male reproductive system.



What is the part labelled X?

- A prostate gland
- B sperm duct
- C testis
- D urethra

13 The diagram shows a food chain.

tree → caterpillar → bird

Which words describe the caterpillar?

- A carnivore and producer
- B consumer and carnivore
- C consumer and herbivore
- D producer and herbivore

14 Two liquids are separated by fractional distillation.

This is possible because the liquids differ in their

- A boiling points.
- B colour.
- C density.
- D solubility in water.

15 The formulae of two minerals are given below.

name of mineral	formula
andalusite	Al_2SiO_5
olivine	$\text{Fe}_2\text{Mg}_2\text{SiO}_4$

Which statement about the formulae of andalusite and olivine is correct?

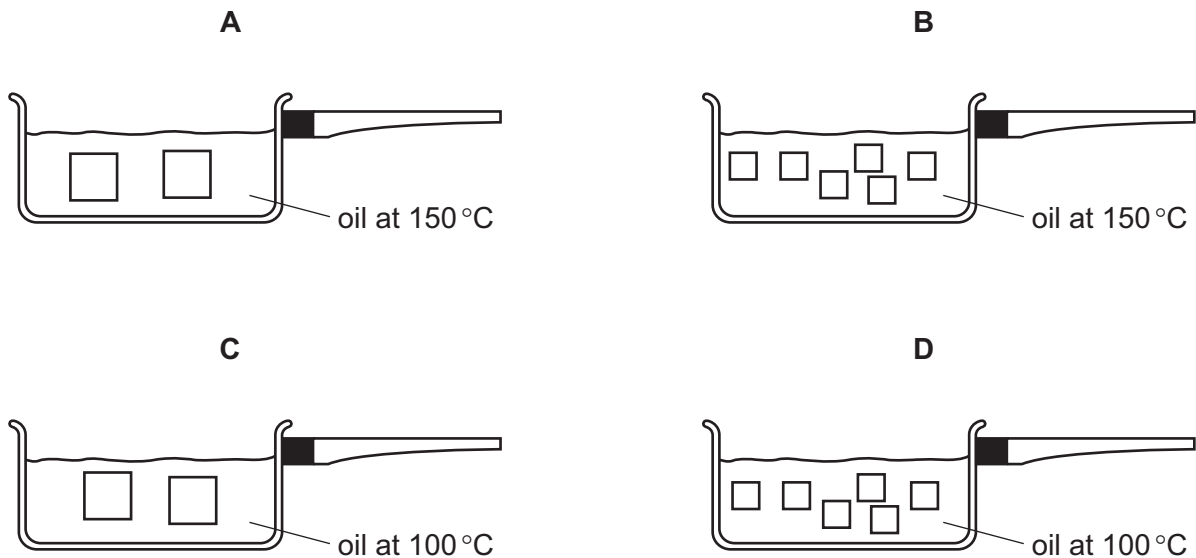
- A They contain the same metals.
- B They contain the same number of oxygen atoms.
- C They contain the same number of silicon atoms.
- D They contain the same total number of atoms.

16 Which word equation shows a thermal decomposition?

- A ammonia + nitric acid \rightarrow ammonium nitrate
- B hydrogen + oxygen \rightarrow water
- C magnesium carbonate \rightarrow magnesium oxide + carbon dioxide
- D potassium chloride + silver nitrate \rightarrow potassium nitrate + silver chloride

17 A sweet potato is cut into pieces and cooked.

In which pan does the potato cook most quickly?

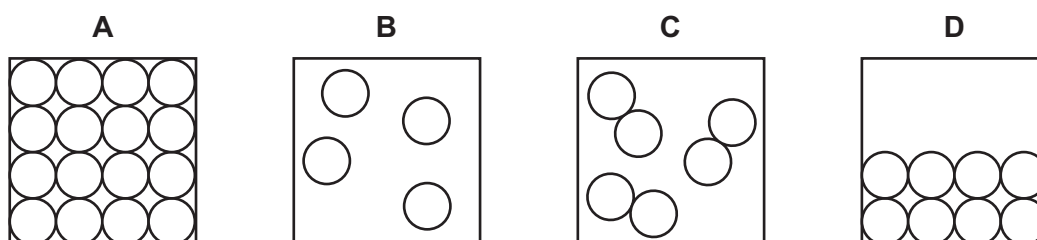


18 Element X forms a basic oxide.

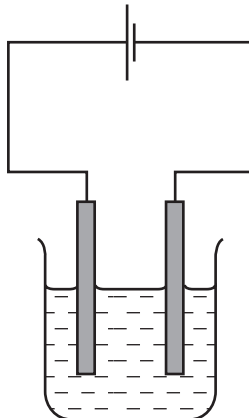
Which row describes element X and its position in the Periodic Table?

	type of element	position in the Periodic Table
A	metal	on the left
B	metal	on the right
C	non-metal	on the left
D	non-metal	on the right

19 Which diagram represents gaseous molecules?



20 A circuit is set up to pass a current through a solution.



What is added to the circuit to show that a current flows?

- A** an anode
- B** a battery
- C** a cathode
- D** a lamp

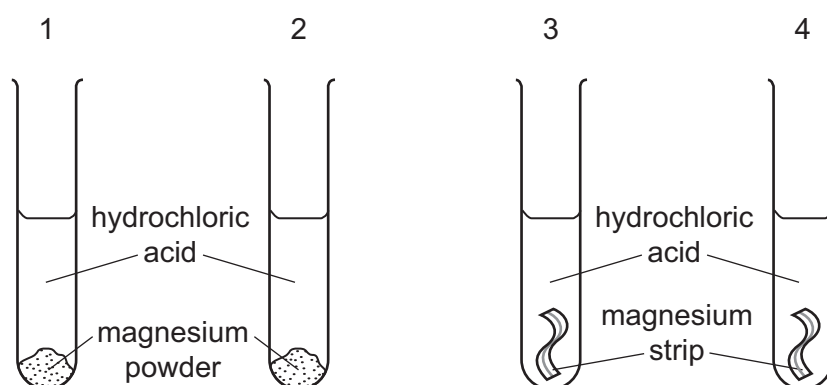
21 The initial and final temperatures of two chemical reactions are shown.

reaction	initial temperature / °C	final temperature / °C
1	19	23
2	20	16

Which statement is correct?

- A Both reactions are endothermic.
- B Both reactions are exothermic.
- C Reaction 1 is endothermic and reaction 2 is exothermic.
- D Reaction 1 is exothermic and reaction 2 is endothermic.

22 Magnesium is added to four separate test-tubes containing hydrochloric acid as shown. The mass of magnesium and volume of hydrochloric acid are the same in each test-tube.



test-tube	1	2	3	4
magnesium	powder	powder	strip	strip
hydrochloric acid	dilute	concentrated	concentrated	dilute
temperature	30 °C	50 °C	50 °C	30 °C

Which experiment is the fastest and which experiment is the slowest?

	fastest	slowest
A	1	2
B	1	4
C	2	3
D	2	4

23 Gasoline is a hydrocarbon fuel obtained from crude oil.

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 for diesel engines.
- D The combustion of gasoline is an endothermic reaction.

24 The noble gases make up Group 0 of the Periodic Table.

Which statement is correct?

- A Argon exists as non-bonded atoms.
- B Krypton is very poisonous.
- C Neon burns in pure oxygen with a red flame.
- D The chemical formula for helium is He_2 .

25 P, Q, R and S are four different elements.

P is a metal that floats on water.

Q is a non-metal and its oxide is coloured.

R is a dense metal.

S has a green colour and its boiling point is -35°C .

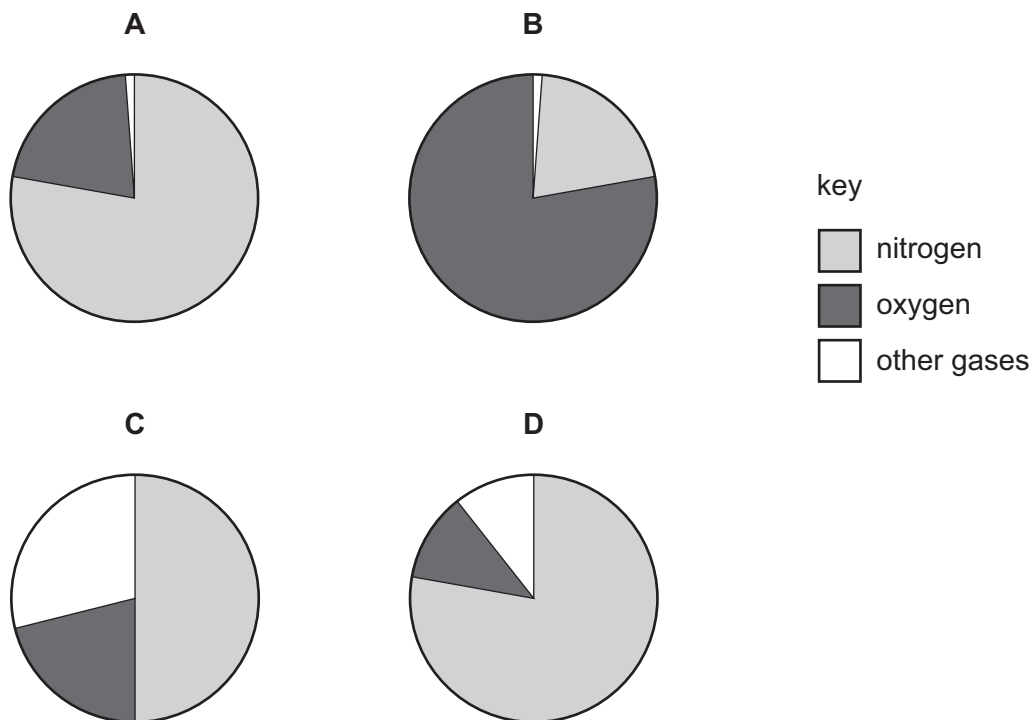
Which row describes the elements?

	transition element	non-transition element
A	P, R	Q, S
B	P, R, S	Q
C	Q, R	P, S
D	R	P, Q S

26 Which statement about alloys is correct?

- A They are made from metals because metals are poor electrical conductors.
- B They are mixtures of compounds that contain metals.
- C They have all the same properties as the metals from which they are made.
- D They have different properties to the metals from which they are made.

27 Which pie chart shows the composition of clean air?

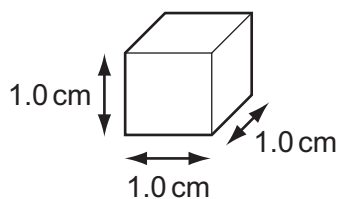


28 A vehicle takes 30 minutes to travel a distance of 60 km.

What is the average speed of the vehicle?

- A** 2.0 km/hour
- B** 30 km/hour
- C** 120 km/hour
- D** 1800 km/hour

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 Which energy resource can be used to obtain electricity without any moving parts?
- A hydroelectric
 - B solar cells
 - C tides
 - D wave
- 31 Which statement describes evaporation?
- A The most energetic molecules of a liquid escape from the surface into the air.
 - B The most energetic molecules of a liquid return to the liquid from the air.
 - C The least energetic molecules of a liquid escape from the surface into the air.
 - D The least energetic molecules of a liquid return to the liquid from the air.
- 32 A badly designed railway line changes shape when the temperature of the air around it changes by a large amount.



railway line before the temperature change



railway line after the temperature change

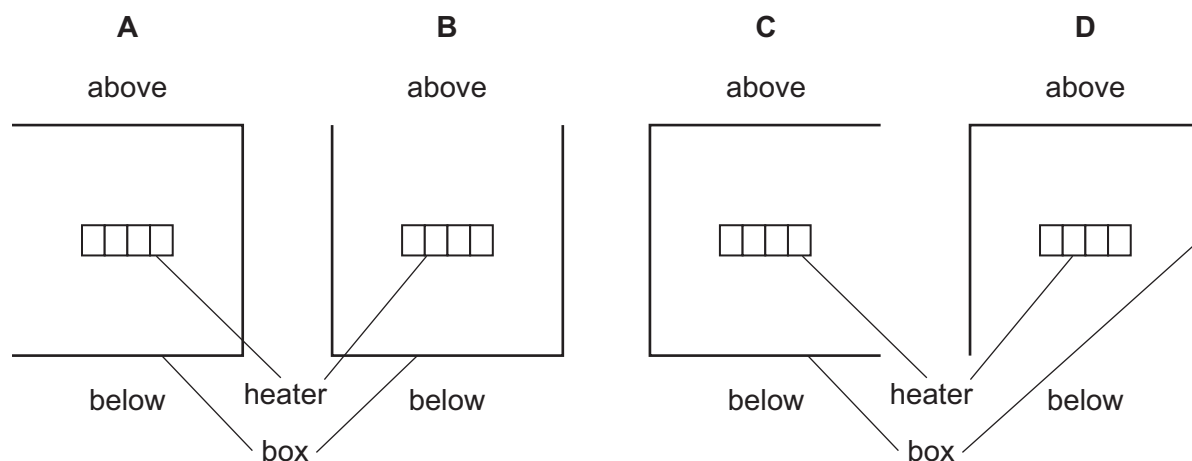
How has the temperature changed, and what change to the railway line has this caused?

	temperature change	change to railway line
A	decreased	contracted
B	decreased	expanded
C	increased	contracted
D	increased	expanded

- 33 An electric heater is placed inside a metal box which has one side open. The diagram shows four possible positions of the box.

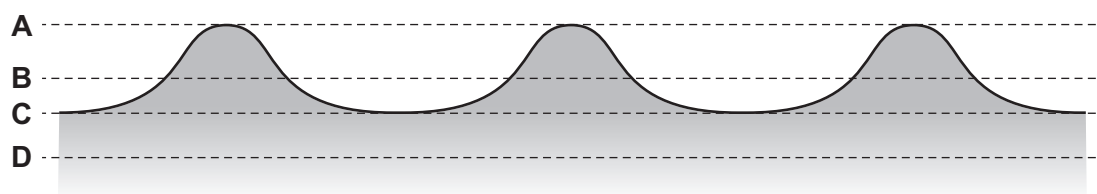
The heater is switched on for several minutes.

In which position does the box become the hottest?



- 34 The diagram shows a section through waves on water.

Which dotted line shows the position of the water surface before the wave reaches it?



- 35 A plane mirror is on a wall.

Which description of the image formed by the mirror is correct?

- A upright and smaller than the object
- B upright and the same size as the object
- C inverted and smaller than the object
- D inverted and the same size as the object

36 Electromagnetic waves are used to scan passengers' luggage before they board an aeroplane.

Electromagnetic waves are also used in a television remote controller.

Which type of electromagnetic wave is used for each of these purposes?

	scanning luggage	television remote controller
A	radio waves	infra-red waves
B	radio waves	ultraviolet waves
C	X-rays	infra-red waves
D	X-rays	ultraviolet waves

37 A woman hammers a post into the ground.

A boy starts a stop-watch when he sees the hammer hit the post. He stops the stop-watch when he hears the sound of the hammer hitting the post.

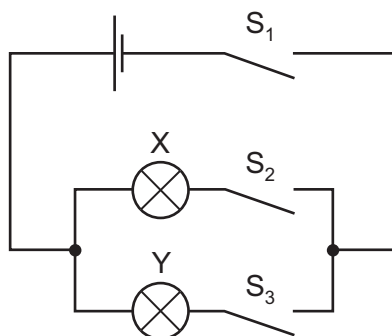
The stop-watch reading is 0.60 seconds.

The speed of sound in air is 330 m/s.

What is the distance between the boy and the post?

- A** 99 m **B** 198 m **C** 275 m **D** 550 m

38 The diagram shows an electric circuit.



Which switches should be closed so that lamp X is lit but lamp Y is not lit?

- A** S_1 , S_2 and S_3
B S_1 and S_2 only
C S_1 and S_3 only
D S_2 and S_3 only

39 Why is a fuse used in an electric circuit in a house?

- A to increase the resistance of the circuit
- B to keep the power used at a constant value
- C to prevent a short circuit from occurring
- D to stop the cables overheating

40 Diagram 1 shows two identical resistors R_1 and R_2 connected in series in a circuit.

In diagram 2, R_2 has been removed.

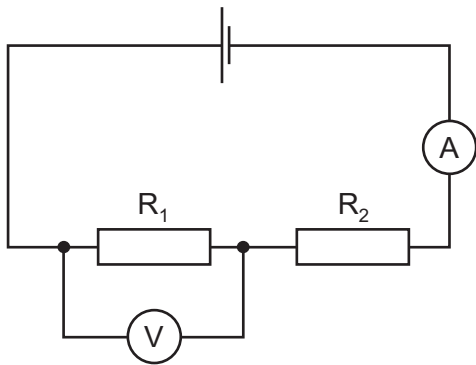


diagram 1

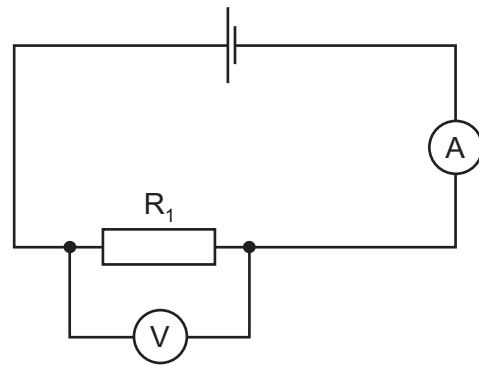


diagram 2

What has happened to the reading on the ammeter and what has happened to the reading on the voltmeter in diagram 2?

	ammeter	voltmeter
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

DATA SHEET
The Periodic Table of the Elements

		Group										
I	II	III	IV	V	VI	VII	0					0
		1 H Hydrogen 1										4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18					84 Kr Krypton 36
39 K Potassium 19	40 Ca Calcium 20	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36					131 Xe Xenon 54
85 Rb Rubidium 37	88 Sr Strontium 38	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54					209 Po Polonium 84
133 Cs Caesium 55	137 Ba Barium 56	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	209 Po Polonium 84	209 At Astatine 85	209 Rn Radon 86					209 Po Polonium 84
226 Ra Radium 88	227 Ac Actinium 89											227 Ac Actinium 89
*58-71 Lanthanoid series †90-103 Actinoid series												
140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	146 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	238 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

	a	X	a = relative atomic mass
Key	X	b	X = atomic symbol
			b = proton (atomic) number

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