Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/13**

Paper 1 Multiple Choice (Core) **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 20.
Electronic calculators may be used.

IB18 11_0653_13/2RP

1 What are characteristics of all living organisms?

A breathing, excretion, nutrition

B excretion, growth, nutrition

C reproduction, respiration, germination

D secretion, growth, sensitivity

2 Which process depends on diffusion?

A circulation

B digestion

C gaseous exchange

D phagocytosis

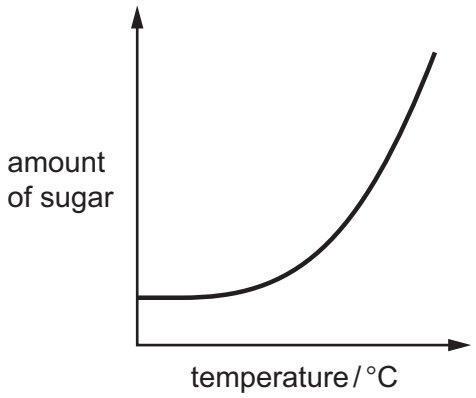
3 A human enzyme breaks down starch into simple sugars.

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

2 cm^3 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?

A



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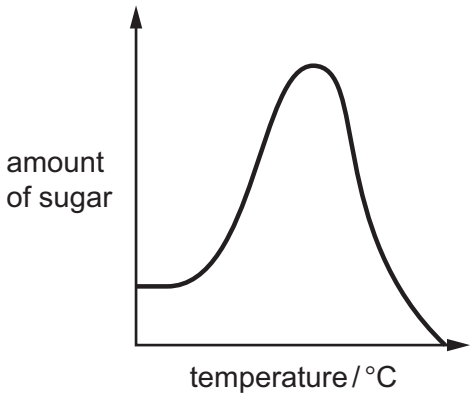

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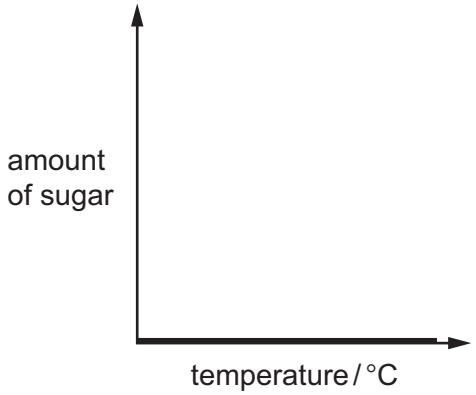
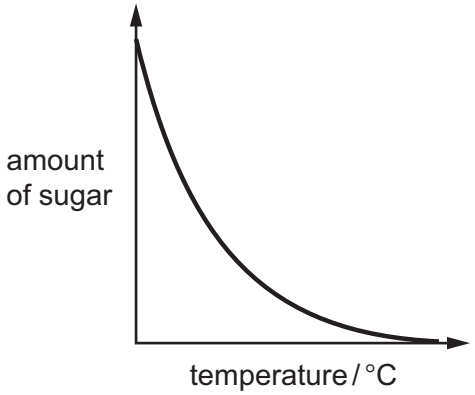


D



4 The table shows the results of three food tests carried out on the same food sample.

name of solution	colour change observed
Benedict's	blue to orange
biuret	remains blue
iodine	brown to black

Which nutrients are present in the food sample?

A protein, reducing sugar and starch

B protein and reducing sugar only

C reducing sugar and starch only

D starch only

5 Transpiration involves the diffusion of water vapour from which part of a leaf?

A chloroplast

B cuticle

C phloem

D stomata

6 Which component of the blood produces antibodies?

A plasma

B platelets

C red blood cells

D white blood cells

7 Which word equation represents aerobic respiration?

A carbon dioxide + water → glucose

B carbon dioxide + water → glucose + oxygen

C glucose + oxygen → carbon dioxide

D glucose + oxygen → carbon dioxide + water

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

A It decreases blood glucose concentration.

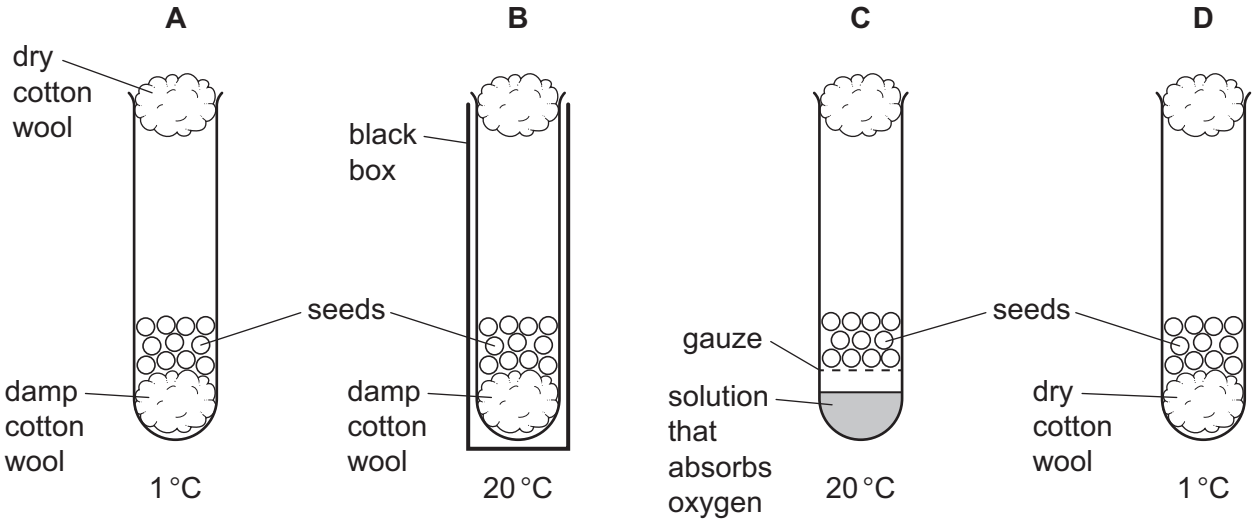
B It is carried by the blood.

C It is produced by a gland.

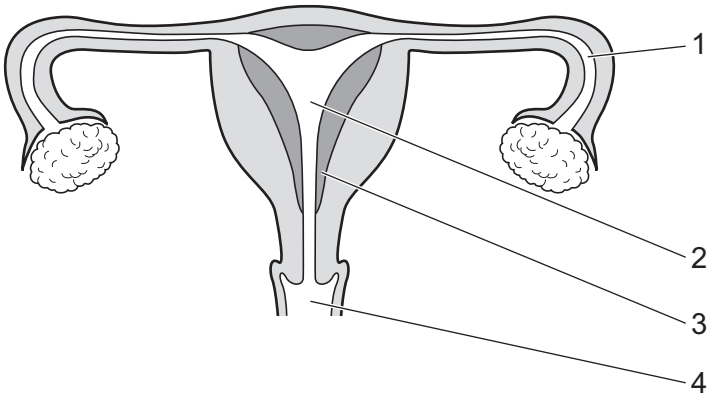
D The heart is one of its target organs.

9 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?



10 The diagram shows the reproductive system of a human female.



Which numbers give the places where the sperm are deposited, the egg is fertilised and implantation occurs?

	sperm deposited	egg fertilised	implantation occurs
A	3	1	2
B	3	2	3
C	4	1	3
D	4	2	2

11 Which shows a food chain?

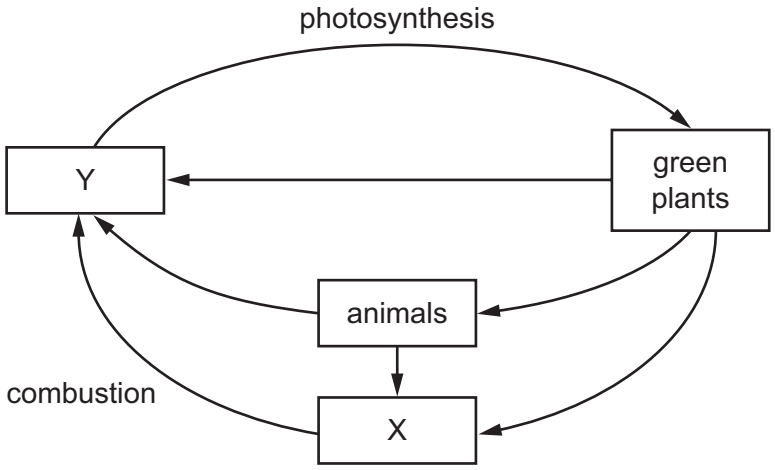
A herbivore → producer → Sun

B producer → consumer → consumer

C producer → consumer → herbivore

D Sun → producer → herbivore

12 The diagram shows part of the carbon cycle.



What are X and Y?

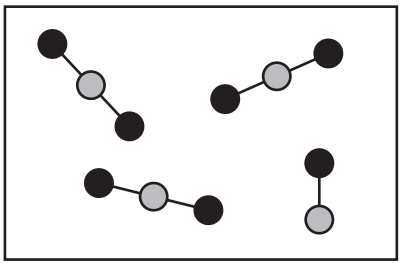
	X	Y
A	carbon dioxide	oxygen
B	fossil fuel	carbon dioxide
C	fossil fuel	oxygen
D	oxygen	carbon dioxide

13 Which are possible harmful effects of deforestation?

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

[Turn over

14 The diagram represents a mixture of carbon dioxide, CO_2, and carbon monoxide, CO.



Which statement is correct?

A The mixture contains 4 elements.

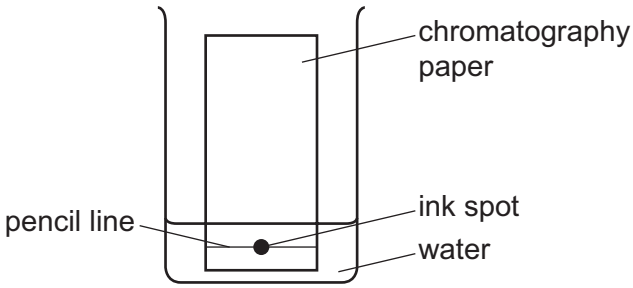
B The mixture contains 4 molecules.

C The mixture contains 11 elements.

D The mixture contains 11 molecules.

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

A



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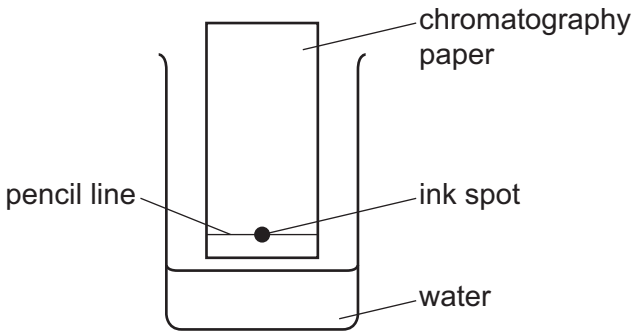

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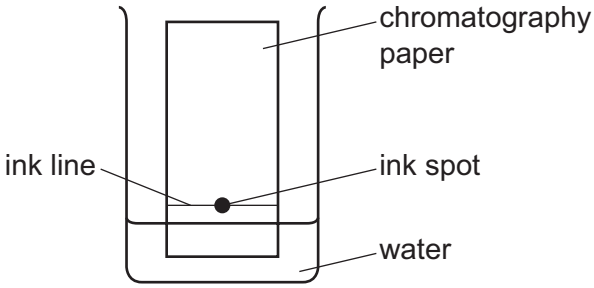
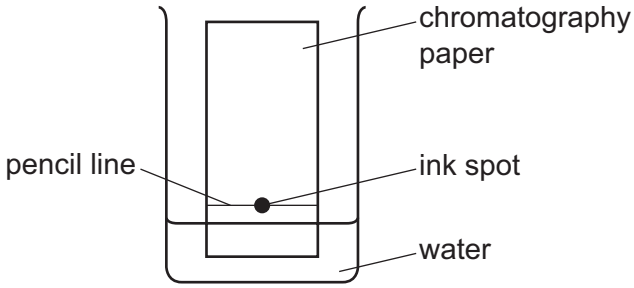
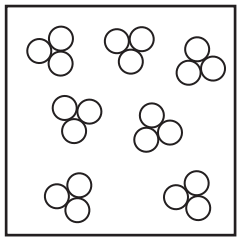


D

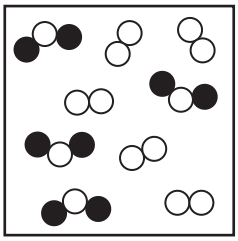


16 Which diagram represents a mixture of elements?

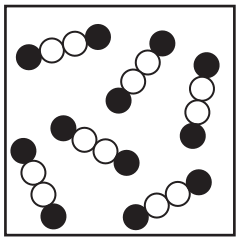
A



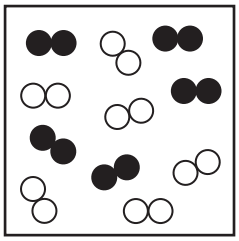
B



C



D



17 What is the formula of nitric acid?

A HCl **B** HNO_3 **C** NaOH **D** NH_3

18 The breakdown of molten lead bromide by ……1…… forms the elements lead and bromine.

Lead is formed at the ……2…… .

Which words complete gaps 1 and 2?

	1	2
A	electrolysis	anode
B	electrolysis	cathode
C	reduction	anode
D	reduction	cathode

19 Equal masses of four different solids are separately dissolved in 100 cm^3 of water.

The temperature of the water is recorded before the solid is added and then after the solid has dissolved.

Which solid dissolves with the largest endothermic change?

	initial temperature / °C	final temperature / °C
A	18	15
B	18	22
C	19	15
D	20	26

[Turn over

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:

iron oxide + carbon monoxide → iron + carbon dioxide

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 The results of two tests on a white solid are shown.

	test	result
1	add aqueous sodium hydroxide	white precipitate formed
2	add dilute hydrochloric acid	colourless gas formed

What is the white solid?

A iron(II) carbonate

B iron(II) chloride

C zinc carbonate

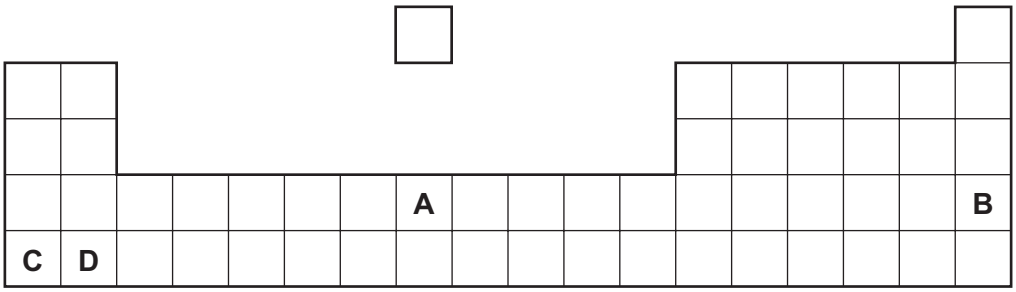
D zinc chloride

23 Which substance does **not** react with chlorine?

A H_2 **B** Kr **C** Li **D** NaBr

24 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?



25 Which element is used to extract copper from copper oxide?

A aluminium

B carbon

C iron

D sodium

26 Which two substances are required for iron to rust?

A nitrogen and oxygen

B nitrogen and water

C oxygen and water

D salt and oxygen

27 Gasoline is a hydrocarbon fuel obtained from petroleum.

Which statement is correct?

A Gasoline burns to form carbon dioxide and water.

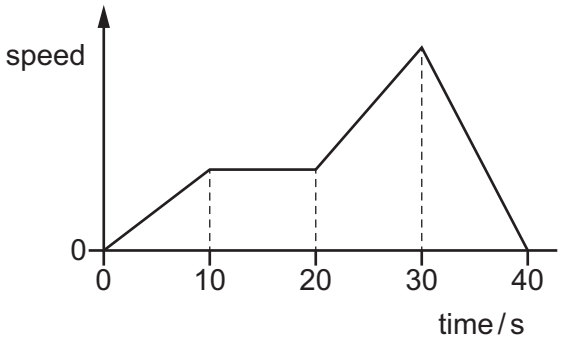
B Gasoline contains the elements carbon, hydrogen and oxygen.

C Gasoline is used as a fuel in diesel engines.

D The combustion of gasoline is an endothermic reaction.

[Turn over

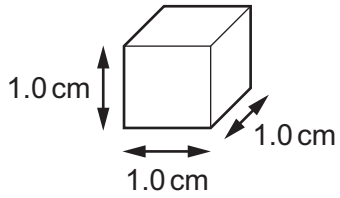
28 The diagram shows a speed-time graph for a car.



Which row describes the motion of the car at 15 s and at 35 s?

	motion at 15 s	motion at 35 s
A	at rest	moving with changing speed
B	at rest	moving with constant speed
C	moving with constant speed	moving with changing speed
D	moving with constant speed	moving with constant speed

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 The table compares the output of **thermal** energy per second from four different lamps. Each lamp takes in 100 J of input energy per second.

Which lamp is the most efficient at producing **light** energy?

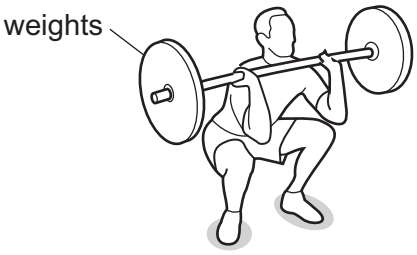
	lamp	thermal energy per second / J
A	compact fluorescent	65
B	halogen	85
C	incandescent	95
D	L.E.D.	25

[Turn over

31 Weightlifting involves a number of different stages.

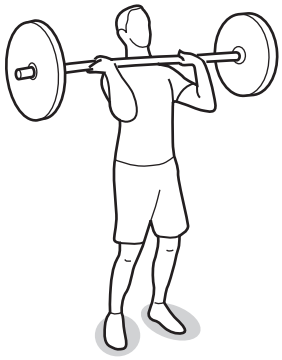
In which stage is **no** work being done on the weights?

A



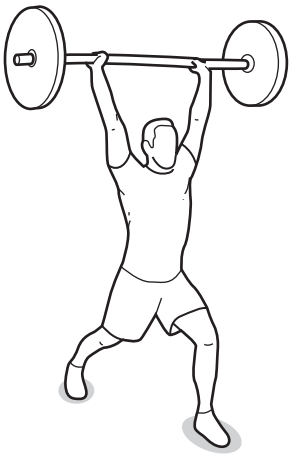
The weights are lifted up off the floor.

B



The weights are lifted as the man stands up.

C



The weights are lifted above the head.

D

The weights are held stationary above the head.

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?

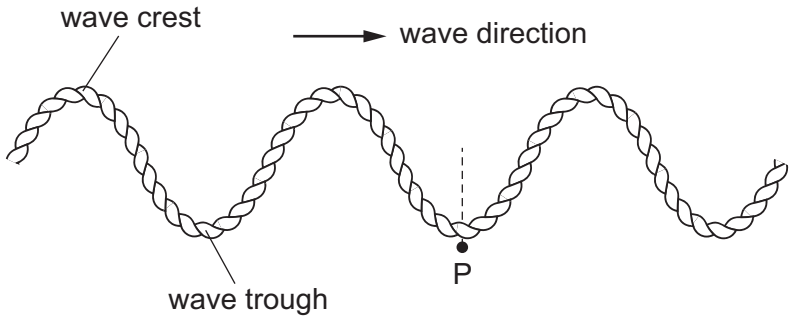
A in a gas and in a vacuum

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 The diagram shows a wave travelling along a rope. Ten wave troughs pass the fixed point P in 2.0 seconds.



What does this indicate about the wave?

A It has a frequency of 0.20 Hz.

B It has a frequency of 5.0 Hz.

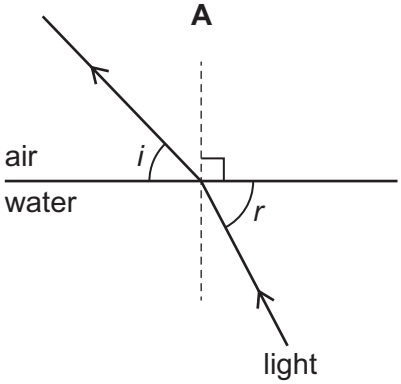
C It has a speed of 0.50 m / s.

D It has a speed of 5.0 m / s.

35 The diagram shows light passing from water into air.

Which diagram shows the angle of incidence *i* and the angle of refraction *r* correctly labelled?

A



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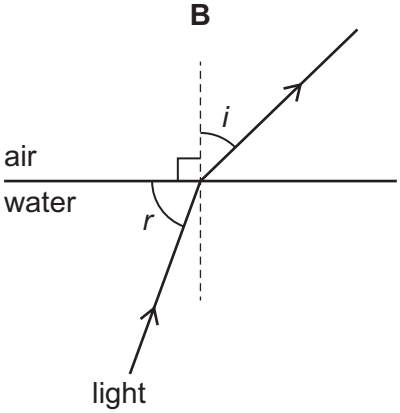

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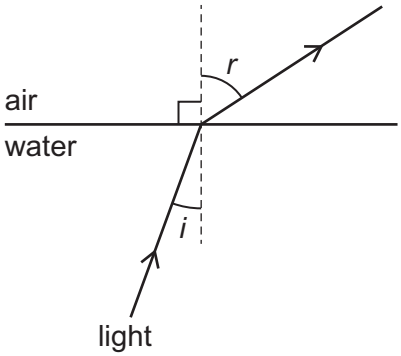

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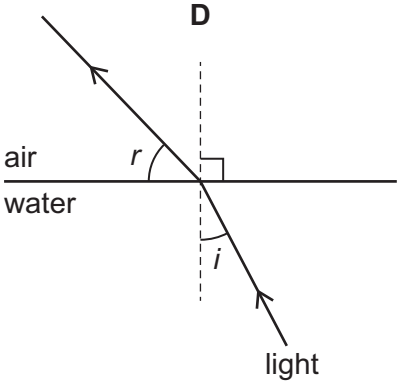


36 A hidden security system transmits electromagnetic waves into an area where people work.

The waves that can be used must have a frequency **less** than the frequency of visible light.

Which of the electromagnetic waves that can be used has the highest frequency?

A gamma

B infra-red

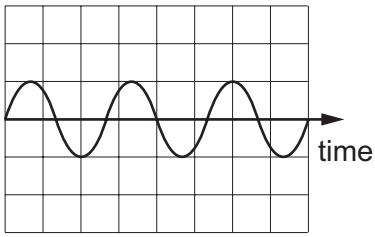
C radio

D ultraviolet

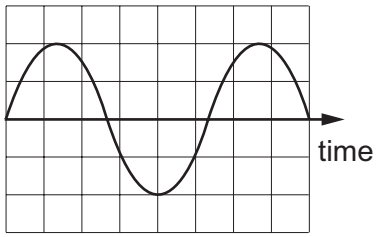
37 The diagrams represent four different sound waves. The scales are the same in all the diagrams.

Which sound has the lowest pitch?

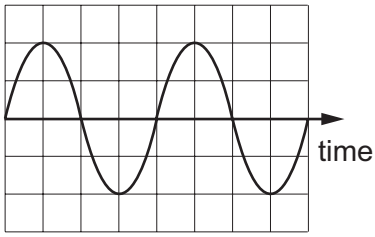
A



B



C



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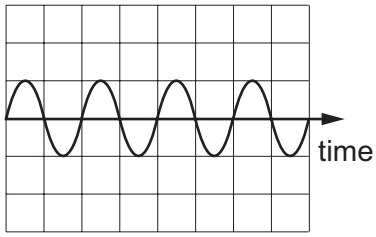
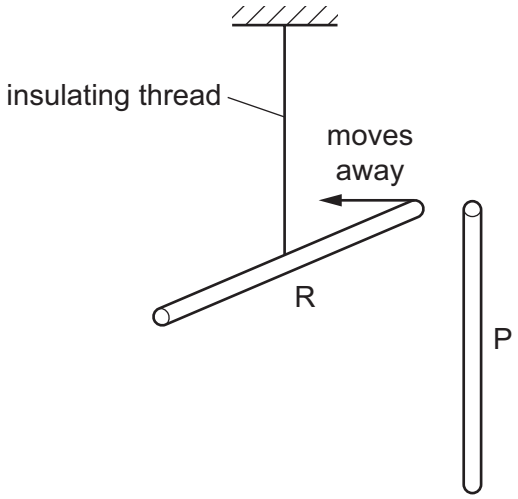


38 The diagram shows a rod R suspended by an insulating thread. Rod R is positively charged.

A second rod P is brought close to rod R. Rod R moves away from rod P.



What is the charge, if any, on rod P?

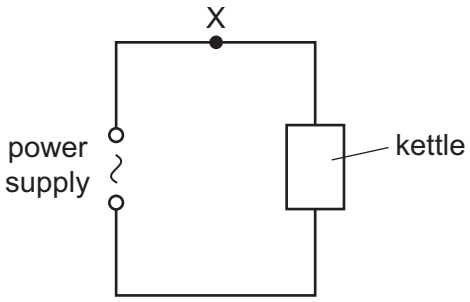
A The charge on P could be positive or negative.

B The charge on P is negative.

C The charge on P is positive.

D There is no charge on P.

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

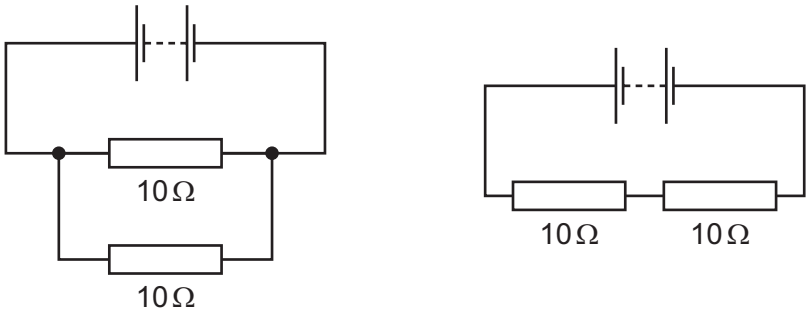


If too much current flows, a component connected at X automatically disconnects the power supply.

Which symbol represents the component at X?

A **B** **C** **D**

40 The diagram shows two circuits each containing two 10 Ω resistors.



circuit 1 circuit 2

What is the resistance of each circuit?

	circuit 1	circuit 2
A	greater than 10 Ω	greater than 10 Ω
B	greater than 10 Ω	less than 10 Ω
C	less than 10 Ω	greater than 10 Ω
D	less than 10 Ω	less than 10 Ω

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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 –		114 Fl flerovium –		116 Lv livermorium –		

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.).