

**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.

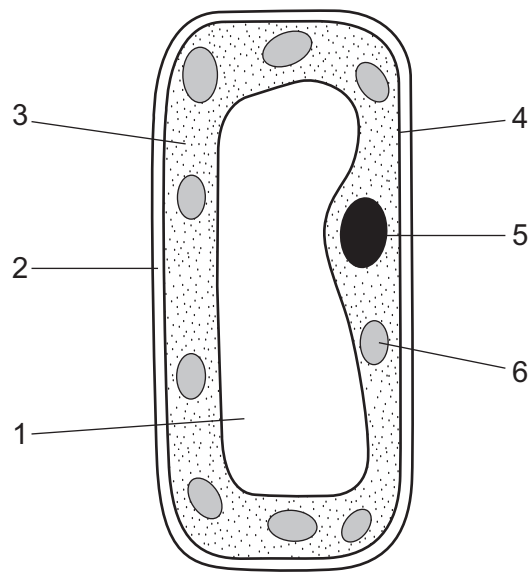
This document consists of **18** printed pages and **2** blank pages.

- 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

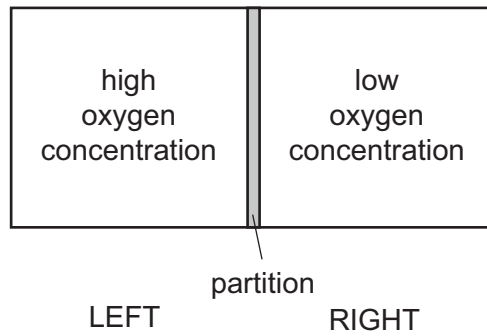
- 2 The diagram shows a cell from the leaf of a plant.



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.

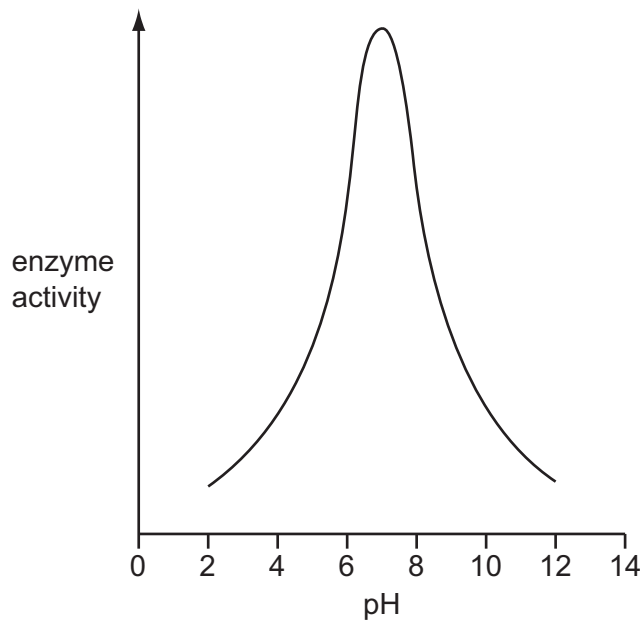


The partition is removed.

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.



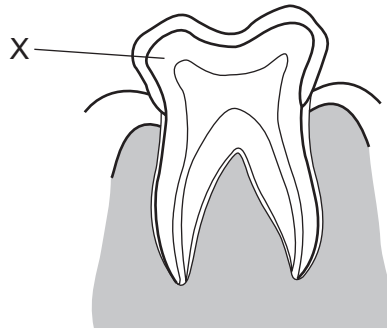
At which pH is this enzyme most active?

- 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

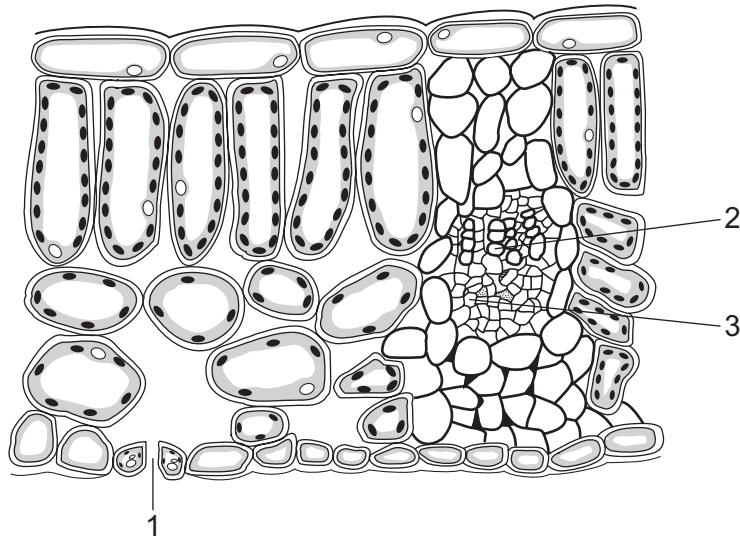
6 The diagram shows a section through a tooth.



What is part X?

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

7 The diagram shows a section through a leaf.

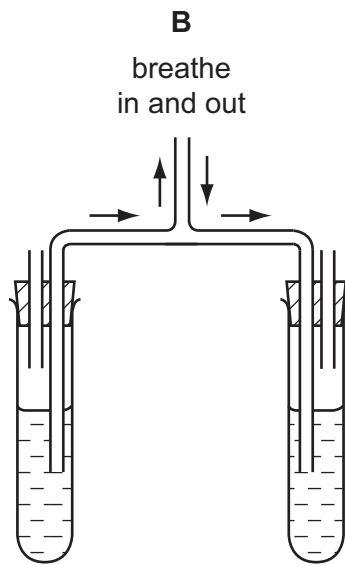
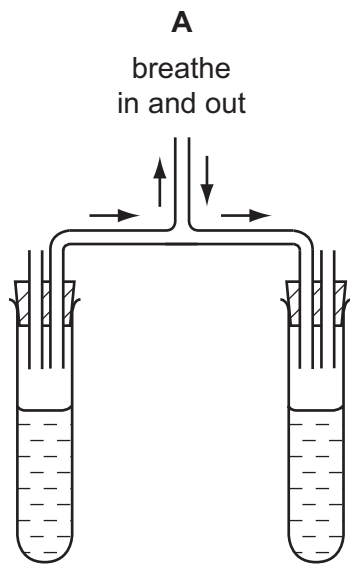


Which part brings water to the leaf and through which part does water leave?


	brings water	water leaves
<b>A</b>	1	2
<b>B</b>	1	3
<b>C</b>	2	1
<b>D</b>	3	1

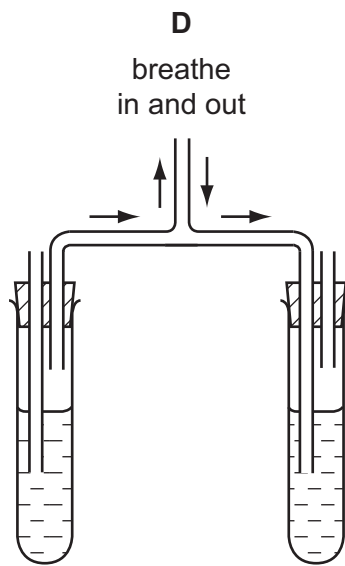
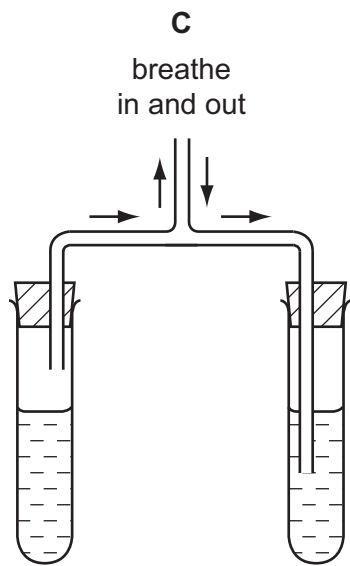
- 8 Four students assembled apparatus intended to show that air breathed out contains more carbon dioxide than air breathed in.

Which apparatus is assembled correctly?



key

 carbon dioxide indicator



- 9 What are the reactants in aerobic respiration?

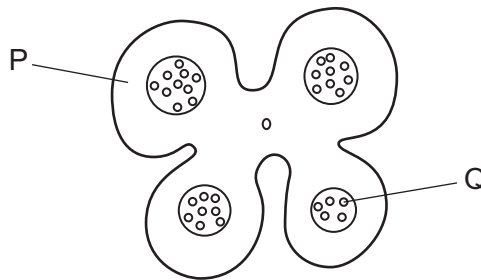
- A carbon dioxide and oxygen
- B carbon dioxide and water
- C glucose and oxygen
- D glucose and water

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.

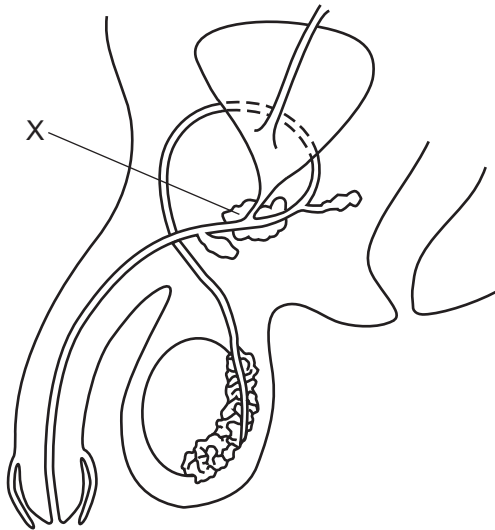
11 The diagram shows a cross-section through part of a stamen of a plant.



Which row identifies P and Q?

	P	Q
<b>A</b>	anther	egg
<b>B</b>	anther	pollen grain
<b>C</b>	stigma	egg
<b>D</b>	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	$\text{Al}_2\text{SiO}_5$
olivine	$\text{Fe}_2\text{Mg}_2\text{SiO}_4$

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

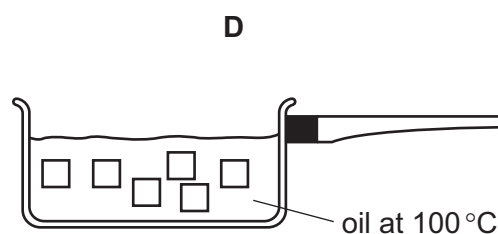
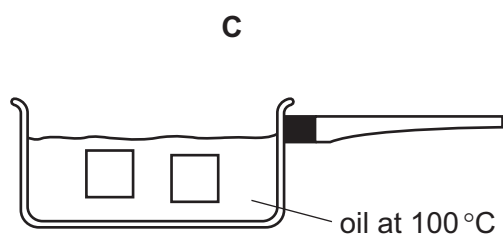
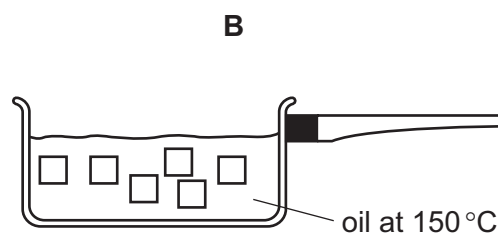
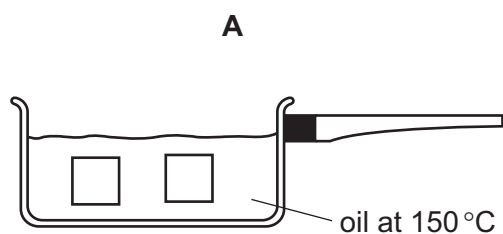
- A They contain the same metals.
- B They contain the same number of oxygen atoms.
- C They contain the same number of silicon atoms.
- D They contain the same total number of atoms.

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?

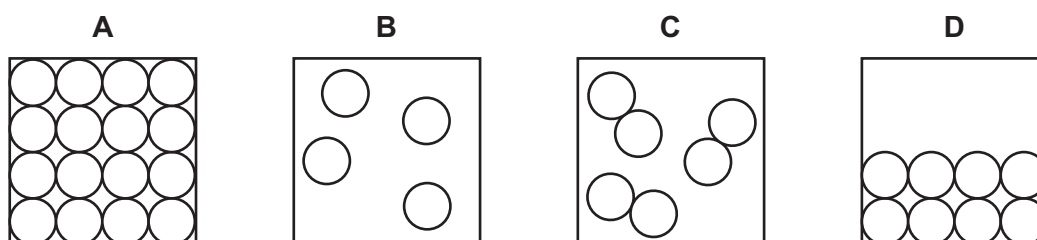


18 Element X forms a basic oxide.

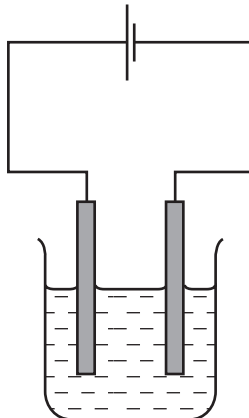
Which row describes element X and its position in the Periodic Table?

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

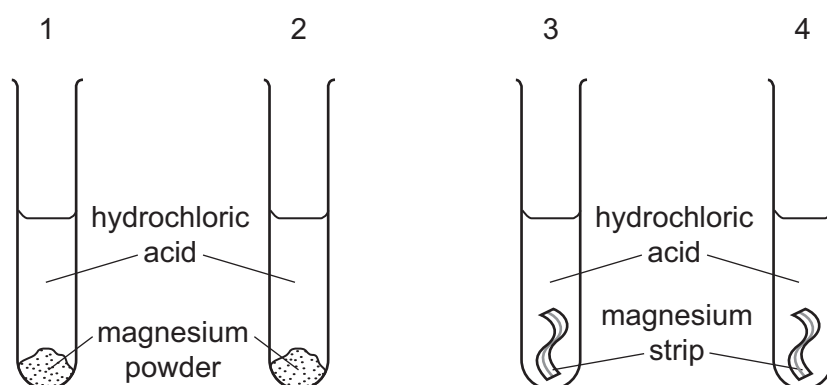
21 The initial and final temperatures of two chemical reactions are shown.

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  $\text{He}_2$ .

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  $-35^\circ\text{C}$ .

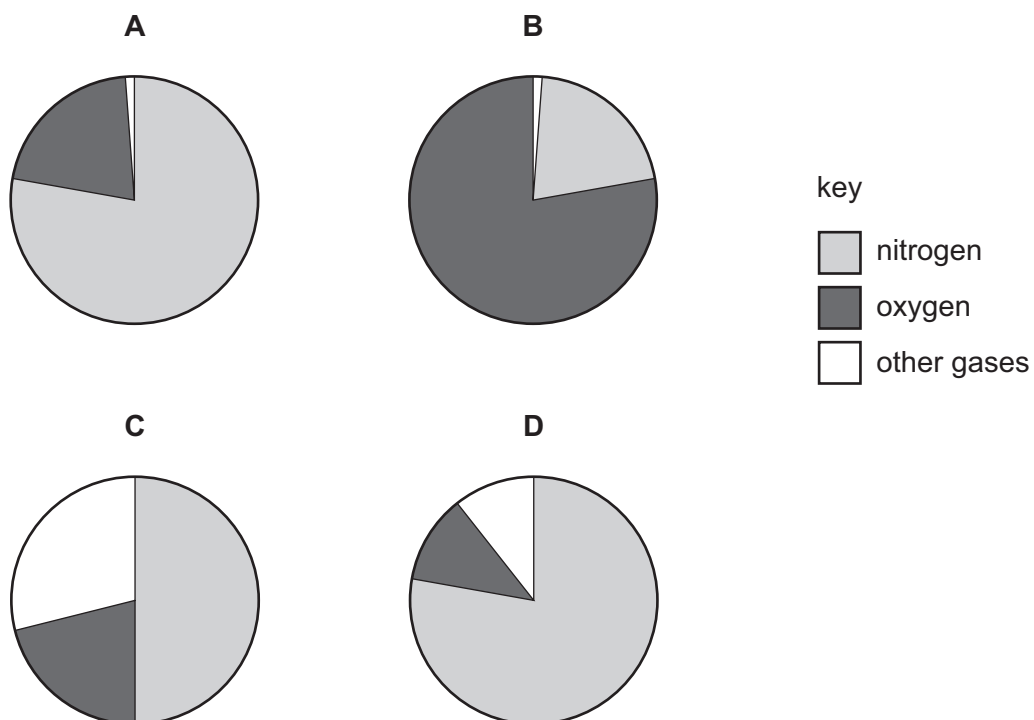
Which row describes the elements?

	transition element	non-transition element
<b>A</b>	P, R	Q, S
<b>B</b>	P, R, S	Q
<b>C</b>	Q, R	P, S
<b>D</b>	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?

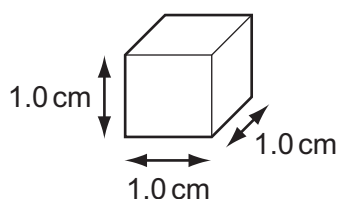


28 A vehicle takes 30 minutes to travel a distance of 60 km.

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

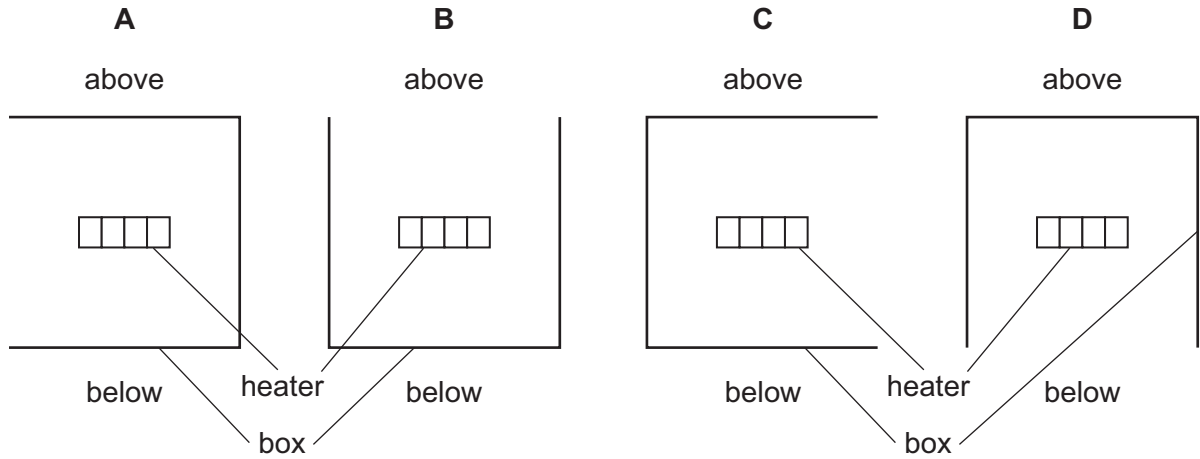
How has the temperature changed, and what change to the railway line has this caused?

	temperature change	change to railway line
<b>A</b>	decreased	contracted
<b>B</b>	decreased	expanded
<b>C</b>	increased	contracted
<b>D</b>	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.

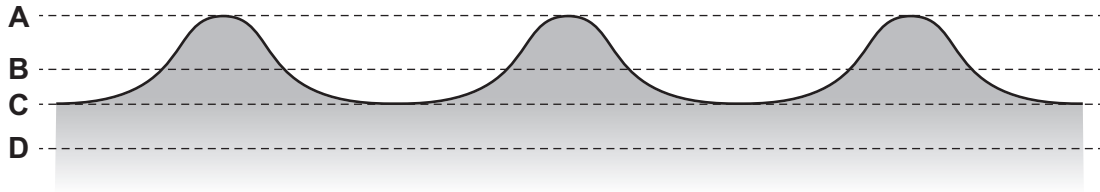
The heater is switched on for several minutes.

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 aircraft. 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
<b>A</b>	radio waves	infra-red waves
<b>B</b>	radio waves	ultraviolet waves
<b>C</b>	X-rays	infra-red waves
<b>D</b>	X-rays	ultraviolet waves

- 37 A woman hammers a post into the ground.

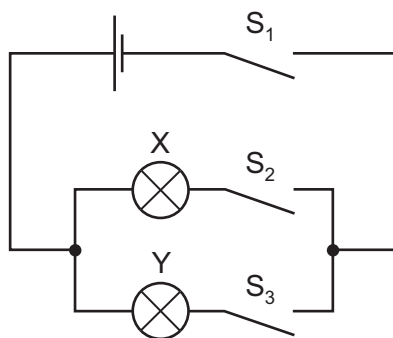
A boy starts a stop-watch when he sees the hammer hit the post. He stops the stop-watch when he hears the sound of the hammer hitting the post.

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.

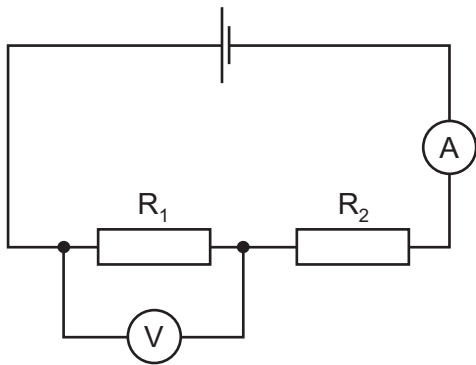


diagram 1

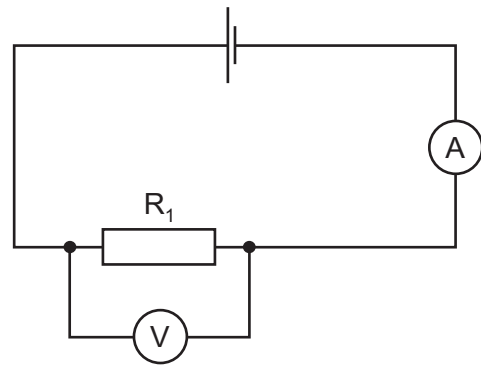


diagram 2

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

	ammeter	voltmeter
<b>A</b>	decreases	decreases
<b>B</b>	decreases	increases
<b>C</b>	increases	decreases
<b>D</b>	increases	increases





**DATA SHEET**  
**The Periodic Table of the Elements**

		Group																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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7	9	<b>Li</b> Lithium 3	<b>Be</b> Beryllium 4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
23	24	<b>Na</b> Sodium 11	<b>Mg</b> Magnesium 12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
39	40	<b>K</b> Potassium 19	<b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
85	88	<b>Rb</b> Rubidium 37	<b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	101 <b>Rh</b> Rhodium 45	103 <b>Rh</b> Rhodium 45	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
133	137	<b>Cs</b> Caesium 55	<b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	190 <b>Os</b> Osmium 76	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

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