Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/11**

Paper 1 Multiple Choice **October/November 2016**

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 **18** printed pages and **2** blank pages.

1 A boy is playing a game with a dog.

Which characteristic shown by the boy and the dog is a characteristic of all living organisms?

A Each can hear sounds made by the other.

B Meat is an important part of what they eat.

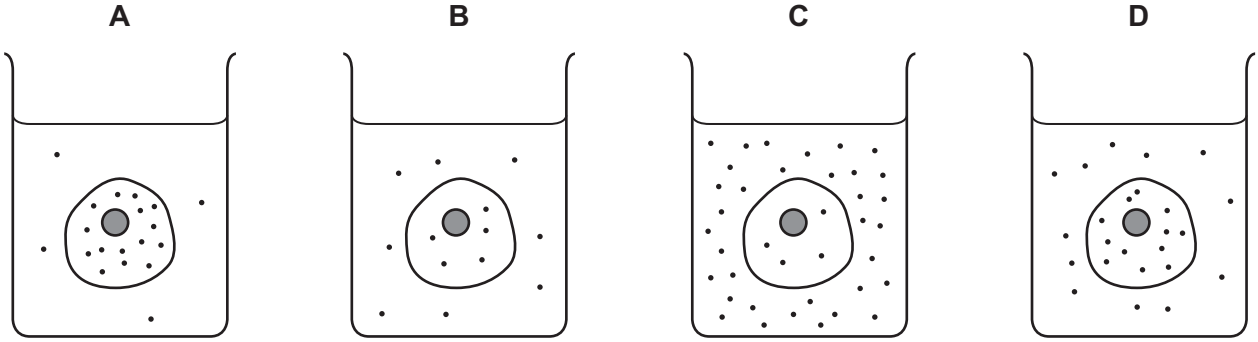
C There is hair on their bodies.

D They are able to move.

2 The diagrams represent four similar animal cells immersed in blood plasma.

The black dots represent molecules of dissolved oxygen.

Which cell will have oxygen molecules diffusing into it most rapidly?



3 A student observes a cell under a microscope.

Which structure identifies this cell as being from a plant and not from an animal?

A cell membrane

B cell wall

C cytoplasm

D nucleus

4 What is the purpose of chemical digestion?

A to absorb minerals such as calcium and iron

B to pass food out as faeces

C to break down large molecules of nutrients into smaller molecules

D to secrete enzymes

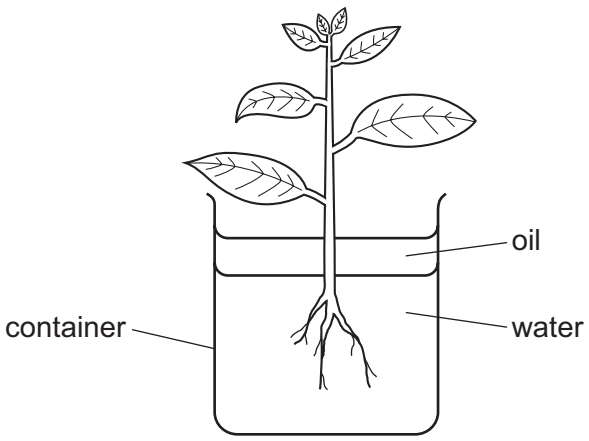
5 The table shows the results of tests carried out on a food.

name of test	colour obtained
iodine	brown
Benedict's	orange
biuret	blue

Which nutrients does the food contain?

	reducing sugar	starch	protein
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

6 The diagram shows a plant in a container of water. The layer of oil stops the water in the container evaporating.



The initial mass of the container and contents is 296 g.

After two hours the mass of the container and contents is 292 g.

What is the rate of transpiration in this time?

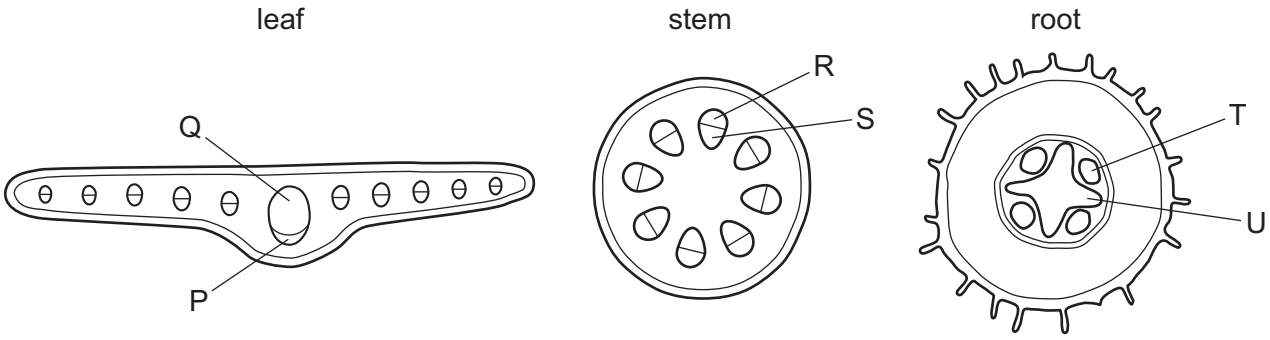
A 150 g water / hour

B 148 g water / hour

C 4 g water / hour

D 2 g water / hour

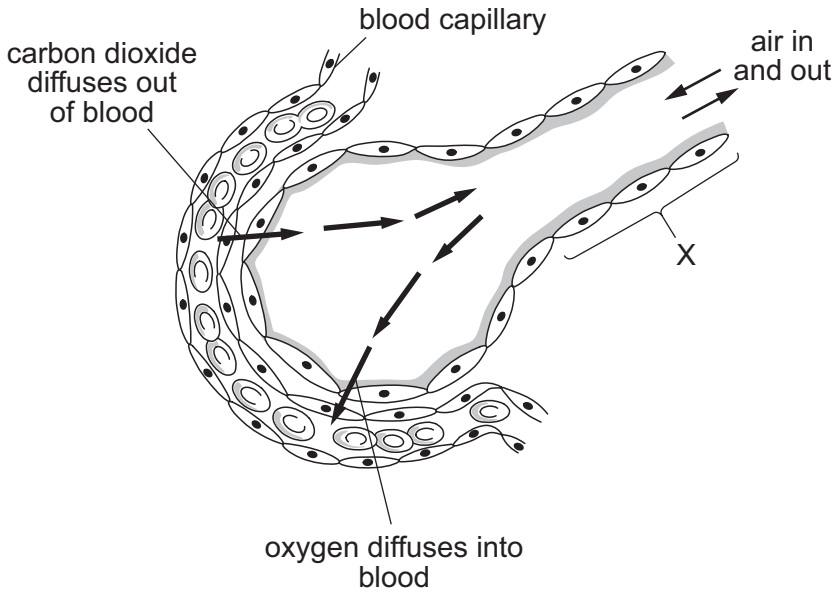
7 The diagrams show transverse sections through different parts of a plant.



Which tissues transport water through the plant?

A P, R and T **B** P, S and U **C** Q, R and T **D** Q, S and U

8 The diagram shows a section through part of a lung.



What is structure X?

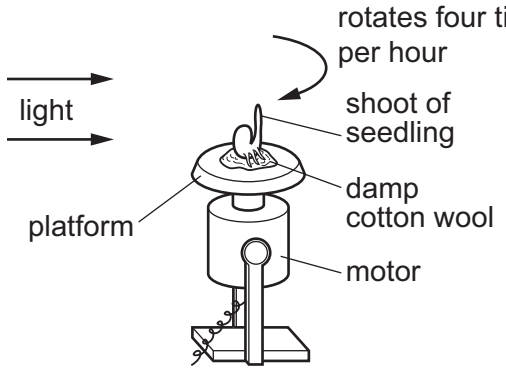
A alveolus

B bronchiole

C larynx

D trachea

9 The diagram shows apparatus containing a seedling fixed to a platform.



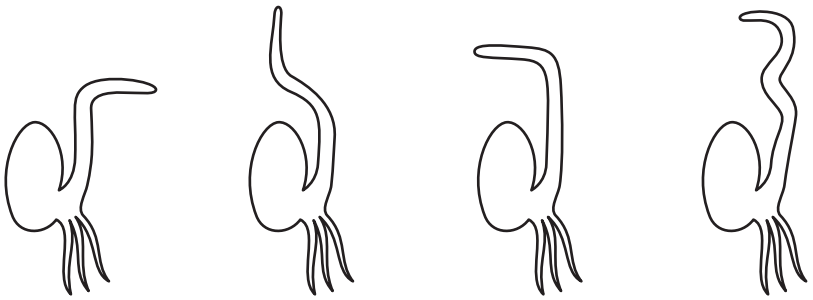
The platform is rotated four times every hour, for two days.

The motor is then switched off and the platform is stationary for the next two days.

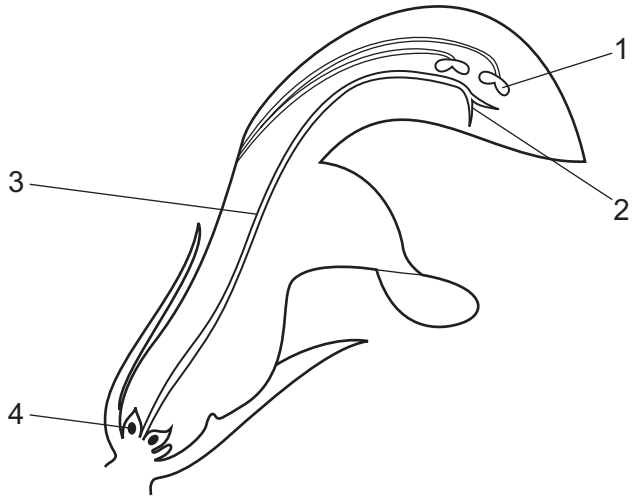
During all four days the light source remains stationary.

What is the appearance of the seedling after the four days?

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



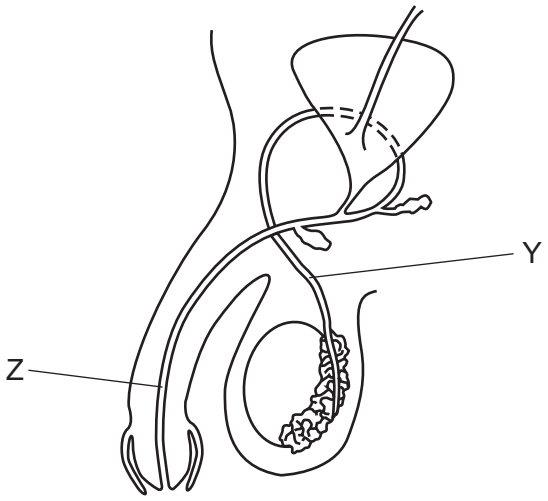
10 The diagram shows a section through a flower.



Which row in the table identifies male and female parts?

	male part	female part
A	1	2
B	2	4
C	3	1
D	4	3

11 The diagram shows the male reproductive system.



What are the parts Y and Z?

	Y	Z
A	prostate gland	urethra
B	urethra	prostate gland
C	sperm duct	prostate gland
D	sperm duct	urethra

12 Which factor is used to decide which organisms are linked in a food chain or web?

A Energy passes from one to another as they feed.

B They all depend ultimately on plants for food.

C They all feed on one species of plant.

D They are the organisms found living on an individual tree.

13 Why is it important to conserve fossil fuels?

A Producing them causes pollution.

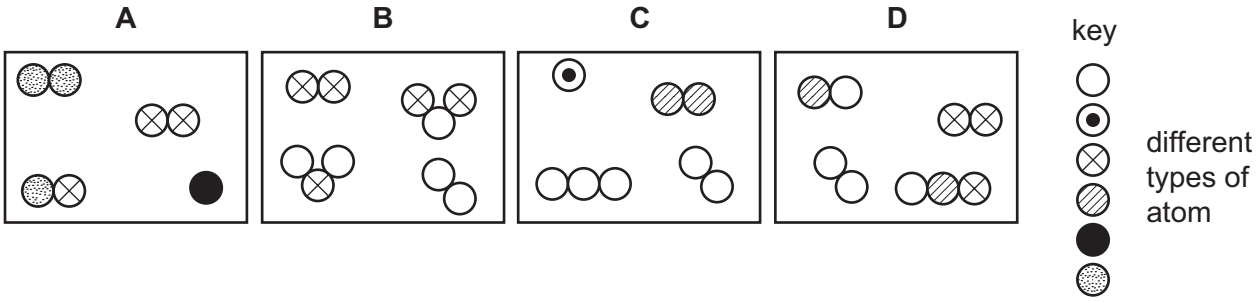
B They are difficult to dig out of the ground.

C They are expensive to manufacture.

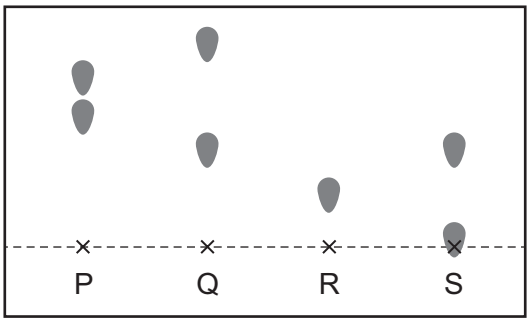
D They are non-renewable.

14 The diagrams show four different mixtures of gases.

Which diagram represents a mixture containing **only** elements?



15 The chromatogram of four inks P, Q, R and S is shown.



Which statement is correct?

A P is a single substance.

B Q contains two substances.

C R contains two substances.

D S is a single substance.

16 Which particle has the smallest mass?

A atom

B electron

C neutron

D proton

17 Which statement about compounds is correct?

A An ionic compound contains two metallic elements bonded together.

B In an ionic compound, metal ions are negatively charged.

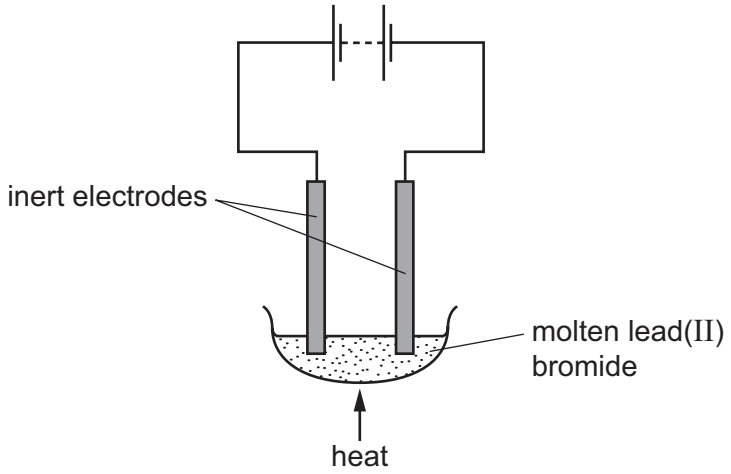
C When metals combine with non-metals, electrons are shared between the atoms.

D When two non-metals combine, molecules are formed.

18 What does a word equation show?

	the changes that occur in a reaction	the speed of a reaction
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

19 The apparatus for the electrolysis of lead(II) bromide is shown.



What is seen at each electrode?

	anode	cathode
A	brown gas	silvery solid
B	green gas	silvery solid
C	silvery solid	brown gas
D	silvery solid	green gas

20 Solid calcium oxide reacts with cold water forming calcium hydroxide.

As the cold water is added, steam is seen coming from the solid.

Which statement describes the reaction?

A It is endothermic and the temperature decreases.

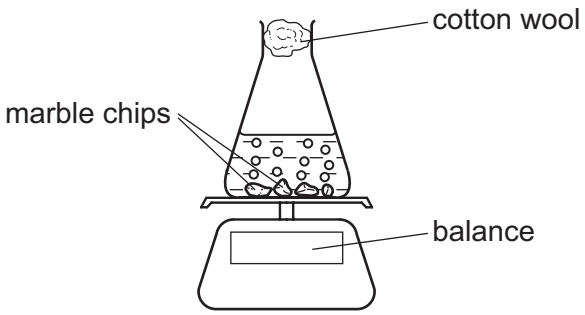
B It is endothermic and the temperature increases.

C It is exothermic and the temperature decreases.

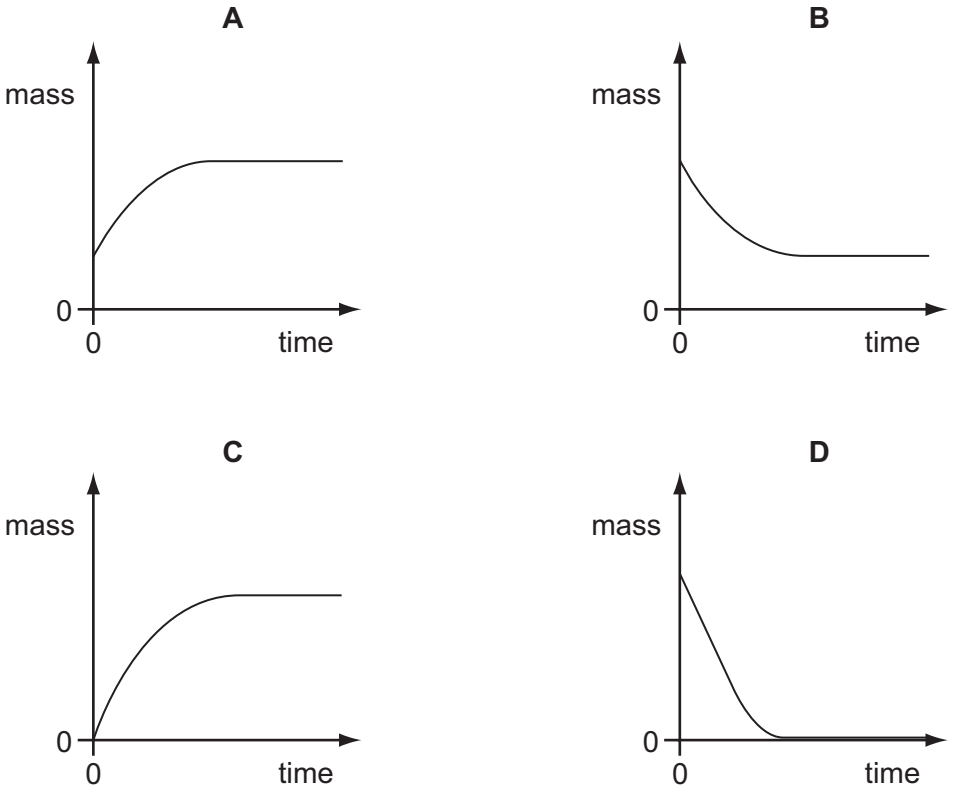
D It is exothermic and the temperature increases.

21 Marble chips react with dilute hydrochloric acid producing carbon dioxide.

The progress of this reaction is followed using the apparatus shown.



Which graph shows the results of this experiment?



22 Hydrochloric acid reacts with aqueous sodium hydroxide to form a neutral solution of sodium chloride.

Which process **must** be used to obtain dry crystals of sodium chloride from this solution?

A distillation

B evaporation

C filtration

D neutralisation

23 Solution X is mixed with nitric acid and aqueous barium nitrate.

A white precipitate is formed.

Which ion is present in solution X?

A carbonate

B chloride

C nitrate

D sulfate

24 Which statement describes a trend in the elements going down Group VII?

A They are darker in colour.

B They are displaced from their salts by elements lower down the group.

C They are more reactive.

D They have lower boiling points.

25 Many coins are made of an alloy.

Which property of an alloy makes it suitable for coins?

A conducts electricity

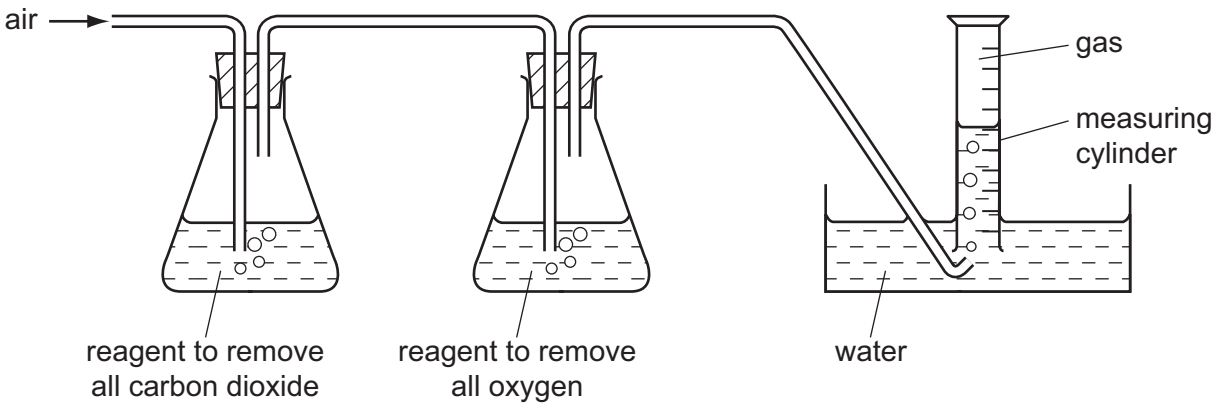
B expensive to buy

C resistant to corrosion

D soft and malleable

[Turn over

26 A 100 cm^3 sample of air is passed into the apparatus as shown.



What is the volume and the composition of the gas collected in the measuring cylinder?

	volume / cm^3	composition
A	21	pure nitrogen
B	21	nitrogen and other gases
C	79	pure nitrogen
D	79	nitrogen and other gases

27 What is formed during the complete combustion of a hydrocarbon?

A carbon dioxide and water

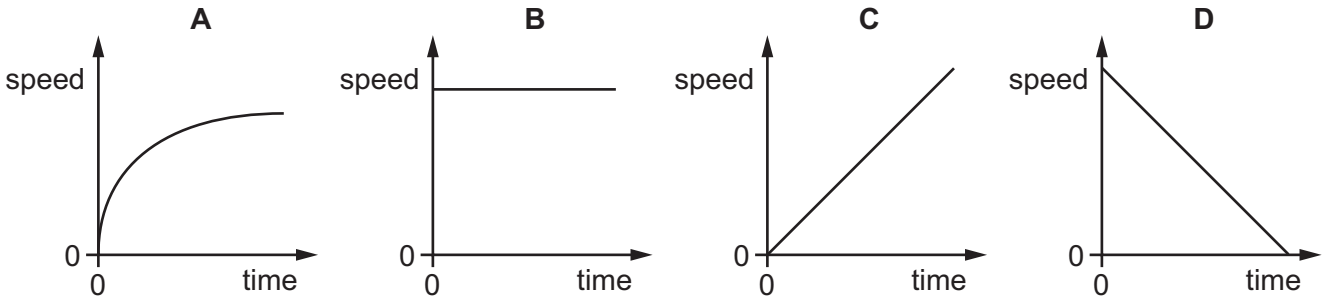
B carbon dioxide only

C carbon monoxide and carbon dioxide

D carbon monoxide only

28 A speed / time graph is plotted for the journey of a car.

Which graph shows that the car is travelling at a constant speed?



29 There is water in a beaker on a laboratory bench.

On a hot day some water evaporates.

What happens to the volume and what happens to the mass of the water in the beaker?

	volume	mass
A	decreases	decreases
B	decreases	stays the same
C	stays the same	decreases
D	stays the same	stays the same

30 A wind-powered generator is used to charge a car battery.

In which form is energy stored in the moving air and in which form is energy stored in the charged battery?

	energy in moving air	energy in charged battery
A	kinetic	chemical
B	kinetic	electrical
C	thermal	chemical
D	thermal	electrical

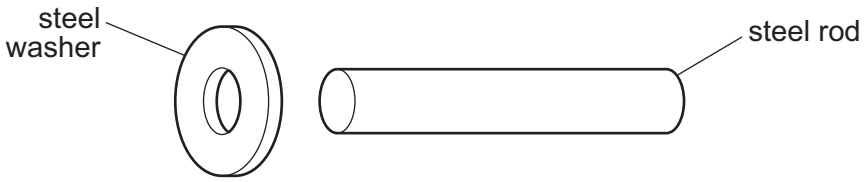
31 A bowl contains some warm water. The water evaporates from the bowl.

Which row describes where the evaporation occurs and the effect of the evaporation on the temperature of the water left in the bowl?

	where evaporation occurs	effect on temperature of water in bowl
A	only on the surface	decreases
B	only on the surface	no change
C	throughout the water	decreases
D	throughout the water	no change

[Turn over

32 An engineer wants to fix a steel washer on to a steel rod. The rod is slightly too big to fit into the hole in the washer.



How can the engineer fit the washer on to the rod?

A Cool the washer and push it over the rod.

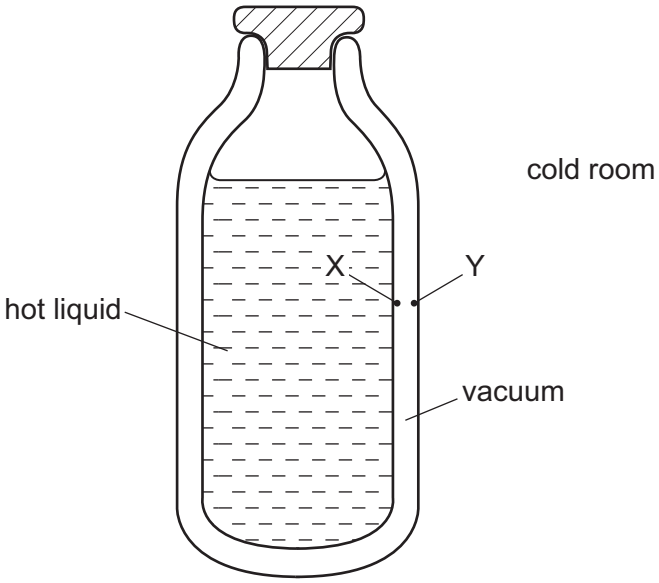
B Cool the washer and the rod to the same temperature and then push them together.

C Heat the rod and then push it in the hole.

D Heat the washer and then place it over the rod.

33 The diagram shows a vacuum flask containing a hot liquid in a cold room.

X and Y are points on the inside surfaces of the walls of the flask.



How is energy transferred through the vacuum between X and Y?

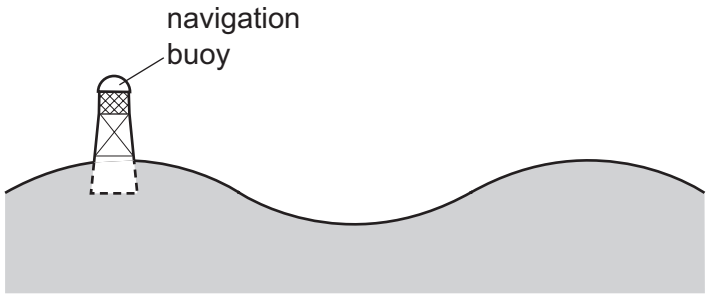
A by conduction and convection

B by conduction only

C by radiation and convection

D by radiation only

34 A navigation buoy floating on the sea oscillates up and down as a wave passes.

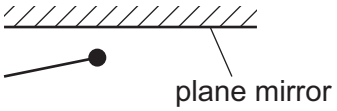


In exactly two minutes, six complete wavelengths pass the buoy.

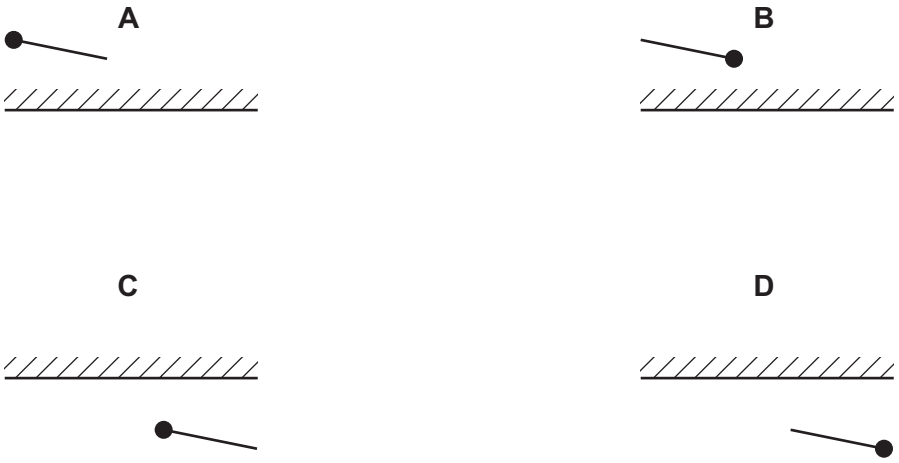
What is the frequency of the waves?

A 0.050 Hz **B** 0.33 Hz **C** 3.0 Hz **D** 20 Hz

35 The diagram shows an object in front of a plane mirror.



Which diagram below shows the image of the object formed by the mirror?



36 Which statement about the electromagnetic spectrum is correct?

A Gamma rays have the highest frequency.

B Microwaves have the smallest wavelength.

C Ultraviolet waves have the largest wavelength.

D Visible light has the lowest frequency.

37 A sound wave has a frequency of 250 Hz in air. A second sound wave has a frequency of 500 Hz in air. Both sound waves have the same amplitude.

How does the second sound wave compare with the first?

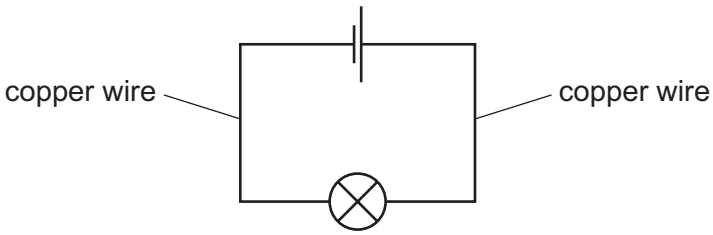
A It is louder.

B It has a greater speed.

C It has a higher pitch.

D It has a larger wavelength.

38 A lamp is connected to a cell by copper wires. Particles flow from one terminal of the cell around the circuit to the other terminal of the cell.



Which particles flow round the circuit and from which terminal of the cell do they flow?

	particles	from which terminal
A	electrons	negative
B	electrons	positive
C	protons	negative
D	protons	positive

39 When a computer is switched on, the current rises quickly to 3.1 A and then falls slowly to a steady value of 1.0 A while the computer is in use.

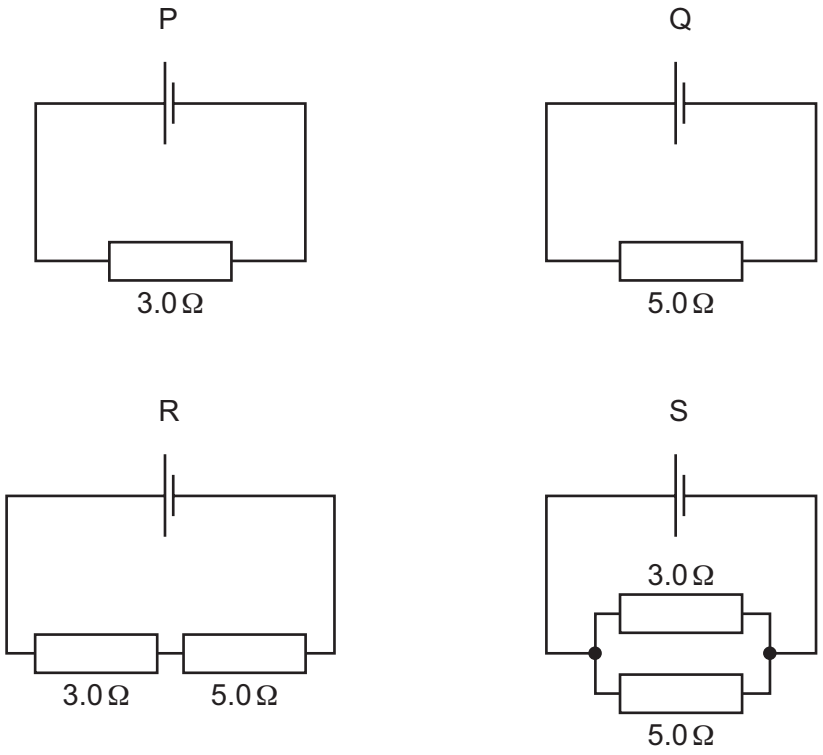
The wire connecting the computer to the power supply can safely carry a current of up to 10.0 A.

The circuit contains a fuse.

Which value of fuse is suitable to use to provide the greatest protection?

A 1.0 A **B** 3.0 A **C** 5.0 A **D** 13.0 A

40 The diagram shows four different circuits containing either one or two resistors.



What is the order of increasing resistance of these circuits?

	lowest resistance → highest resistance			
A	P	Q	R	S
B	R	S	P	Q
C	S	P	Q	R
D	P	R	Q	S

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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.)