Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/11**

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)

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 **17** printed pages and **3** blank pages.

1 Which characteristics help to define a living organism?

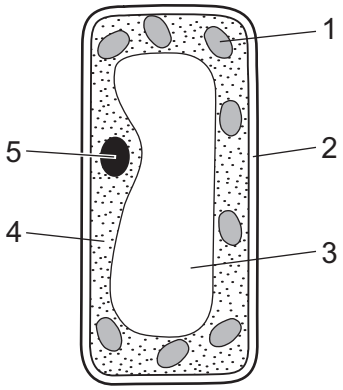
A diffusion, movement, respiration

B excretion, nutrition, sensitivity

C excretion, reproduction, transpiration

D growth, inspiration, nutrition

2 The diagram shows a plant cell.



Which two parts are found in plant cells but **not** in animal cells?

A 1 and 5 **B** 2 and 3 **C** 2 and 4 **D** 3 and 5

3 The table shows the concentration (in parts per million) of three ions inside and outside a plant cell.

	inside cell	outside cell
magnesium ions	38	50
nitrate ions	825	700
sulfate ions	145	200

In which directions would the ions diffuse?

	magnesium ions	nitrate ions	sulfate ions
A	+	+	+
B	+	–	+
C	–	+	–
D	–	–	–

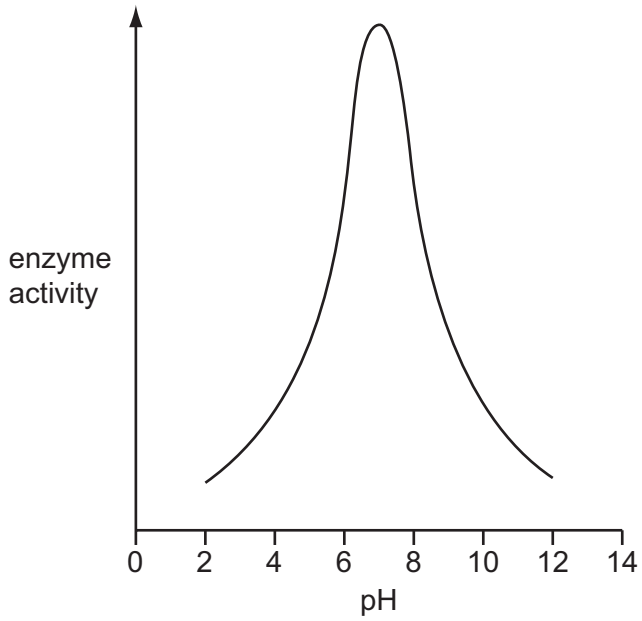
key

+ = diffuses into cell

– = diffuses out of cell

4 An experiment is carried out to investigate the effect of pH on the activity of an enzym

The graph shows the results.



At which pH is this enzyme most active?

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

5 Which two nutrients are needed for the development of strong bones and teeth?

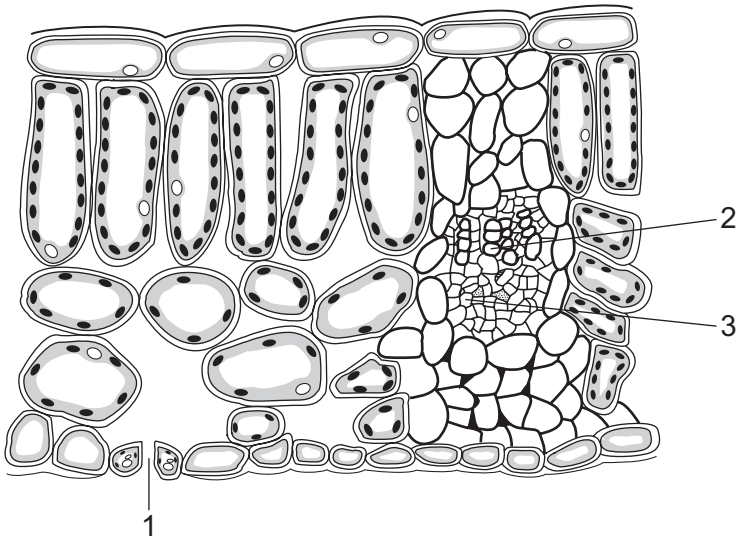
A vitamin C and calcium

B vitamin C and iron

C vitamin D and calcium

D vitamin D and iron

6 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

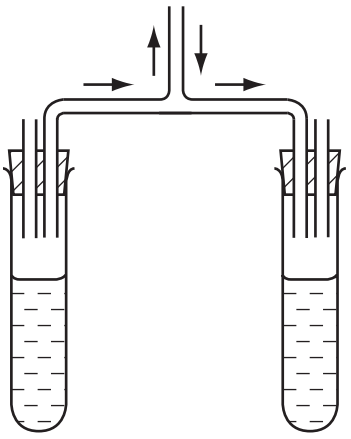
7 Which row describes the movement of a substance in a plant transport tissue?

	tissue	substance	direction of movement
A	phloem	sugar	down only
B	phloem	sugar	up and down
C	xylem	water	up and down
D	xylem	water and mineral ions	down only

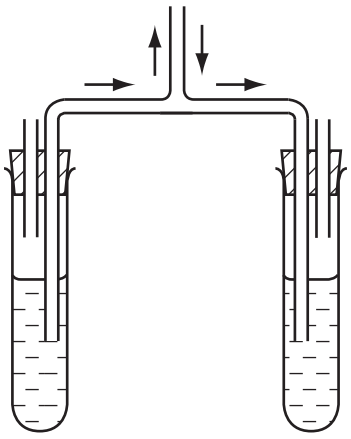
8 Four students assembled apparatus intended to show that air breathed out contains more carbon dioxide than air breathed in.

Which apparatus is assembled correctly?

A



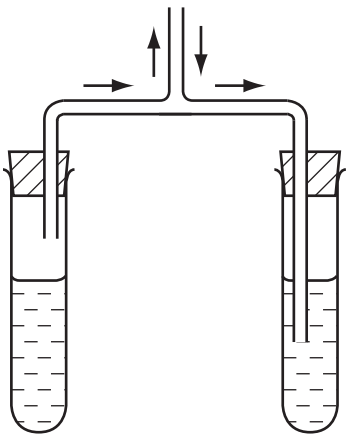
B



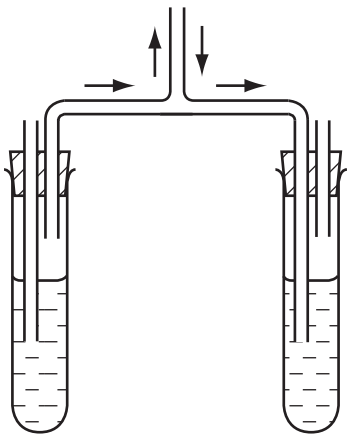
key

carbon dioxide indicator

C



D



9 Which gives these structures in order of their increasing diameter?

A bronchi → bronchioles → trachea

B bronchi → trachea → bronchioles

C bronchioles → bronchi → trachea

D trachea → bronchi → bronchioles

10 When a food is heated with Benedict's solution, an orange colour appears.

Which nutrient must be present in the food?

A fat

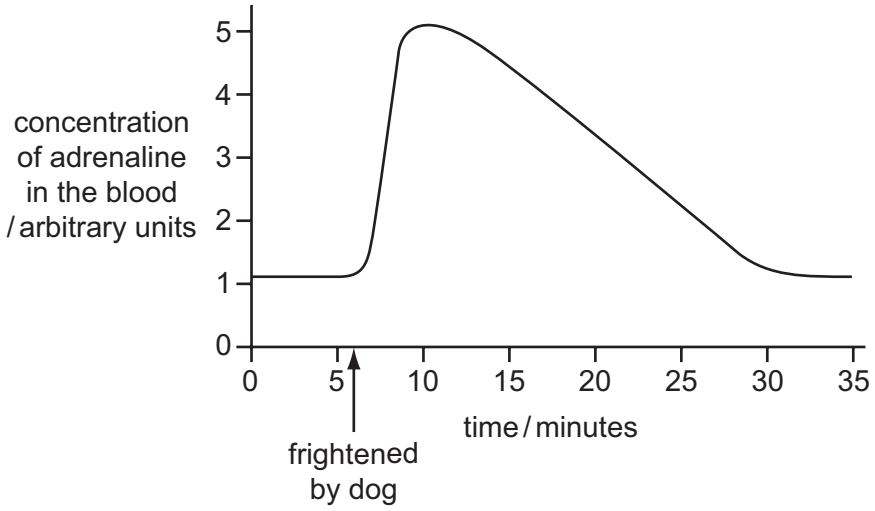
B protein

C reducing sugar

D starch

11 A student is frightened by a dog and runs away.

The changes in the concentration of adrenaline in the student's blood are shown in the graph.



What explains the gradual fall in the adrenaline concentration after the fright?

A It is destroyed by the liver.

B It is reabsorbed by the glands that produced it.

C It is respired to release energy.

D It is used up by the contracting muscles.

12 Where does a fertilised human egg normally become implanted?

A ovary

B oviduct

C uterus

D vagina

13 The diagram shows a food chain.

maize → mouse → owl

Which terms correctly describe the organisms in this food chain?

	maize	mouse	owl
A	consumer	carnivore	producer
B	consumer	herbivore	carnivore
C	producer	carnivore	herbivore
D	producer	herbivore	carnivore

14 Two liquids are separated by fractional distillation.

This is possible because the liquids differ in their

A boiling points.

B colour.

C density.

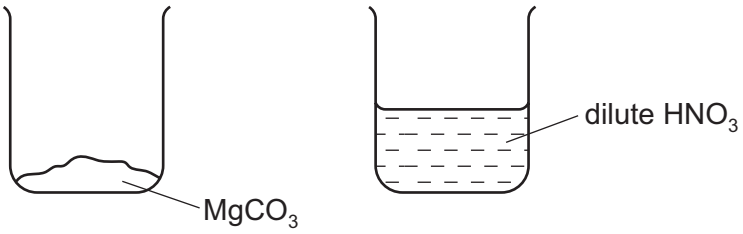
D solubility in water.

15 The fertiliser ammonium sulfate has the formula $(NH_4)_2SO_4$.

How many atoms of each element are present?

	number of hydrogen atoms	number of nitrogen atoms	number of oxygen atoms	number of sulfur atoms
A	4	1	1	1
B	4	2	4	1
C	8	1	4	1
D	8	2	4	1

16 The contents of the two beakers shown are mixed.



Which salt is formed?

A magnesium nitrate

B magnesium sulfate

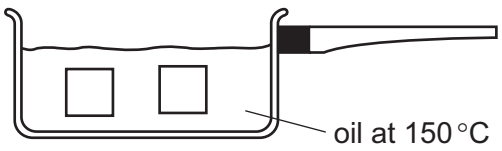
C manganese nitrate

D manganese sulfate

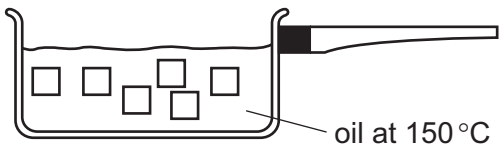
17 A sweet potato is cut into pieces and cooked.

In which pan does the potato cook most quickly?

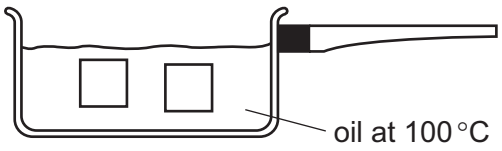
A



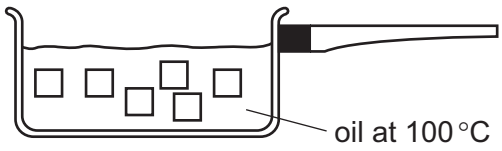
B



C



D



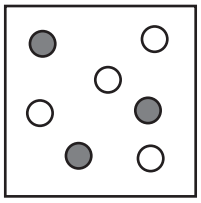
18 Element X forms a basic oxide.

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

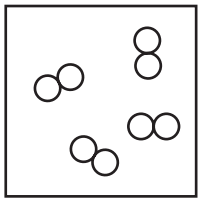
	type of element	position in the Periodic Table
A	metal	on the left
B	metal	on the right
C	non-metal	on the left
D	non-metal	on the right

19 The diagrams represent different substances.

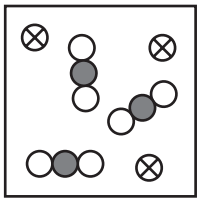
P



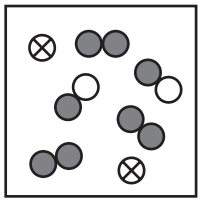
Q



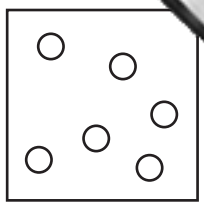
R



S



T



Which row correctly describes the substances?

	only separate atoms	only molecules	mixture of atoms and molecules
A	P	Q	S
B	Q	T	R
C	T	P	R
D	T	Q	P

20 In the electrolysis of molten lead(II) bromide, what is the electrolyte?

A anode

B bromine

C lead

D lead bromide

21 The table shows the initial and final temperatures in a series of experiments.

Which experiment is most exothermic?

	initial temperature / °C	final temperature / °C
A	16.0	24.0
B	18.5	27.0
C	17.5	26.5
D	18.5	14.0

22 Iron(III) oxide, Fe_2O_3, reacts with carbon monoxide, CO, to produce iron and carbon dioxide. The equation for the reaction is

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

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.

23 Which statement about transition metals is **not** correct?

A They are often used as catalysts.

B They form colourless compounds.

C They have high densities.

D They have high melting points.

24 Which statement about Group I elements is correct?

A Their melting points increase down the group.

B They are relatively soft metals.

C They do not react with cold water.

D They include sodium, potassium and calcium.

25 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.

26 Copper can be made from copper oxide by reacting it with carbon at a high temperature.

Why is carbon used?

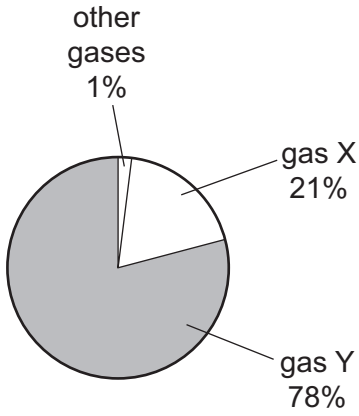
A It does not react with copper.

B It is a conductor of electricity.

C It is a high melting point solid.

D It is more reactive than copper.

27 The diagram shows the approximate composition of air.



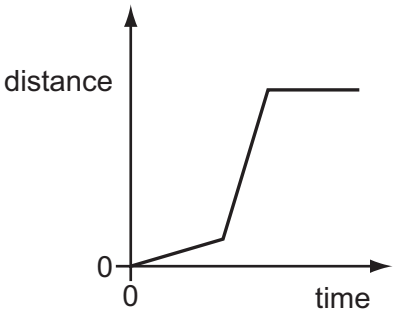
What are gases X and Y?

	gas X	gas Y
A	carbon dioxide	oxygen
B	nitrogen	oxygen
C	oxygen	carbon dioxide
D	oxygen	nitrogen

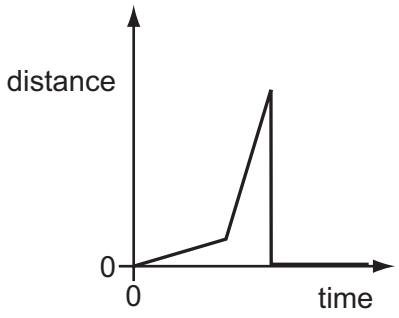
28 A boy walks along a track. He starts running, and finally stops for a rest.

Which distance / time graph represents his journey?

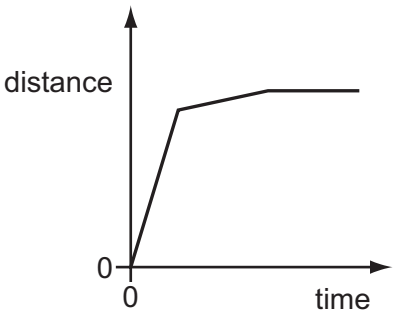
A



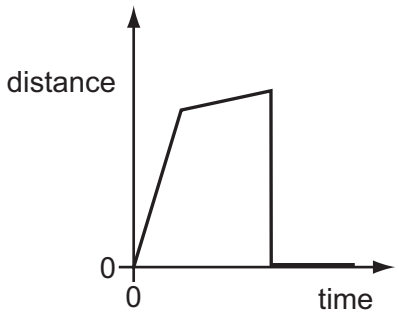
B



C



D



29 Which line in the table shows the unit for force, the unit for mass and the unit for weight?

	force	mass	weight
A	kg	kg	N
B	kg	N	kg
C	N	kg	N
D	N	N	kg

30 Diagram 1 shows a force *F* lifting a weight through a height *h*.

Diagram 2 shows the same force *F* lifting the same weight through a height 2*h*.

In both diagrams, air resistance and friction are negligible.

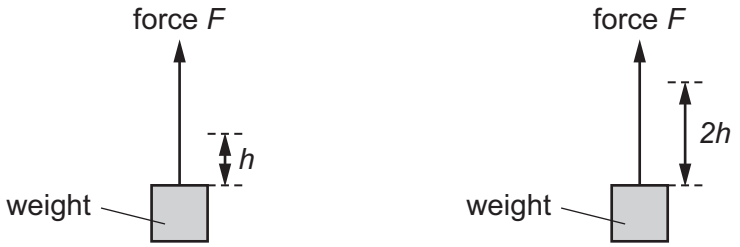


diagram 1 diagram 2

Each lift can take either 1 s or 10 s.

Which row shows the greatest power being developed when the weight is lifted?

	total height lifted	time taken for the lift / s
A	*h*	1
B	*h*	10
C	2*h*	1
D	2*h*	10

31 A liquid evaporates when molecules leave its surface.

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

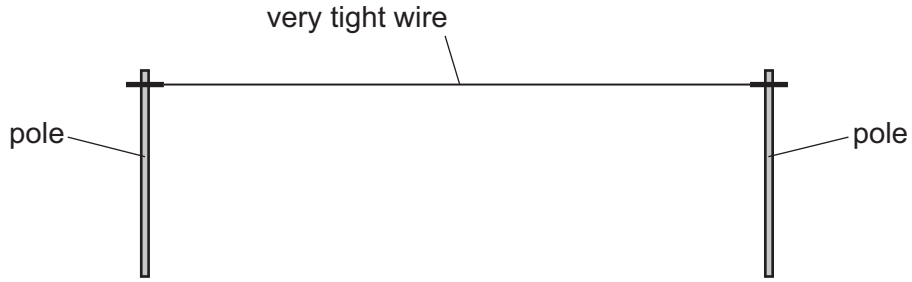
A The more energetic molecules leave and the temperature falls.

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.

32 A telephone engineer connects a wire between two poles on a very hot day in a [illegible]e makes the wire very tight.



During the night, it becomes very cold.

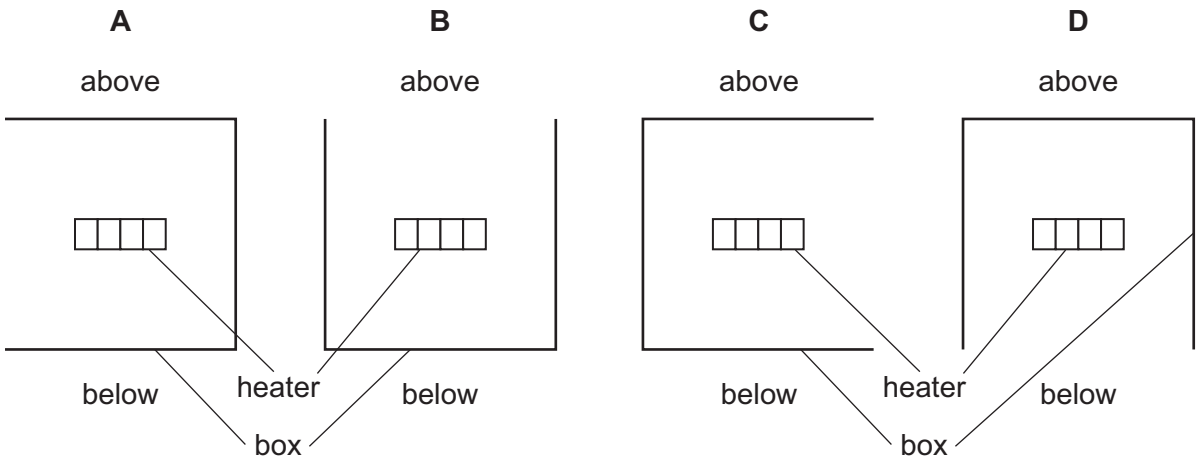
What could happen to the wire, and why?

	what could happen	why
A	it breaks	it contracts
B	it breaks	it expands
C	it sags lower down	it contracts
D	it sags lower down	it expands

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

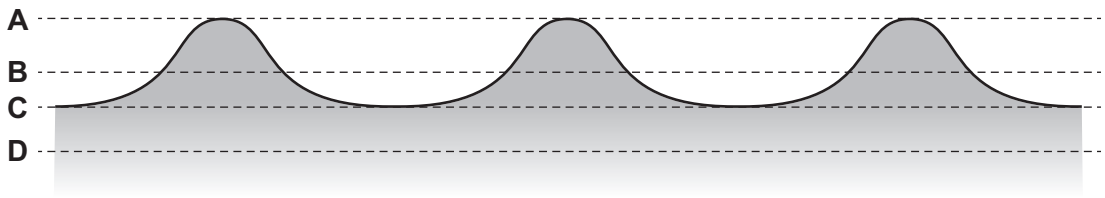
The heater is switched on for several minutes.

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 Which electromagnetic waves have the smallest wavelength and which electromagnetic waves have the highest frequency?

	shortest wavelength	highest frequency
A	radio waves	gamma rays
B	microwaves	microwaves
C	gamma rays	gamma rays
D	microwaves	radio waves

37 The sound from a drum is loud and has a low pitch.

Which row describes the amplitude and the frequency of the sound?

	amplitude	frequency
A	large	high
B	large	low
C	small	high
D	small	low

38 When a plastic rod is rubbed with a cloth, the rod becomes positively charged.

How is this explained?

A Electrons have been added to the rod.

B Electrons have been removed from the rod.

C Neutrons have been added to the rod.

D Neutrons have been removed from the rod.

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

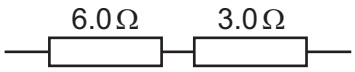
A to increase the resistance of the circuit

B to keep the power used at a constant value

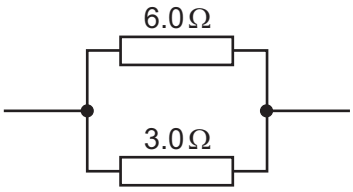
C to prevent a short circuit from occurring

D to stop the cables overheating

40 Two resistors of resistance 6.0 ohms and 3.0 ohms are combined first in series and then in parallel.



arrangement 1



arrangement 2

Which row shows the resistance of arrangement 1 and the resistance of arrangement 2?

	resistance of arrangement 1	resistance of arrangement 2
A	9Ω	2Ω
B	9Ω	9Ω
C	18Ω	2Ω
D	18Ω	9Ω

BLANK PAGE

BLANK PAGE

BLANK PAGE

DATA SHEET
The Periodic Table of the Elements

Group																	
I	II									III	IV	V	VI	VII	0
				1 H Hydrogen 1											4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4									11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	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
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	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	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

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

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).