Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/13**

Paper 1 Multiple Choice (Core) **October/November 2017**

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.

IB17 11_0653_13/2RP

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 Which two structures are found in a plant cell but **not** an animal cell?

A cell membrane and cell wall

B cell wall and chloroplasts

C chloroplasts and nucleus

D nucleus and cell membrane

3 What are enzymes made from?

A fat

B hormones

C protein

D starch

4 The list shows chemicals that are important to a plant.

1 carbon dioxide

2 nitrates

3 oxygen

4 water

Which chemicals does a plant use in photosynthesis?

A 1, 2 and 4 **B** 1 and 2 only **C** 1 and 4 only **D** 3 and 4 only

5 In which order does food pass through parts of the alimentary canal?

A oesophagus → colon → small intestine

B small intestine → oesophagus → rectum

C small intestine → rectum → anus

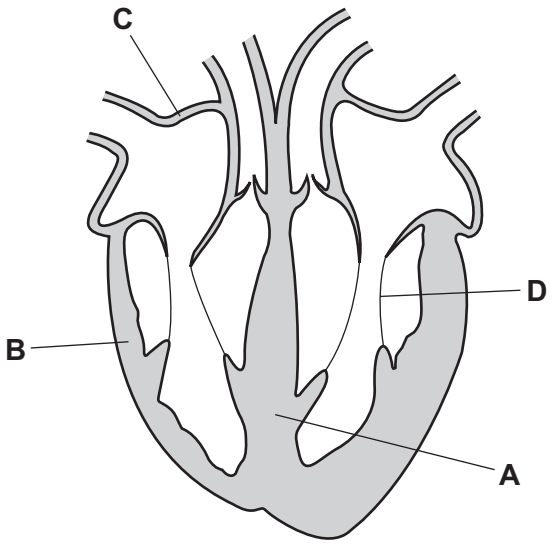
D stomach → colon → small intestine

6 Which row shows the effects of increasing humidity, light intensity and temperature on the rate of transpiration in a plant?

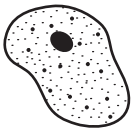
	increasing humidity	increasing light intensity	increasing temperature
A	rate decreases	rate decreases	rate decreases
B	rate decreases	rate increases	rate increases
C	rate increases	rate decreases	rate increases
D	rate increases	rate increases	rate decreases

7 The diagram shows a section through the human heart.

Which is the septum?



8 Which row correctly matches the cell to its function?

	cell	function
A		blood clotting
B		blood clotting
C		oxygen transport
D		oxygen transport

9 The table shows the percentage of some gases in four samples of air.

Which sample is expired air?

	percentage of gas		
	carbon dioxide	oxygen	nitrogen
A	1	16	75
B	1	21	78
C	4	16	78
D	4	21	75

10 Which statements about hormones are correct?

1 They are carried by the blood.

2 They are chemical substances.

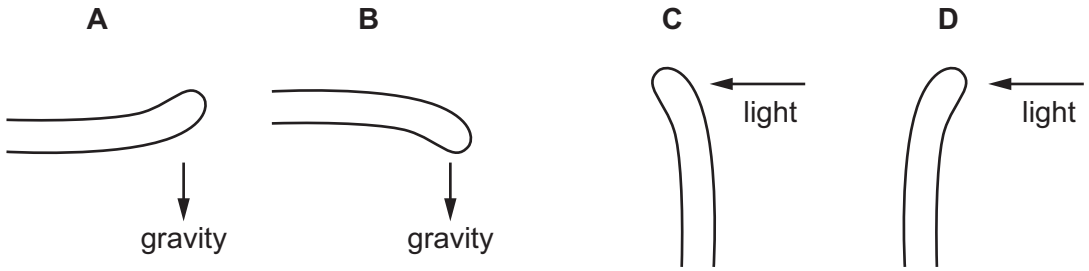
3 They are destroyed by the pancreas.

4 They are produced by a target organ.

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

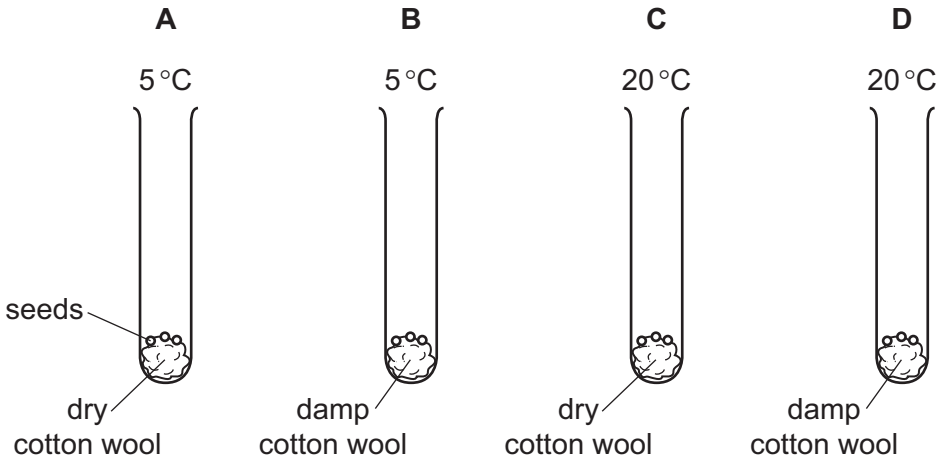
11 The diagrams show shoots of maize seedlings.

Which shoot shows a geotropic response in which it grows away from the stimulus?



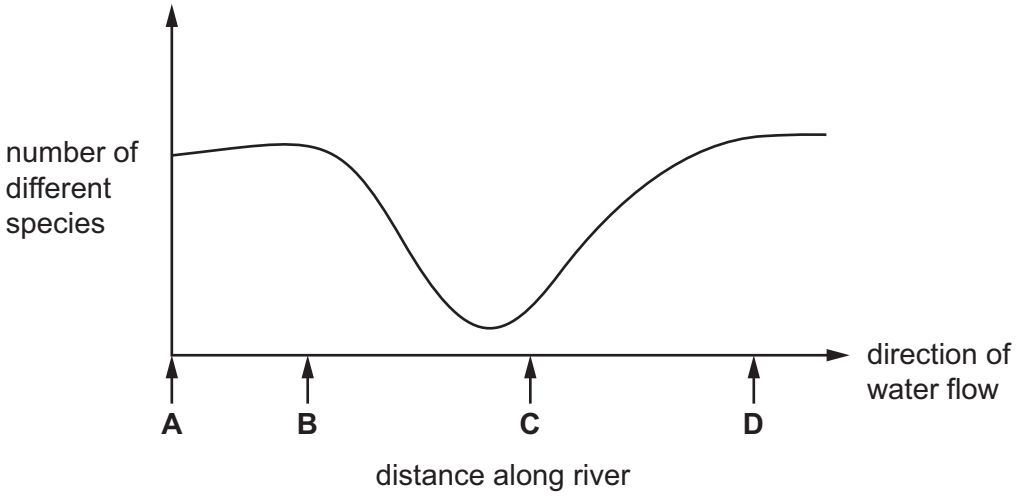
12 A student investigated the conditions needed for the germination of seeds.

Which seeds will germinate first?



13 The graph shows changes in the number of different species in the water flowing along a river.

At which point is untreated sewage released into the river?



14 The formulae of three substances are shown.

substance	formula
methane	CH_4
water	H_2O
oxygen	O_2

Which statement is correct?

A Methane is made from five different types of atom.

B Methane, water and oxygen are molecules.

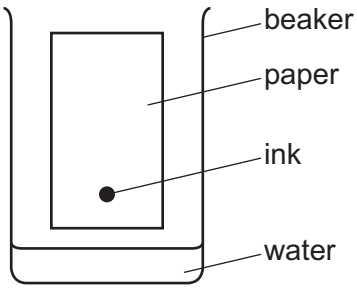
C Only methane and water are molecules.

D Oxygen is made from two different types of atom.

15 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?

A



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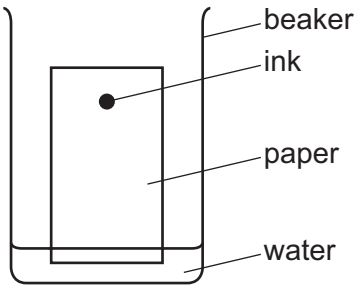

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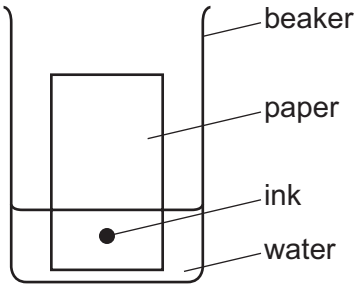
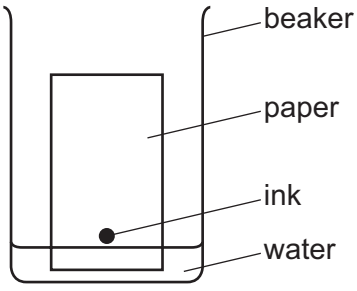


D



16 Which row describes the type of change for each process?

	melting ice	sodium reacting with water
A	chemical	physical
B	chemical	chemical
C	physical	physical
D	physical	chemical

17 One molecule of a compound contains twice as many carbon atoms as oxygen atoms, and three times as many hydrogen atoms as carbon atoms.

What is the formula of this compound?

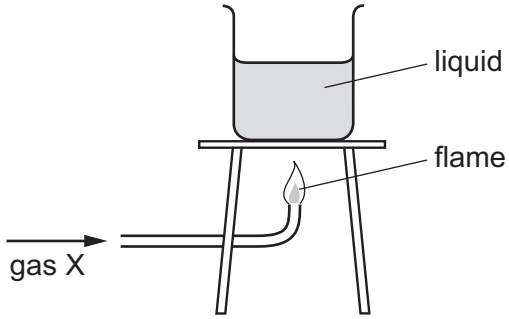
A C_2H_3O **B** C_2H_6O **C** $C_2H_6O_2$ **D** $C_4H_6O_2$

18 Which row describes an ionic compound?

	melting point	can be electrolysed
A	high	no
B	high	yes
C	low	no
D	low	yes

[Turn over

19 The diagram shows gas X burning and heating a liquid.



Which row is correct?

	gas X	the burning of gas X is exothermic
A	hydrogen	✓
B	hydrogen	✗
C	oxygen	✓
D	oxygen	✗

20 Copper is produced by heating copper oxide with carbon.

The word equation for this reaction is shown.

copper oxide + carbon → copper + carbon dioxide

Which statement explains why this is a redox reaction?

A Carbon dioxide contains oxygen.

B Carbon is a solid and carbon dioxide is a gas.

C Copper oxide is oxidised.

D Copper oxide loses oxygen and carbon gains oxygen.

21 Dilute sulfuric acid is added to copper(II) oxide. The mixture is warmed gently.

Which observations are correct?

	colour of solution formed	gas formed
A	blue	no
B	blue	yes
C	colourless	no
D	colourless	yes

22 Separate samples of the gases ammonia, carbon dioxide, chlorine and hydrogen are tested with damp red litmus paper.

How many of these gases turn the litmus paper blue?

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

23 Which statement describes the arrangement of elements from sodium to argon in the Periodic Table?

A They are in neutron number order and change from metallic to non-metallic.

B They are in neutron number order and change from non-metallic to metallic.

C They are in proton number order and change from metallic to non-metallic.

D They are in proton number order and change from non-metallic to metallic.

24 What is **not** a property of transition elements?

A conduct electricity

B form coloured compounds

C high melting point

D low density

25 Platinite is made by melting and mixing iron and nickel.

Which type of substance is platinite?

A alloy

B hydrocarbon

C ionic compound

D transition metal

[Turn over

26 P, Q, R and S are four gases found in clean air.

P is very unreactive.

Q makes up 21% of the air.

R makes up 78% of the air.

S is formed when fossil fuels are burned.

Which row is correct?

	P	Q	R	S
A	argon	nitrogen	oxygen	carbon dioxide
B	argon	oxygen	nitrogen	carbon dioxide
C	carbon dioxide	oxygen	nitrogen	argon
D	carbon dioxide	nitrogen	oxygen	argon

27 Which power stations burn fossil fuels?

1 a coal-fired power station

2 a nuclear power station

3 an oil-fired power station

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

28 A car travels at various speeds during a short journey.

The table shows the distances travelled and the times taken during each of four stages P, Q, R and S.

stage	P	Q	R	S
distance travelled / km	1.8	3.6	2.7	2.7
time taken / minutes	2.0	2.0	4.0	3.0

During which two stages is the car travelling at the same average speed?

A P and Q **B** P and S **C** Q and R **D** R and S

29 The mass of an astronaut on the Moon is 70 kg.

What is the mass of the astronaut on the Earth?

A 7 kg **B** 70 kg **C** 80 kg **D** 700 kg

30 Diagram 1 shows an empty measuring cylinder on a balance.

Diagram 2 shows the same measuring cylinder on the balance, but it now contains a liquid.

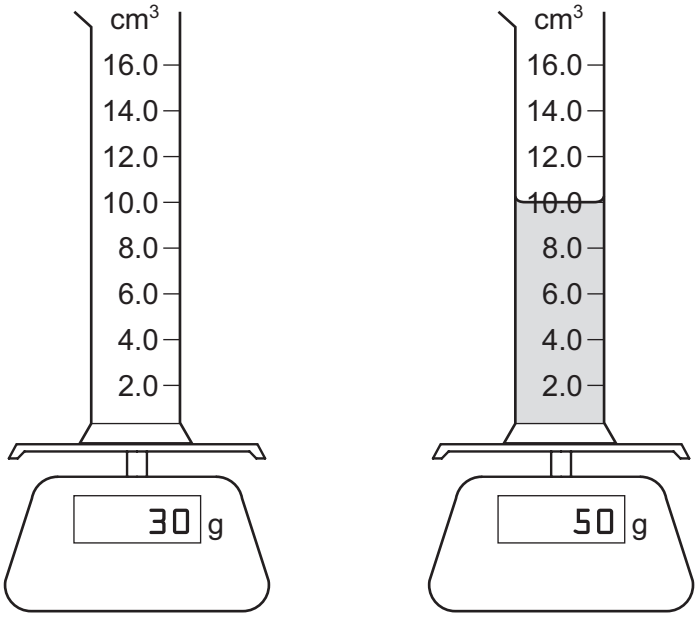


diagram 1 diagram 2

What is the density of the liquid?

A $0.20\,g/cm^3$ **B** $0.50\,g/cm^3$ **C** $2.0\,g/cm^3$ **D** $5.0\,g/cm^3$

31 On a hot day with no wind, a boy swims in warm water in a swimming pool.

The boy now leaves the pool and feels cold.

Why does the boy feel cold even though it is a hot day?

A The less energetic water molecules on his skin escape as the water evaporates.

B The less energetic water molecules on his skin escape as the water freezes.

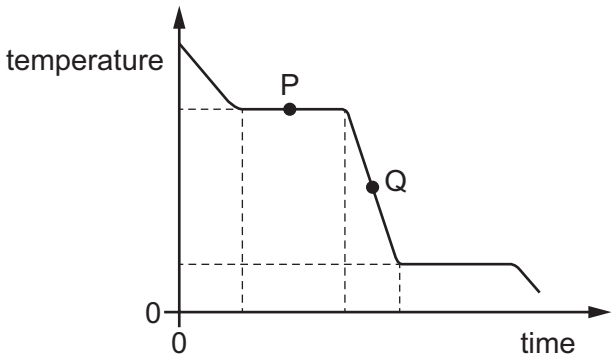
C The more energetic water molecules on his skin escape as the water evaporates.

D The more energetic water molecules on his skin escape as the water freezes.

[Turn over

32 A substance is a gas and loses energy thermally at a constant rate.

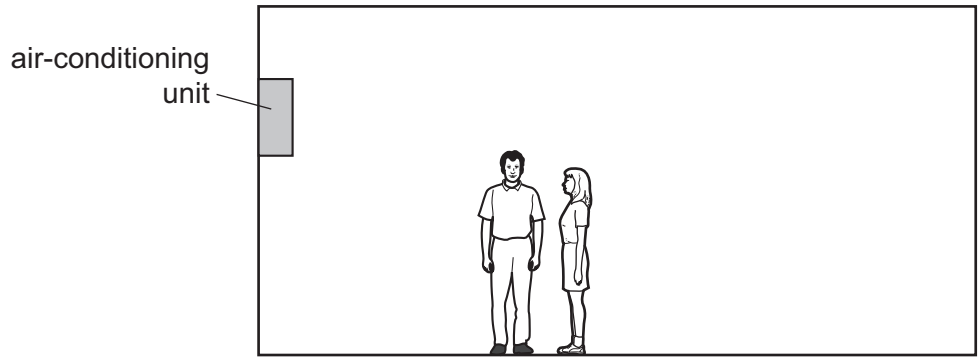
The graph shows how the temperature of the gas changes with time. Two points on the graph are labelled P and Q.



In which state is the substance at P and in which state is the substance at Q?

	state at P	state at Q
A	all gas	all liquid
B	all gas	gas and liquid
C	gas and liquid	all liquid
D	gas and liquid	gas and liquid

33 The diagram shows an air-conditioning unit on the wall of a room. The unit draws in warm air from the room and releases cold air into the room.



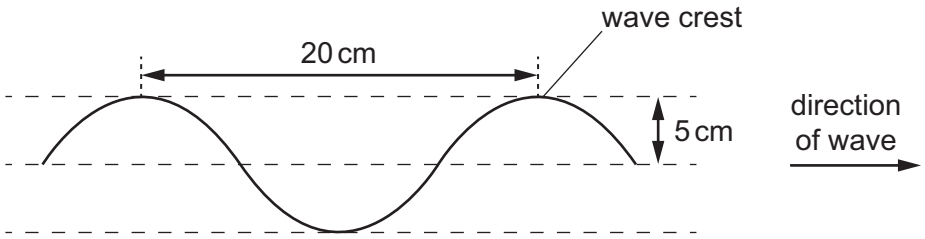
What happens to the cold air and what is the reason?

	cold air	reason
A	falls	it is less dense than warm air
B	falls	it is more dense than warm air
C	rises	it is less dense than warm air
D	rises	it is more dense than warm air

34 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.

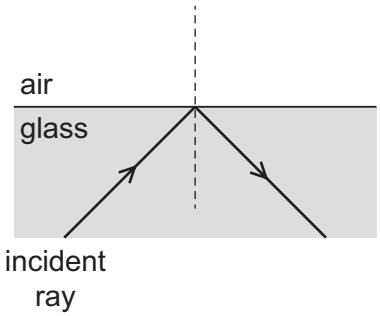


What is the speed of the wave?

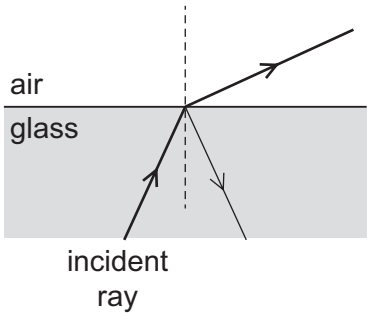
A 4.0 cm / s **B** 5.0 cm / s **C** 20 cm / s **D** 80 cm / s

35 Which diagram shows a ray of light undergoing total internal reflection?

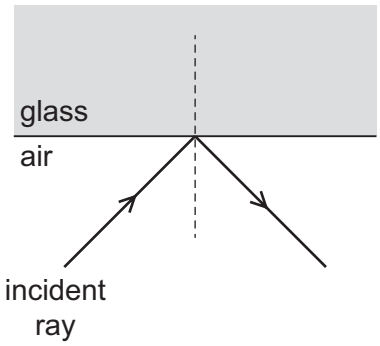
A



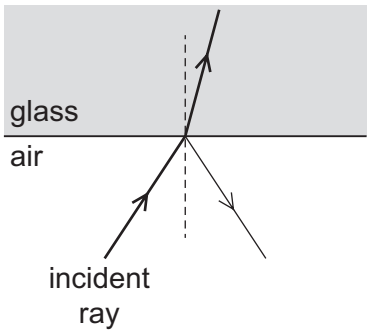
B



C



D



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

Electromagnetic waves are also used in a television remote controller.

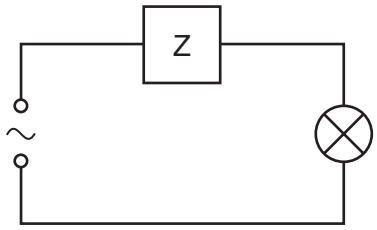
Which type of electromagnetic wave is used for each of these purposes?

	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 What is the approximate range of frequencies of sound that can be heard by a human, and which property of a sound wave causes echoes?

	range of frequencies / Hz	property that causes echoes
A	2.0 to 2000	reflection
B	2.0 to 2000	refraction
C	20 to 20 000	reflection
D	20 to 20 000	refraction

38 The device Z in this circuit is designed to cut off the electricity supply **automatically** if too much current flows.



What is device Z?

A a fuse

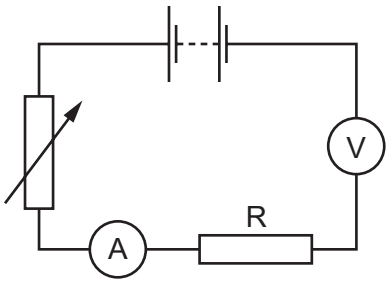
B a resistor

C a switch

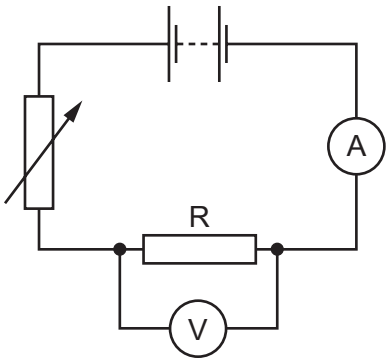
D an ammeter

39 Which circuit is used to determine the resistance of the resistor R?

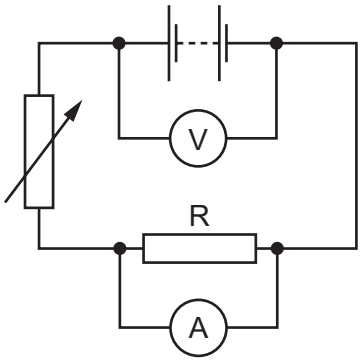
A



B



C



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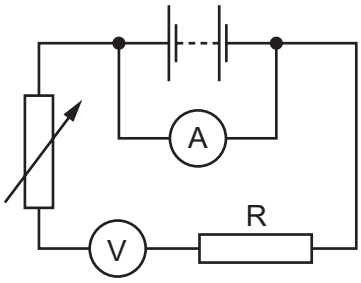
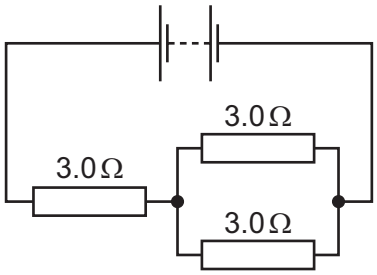


40 Three 3.0 Ω resistors are connected in a circuit as shown.



What is the combined resistance of the three resistors in this circuit?

A less than 3.0 Ω

B between 3.0 Ω and 6.0 Ω

C between 6.0 Ω and 9.0 Ω

D 9.0 Ω

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.).