



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

**COMBINED SCIENCE**

**0653/11**

Paper 1 Multiple Choice (Core)

**May/June 2018**

**45 minutes**

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

\* 1 3 2 0 5 5 9 9 8 0 \*

**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.

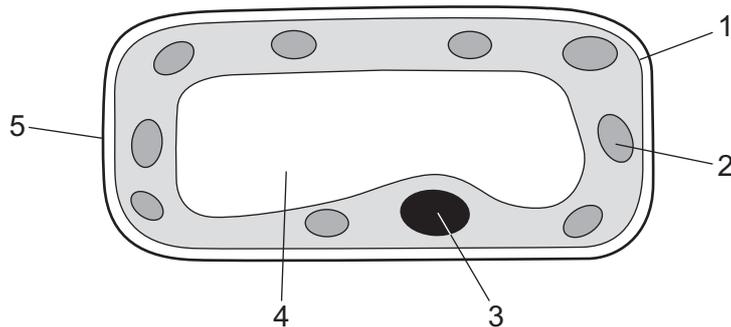
This document consists of **16** printed pages.

- 1 Most cars burn fossil fuels to release energy for their movement.

Which characteristic of living organisms is similar to this?

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

- 2 The diagram shows a plant cell with some structures labelled.

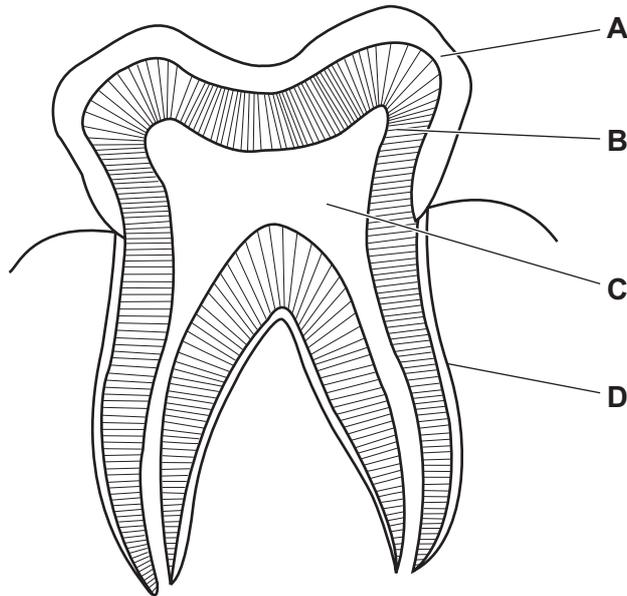


Which two structures are also present in animal cells?

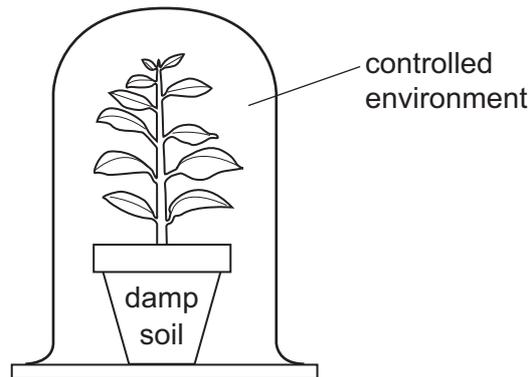
- A 1 and 2
  - B 1 and 3
  - C 2 and 4
  - D 3 and 5
- 3 Food chewed in the mouth is mixed with enzymes which begin the process of chemical digestion.
- What type of molecule is an enzyme?
- A carbohydrate
  - B fat
  - C protein
  - D vitamin
- 4 Which two chemical substances are required for photosynthesis?
- A carbon dioxide and glucose
  - B glucose and oxygen
  - C oxygen and water
  - D water and carbon dioxide

5 The diagram shows a section through a human tooth.

Which part is made of the hardest material?



6 The diagram shows a plant in a controlled environment.



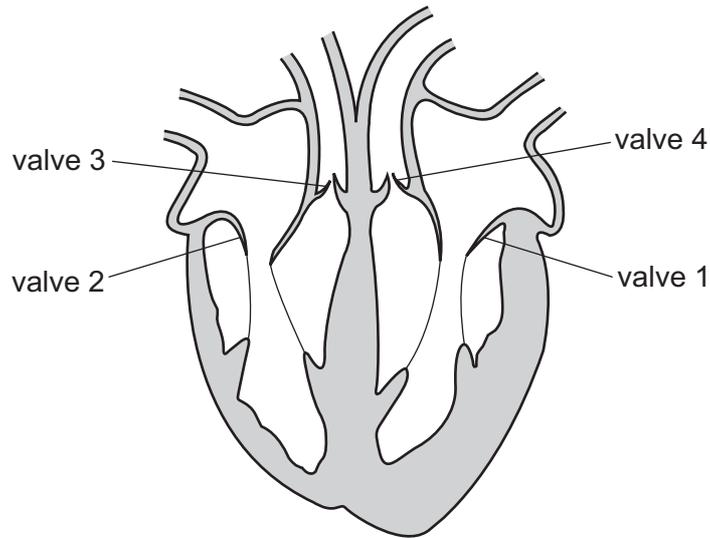
The list gives three ways in which the environment can be altered.

- 1 humidity increased
- 2 light intensity increased
- 3 temperature increased

Which changes will cause an increase in the rate of transpiration of the plant?

	1	2	3
<b>A</b>	✓	✓	x
<b>B</b>	✓	x	x
<b>C</b>	x	x	✓
<b>D</b>	x	✓	✓

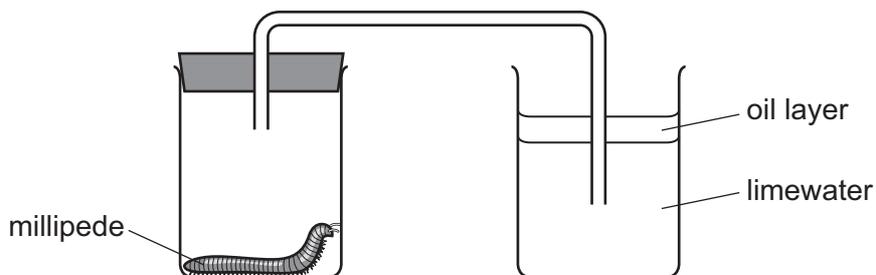
7 The diagram shows a section through the human heart.



What happens to the valves as blood is being pumped to the lungs?

	valve 1	valve 2	valve 3	valve 4
<b>A</b>	closed	closed	open	closed
<b>B</b>	closed	closed	open	open
<b>C</b>	open	open	closed	closed
<b>D</b>	open	open	closed	open

8 A student set up the experiment shown in the diagram.



Which statement is correct?

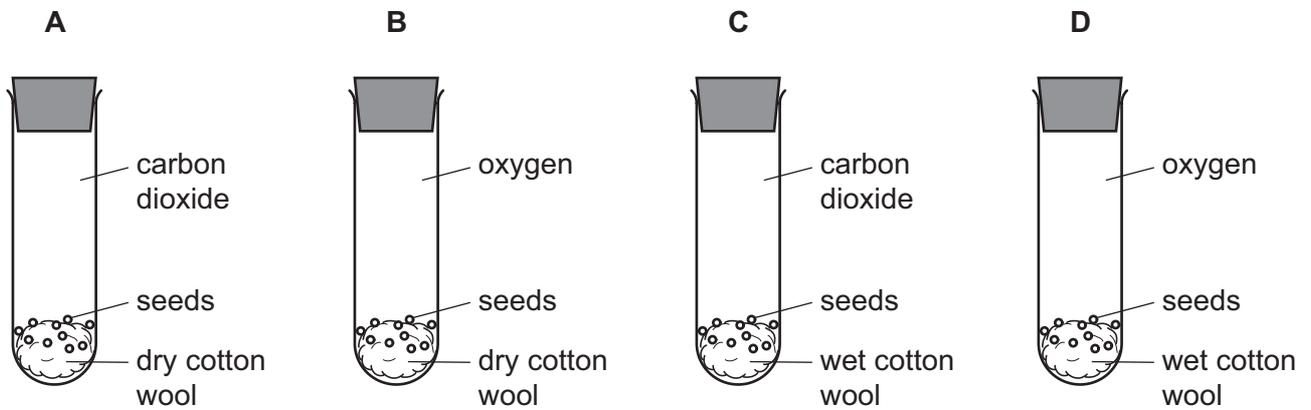
- A** If the limewater stays colourless, aerobic respiration is occurring.
- B** If the limewater stays colourless, photosynthesis is occurring.
- C** If the limewater turns milky, aerobic respiration is occurring.
- D** If the limewater turns milky, photosynthesis is occurring.

9 What are the growth responses of a plant to gravity?

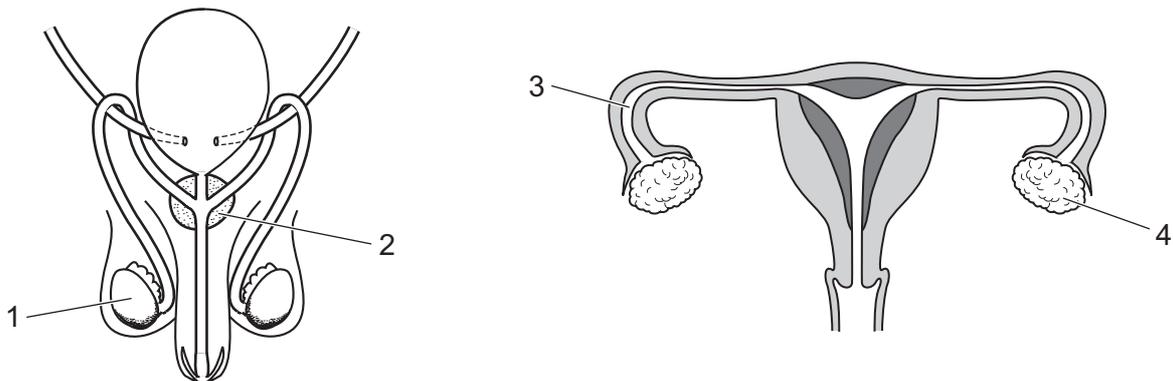
	root grows	stem grows
<b>A</b>	away from gravity	away from gravity
<b>B</b>	away from gravity	towards gravity
<b>C</b>	towards gravity	away from gravity
<b>D</b>	towards gravity	towards gravity

10 The diagram shows four tubes set up to investigate germination. All of the tubes are at 25 °C.

In which tube will the seeds germinate first?



11 The diagrams show the human male and female reproductive systems.



Which numbered parts produce gametes?

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

12 The diagram shows a food chain.

maize → mouse → owl

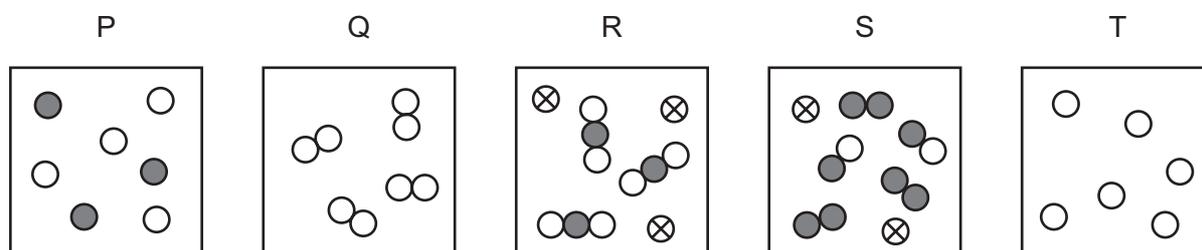
Which terms describe the organisms in this food chain?

	maize	mouse	owl
<b>A</b>	consumer	carnivore	producer
<b>B</b>	consumer	herbivore	carnivore
<b>C</b>	producer	carnivore	herbivore
<b>D</b>	producer	herbivore	carnivore

13 What is **not** an effect of deforestation?

- A** extinction of species
- B** flooding of farmland
- C** increase of oxygen in the air
- D** loss of soil

14 The diagrams represent different substances.



Which row describes the substances?

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

15 Which row describes the method used to obtain salt from salt water and petrol from petroleum?

	salt from salt water	petrol from petroleum
<b>A</b>	crystallisation	distillation
<b>B</b>	crystallisation	fractional distillation
<b>C</b>	filtration	distillation
<b>D</b>	filtration	fractional distillation

16 Some changes are listed.

- 1 boiling
- 2 decomposing
- 3 evaporating
- 4 oxidising

Which changes are physical changes?

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

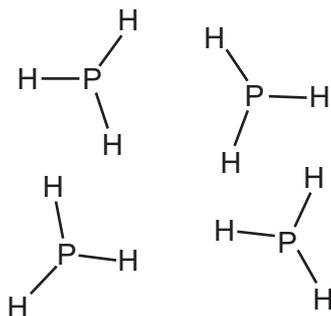
17 Lithium, a Group I element, reacts with fluorine, a Group VII element, to form lithium fluoride.

Lithium fluoride is an ionic substance.

Which row describes how the ions are formed from the atoms?

	lithium atom	fluorine atom
<b>A</b>	gains an electron	gains an electron
<b>B</b>	gains an electron	loses an electron
<b>C</b>	loses an electron	gains an electron
<b>D</b>	loses an electron	loses an electron

18 The diagram represents molecules of phosphine.

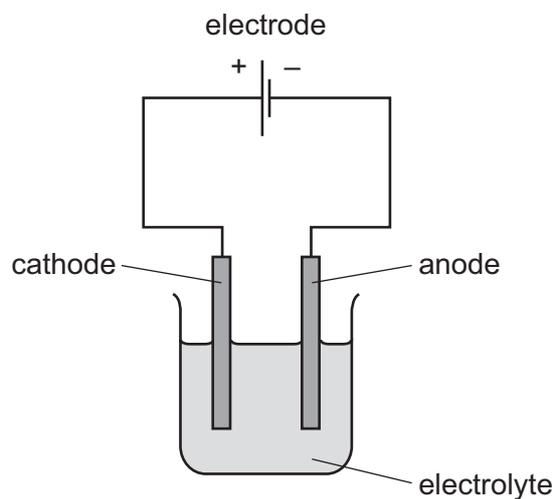


What is the formula of a molecule of phosphine?

- A** HP                      **B**  $\text{HP}_3$                       **C**  $\text{PH}_3$                       **D**  $\text{P}_4\text{H}_{12}$

19 The diagram shows apparatus for electrolysis.

Only one label is correct.



Which label on the diagram is correct?

- A** anode  
**B** cathode  
**C** electrode  
**D** electrolyte

20 Which change **must** take place in an endothermic reaction?

- A Bubbles of gas are released.
- B The mass decreases.
- C The temperature decreases.
- D The temperature increases.

21 Magnesium reacts with steam to form magnesium oxide and hydrogen gas.



Which statement about this reaction is correct?

- A Hydrogen gas is reduced.
- B Magnesium is oxidised.
- C Magnesium is reduced.
- D Water is oxidised.

22 Aqueous ammonia is added to a solution containing a salt.

A white precipitate is produced which dissolves in excess aqueous ammonia.

Which ion is present in the salt?

- A iron(II)
- B iron(III)
- C ammonium
- D zinc

23 Which statement describes the metallic character of elements in Period 2 of the Periodic Table?

- A The first and last elements in this period are metals.
- B The metallic elements are in the centre of this period.
- C The metallic elements are on the left of this period.
- D The metallic elements are on the right of this period.

24 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.

25 Which element is a metal?

	melting point /°C	density g/cm <sup>3</sup>	conducts electricity
<b>A</b>	-39	13.6	yes
<b>B</b>	44	1.8	no
<b>C</b>	113	2.1	no
<b>D</b>	1410	2.3	no

26 Which chemical reactions produce carbon dioxide?

	hydrochloric acid + calcium carbonate	hydrochloric acid + sodium hydroxide	complete combustion of methane	respiration
<b>A</b>	✓	x	✓	✓
<b>B</b>	✓	x	✓	x
<b>C</b>	✓	x	x	✓
<b>D</b>	x	✓	✓	✓

27 Which statement about organic compounds is **not** correct?

- A An ethene molecule contains a double bond.
- B Molecules of ethane and ethanol contain the same number of carbon atoms.
- C The complete combustion of hydrocarbons produces carbon dioxide and water.
- D The main constituent of natural gas is ethane.

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

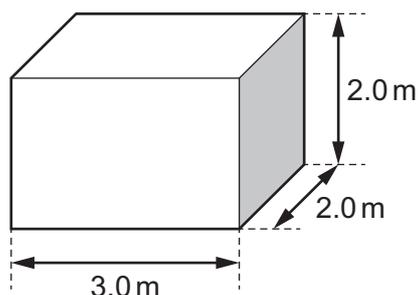
What is the average speed of the vehicle?

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

29 What is the weight of an object?

- A the acceleration of the object due to gravity
- B the energy of the object due to its position
- C the force acting on the object due to gravity
- D the quantity of matter in the object

30 The diagram shows a solid rectangular block of mass 24 kg with the dimensions shown.



What is the density of the material from which the block is made?

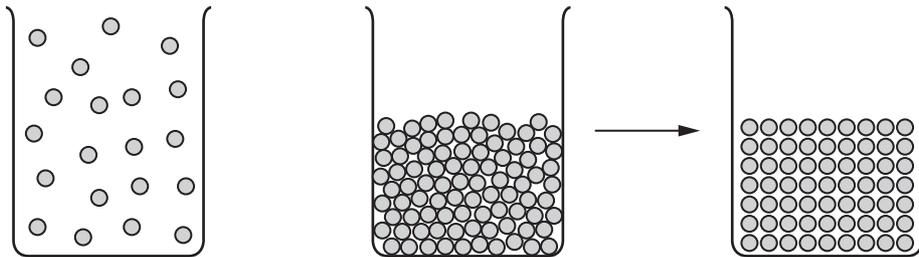
- A  $0.25 \text{ kg/m}^3$
- B  $0.50 \text{ kg/m}^3$
- C  $2.0 \text{ kg/m}^3$
- D  $4.0 \text{ kg/m}^3$

31 Electricity can be obtained from the energy in water behind a hydroelectric dam.

Is this energy resource renewable, and in which form is its energy stored?

	renewable	form of energy
<b>A</b>	no	chemical
<b>B</b>	no	gravitational potential
<b>C</b>	yes	chemical
<b>D</b>	yes	gravitational potential

- 32 Three beakers contain samples of the same substance. The diagrams indicate the molecular structures of the substance in each of the beakers.



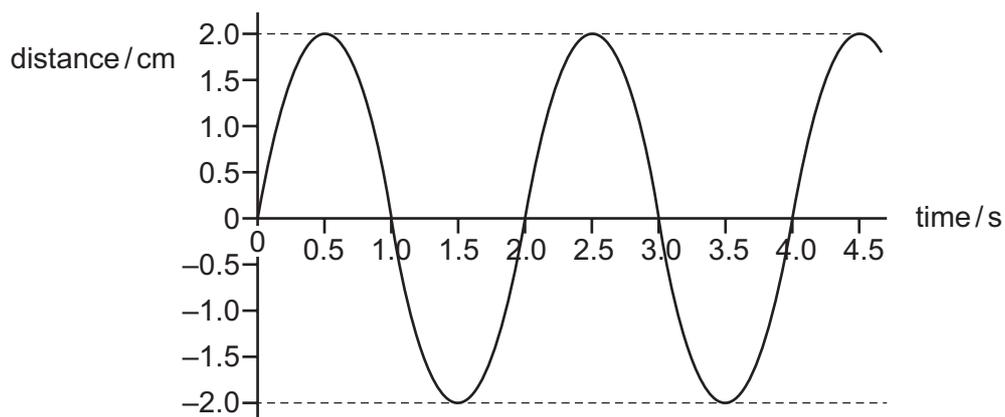
Which change of state is represented by the arrow?

- A liquid to gas
  - B liquid to solid
  - C solid to gas
  - D solid to liquid
- 33 On a summer's day, hot air rises above hot roofs.

What is the name of this process?

- A concentration
- B condensation
- C conduction
- D convection

34 The diagram represents a wave.

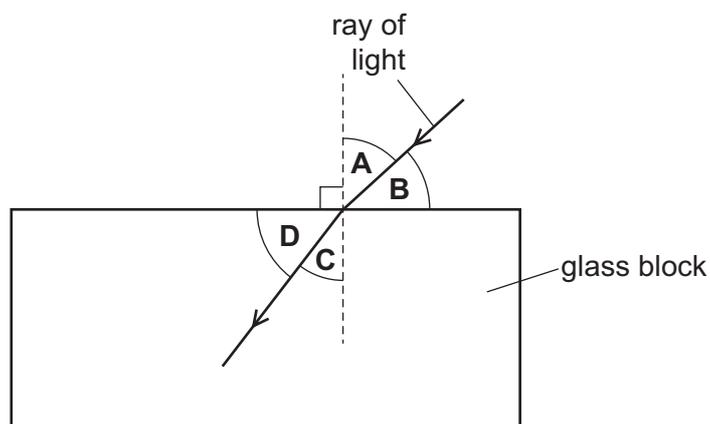


What is the amplitude of the wave, and what is the frequency of the wave?

	amplitude / cm	frequency / Hz
<b>A</b>	2.0	0.50
<b>B</b>	2.0	2.0
<b>C</b>	4.0	0.50
<b>D</b>	4.0	2.0

35 The diagram shows a ray of light as it enters a glass block.

Which labelled angle is the angle of refraction?



36 Which waves are **not** electromagnetic waves?

- A** gamma
- B** infra-red
- C** light
- D** sound

37 A man sees a car door being slammed shut.

After 0.30 s, he hears the sound of the door being shut.

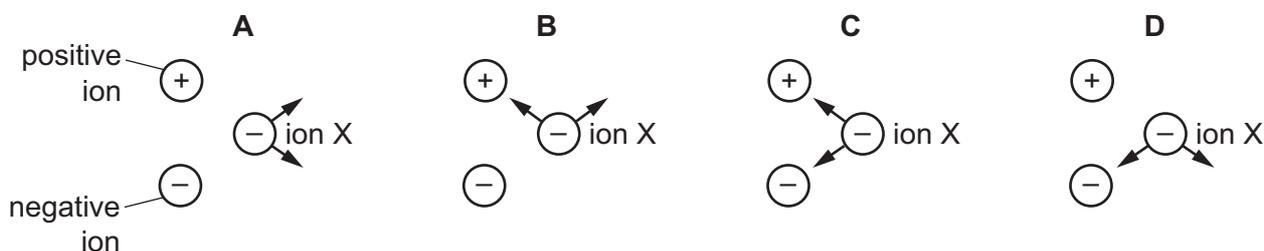
The speed of sound in air is 300 m/s.

How far away is the man from the car door?

- A** 9.0 m      **B** 90 m      **C** 100 m      **D** 1000 m

38 A negative ion X is close to a positive ion and another negative ion. Electrical forces act on ion X because of the charges in the other two ions.

Which diagram shows the directions of the two forces acting on ion X?



39 An electric kettle has the following label attached to its base.

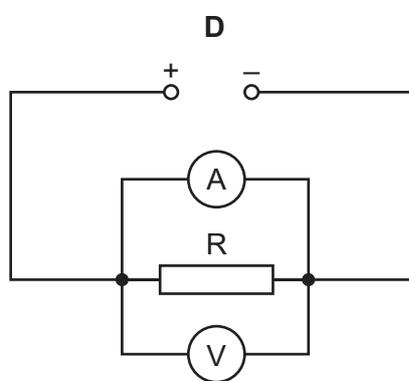
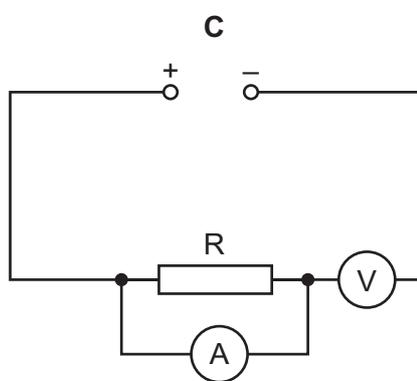
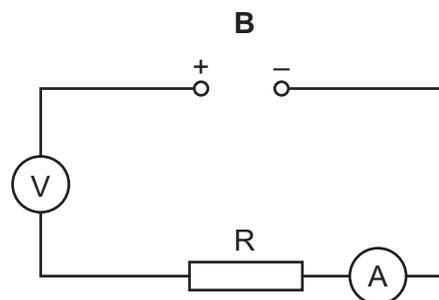
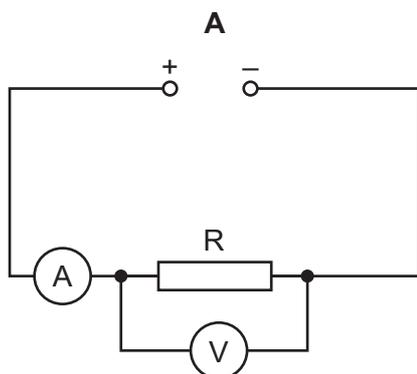
current:	7.5 A
frequency:	50 Hz
power:	1800 W
voltage:	240 V

How is an appropriate fuse for the kettle labelled?

- A** 10 A      **B** 60 Hz      **C** 2000 W      **D** 300 V

40 A student determines the resistance of resistor R.

Which circuit is used to obtain the readings needed?



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The Periodic Table of Elements

		Group															
I	II	III	IV	V	VI	VII	VIII										
3 <b>Li</b> lithium 7	4 <b>Be</b> beryllium 9	<div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <b>Key</b>                      atomic number                      atomic symbol                      name                      relative atomic mass                 </div>										2 <b>He</b> helium 4					
11 <b>Na</b> sodium 23	12 <b>Mg</b> magnesium 24											5 <b>B</b> boron 11	6 <b>C</b> carbon 12	7 <b>N</b> nitrogen 14	8 <b>O</b> oxygen 16	9 <b>F</b> fluorine 19	10 <b>Ne</b> neon 20
19 <b>K</b> potassium 39	20 <b>Ca</b> calcium 40	21 <b>Sc</b> scandium 45	22 <b>Ti</b> titanium 48	23 <b>V</b> vanadium 51	24 <b>Cr</b> chromium 52	25 <b>Mn</b> manganese 55	26 <b>Fe</b> iron 56	27 <b>Co</b> cobalt 59	28 <b>Ni</b> nickel 59	29 <b>Cu</b> copper 64	30 <b>Zn</b> zinc 65	31 <b>Ga</b> gallium 70	32 <b>Ge</b> germanium 73	33 <b>As</b> arsenic 75	34 <b>Se</b> selenium 79	35 <b>Br</b> bromine 80	36 <b>Kr</b> krypton 84
37 <b>Rb</b> rubidium 85	38 <b>Sr</b> strontium 88	39 <b>Y</b> yttrium 89	40 <b>Zr</b> zirconium 91	41 <b>Nb</b> niobium 93	42 <b>Mo</b> molybdenum 96	43 <b>Tc</b> technetium —	44 <b>Ru</b> ruthenium 101	45 <b>Rh</b> rhodium 103	46 <b>Pd</b> palladium 106	47 <b>Ag</b> silver 108	48 <b>Cd</b> cadmium 112	49 <b>In</b> indium 115	50 <b>Sn</b> tin 119	51 <b>Sb</b> antimony 122	52 <b>Te</b> tellurium 128	53 <b>I</b> iodine 127	54 <b>Xe</b> xenon 131
55 <b>Cs</b> caesium 133	56 <b>Ba</b> barium 137	57–71 lanthanoids	72 <b>Hf</b> hafnium 178	73 <b>Ta</b> tantalum 181	74 <b>W</b> tungsten 184	75 <b>Re</b> rhenium 186	76 <b>Os</b> osmium 190	77 <b>Ir</b> iridium 192	78 <b>Pt</b> platinum 195	79 <b>Au</b> gold 197	80 <b>Hg</b> mercury 201	81 <b>Tl</b> thallium 204	82 <b>Pb</b> lead 207	83 <b>Bi</b> bismuth 209	84 <b>Po</b> polonium —	85 <b>At</b> astatine —	86 <b>Rn</b> radon —
87 <b>Fr</b> francium —	88 <b>Ra</b> radium —	89–103 actinoids	104 <b>Rf</b> rutherfordium —	105 <b>Db</b> dubnium —	106 <b>Sg</b> seaborgium —	107 <b>Bh</b> bohrium —	108 <b>Hs</b> hassium —	109 <b>Mt</b> meitnerium —	110 <b>Ds</b> darmstadtium —	111 <b>Rg</b> roentgenium —	112 <b>Cn</b> copernicium —	114 <b>Fl</b> flerovium —	116 <b>Lv</b> livermorium —	—	—	—	—

lanthanoids	57 <b>La</b> lanthanum 139	58 <b>Ce</b> cerium 140	59 <b>Pr</b> praseodymium 141	60 <b>Nd</b> neodymium 144	61 <b>Pm</b> promethium —	62 <b>Sm</b> samarium 150	63 <b>Eu</b> europium 152	64 <b>Gd</b> gadolinium 157	65 <b>Tb</b> terbium 159	66 <b>Dy</b> dysprosium 163	67 <b>Ho</b> holmium 165	68 <b>Er</b> erbium 167	69 <b>Tm</b> thulium 169	70 <b>Yb</b> ytterbium 173	71 <b>Lu</b> lutetium 175
actinoids	89 <b>Ac</b> actinium —	90 <b>Th</b> thorium 232	91 <b>Pa</b> protactinium 231	92 <b>U</b> uranium 238	93 <b>Np</b> neptunium —	94 <b>Pu</b> plutonium —	95 <b>Am</b> americium —	96 <b>Cm</b> curium —	97 <b>Bk</b> berkelium —	98 <b>Cf</b> californium —	99 <b>Es</b> einsteinium —	100 <b>Fm</b> fermium —	101 <b>Md</b> mendelevium —	102 <b>No</b> nobelium —	103 <b>Lr</b> lawrencium —

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