UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice **October/November 2012**

45 minutes

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

4842883193

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, 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.

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.

This document consists of **19** printed pages and **1** blank page.

1 What is diffusion?

A net movement of molecules down a concentration gradient

B net movement of molecules up a concentration gradient

C total movement of molecules down a concentration gradient

D total movement of molecules up a concentration gradient

2 Water enters a plant cell.

In what order does the water pass through the cell structures before reaching the vacuole?

A cell surface membrane → cell wall → cytoplasm

B cell wall → cell surface membrane → cytoplasm

C cell wall → cytoplasm → cell surface membrane

D cytoplasm → cell wall → cell surface membrane

3 Water moves through the stomata of leaves during transpiration.

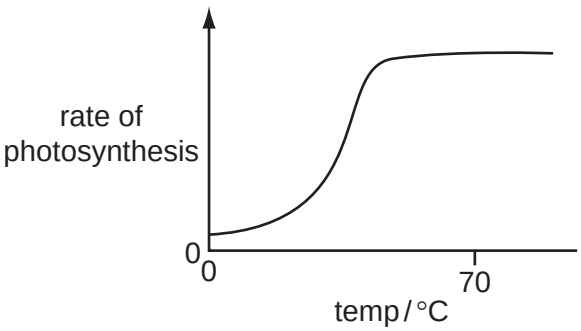
In which direction, and in which form, does it move?

	direction	form
A	into the leaf	liquid
B	into the leaf	vapour
C	out of the leaf	liquid
D	out of the leaf	vapour

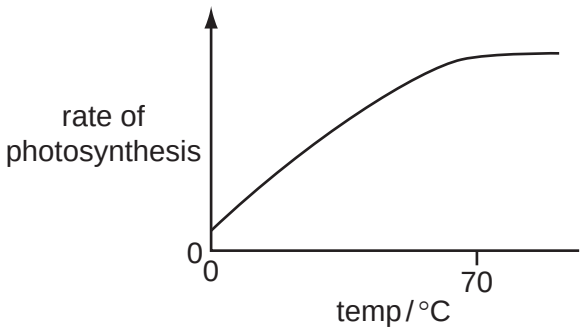
4 The chemical reactions in photosynthesis depend on enzymes.

Which graph shows the effect of temperature on the rate of these reactions?

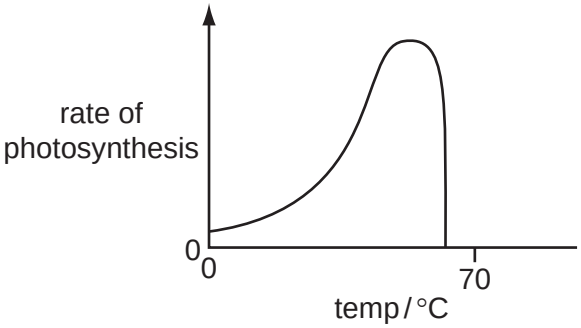
A



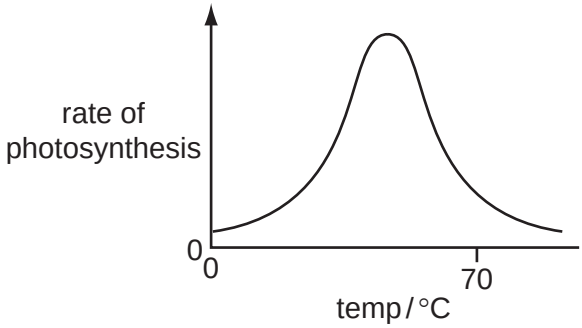
B



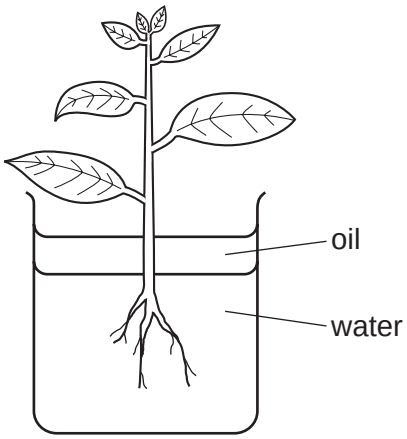
C



D



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



When set up, the apparatus weighs 296 g.
After two hours it weighs 292 g.

What is the rate of transpiration?

A 150 g water / hour

B 148 g water / hour

C 4 g water / hour

D 2 g water / hour

6 Which of these places parts of the alimentary canal in the order in which food passes through them?

A oesophagus → colon → small intestine

B small intestine → oesophagus → rectum

C small intestine → rectum → anus

D stomach → colon → small intestine

7 Which part of blood contains haemoglobin?

A plasma

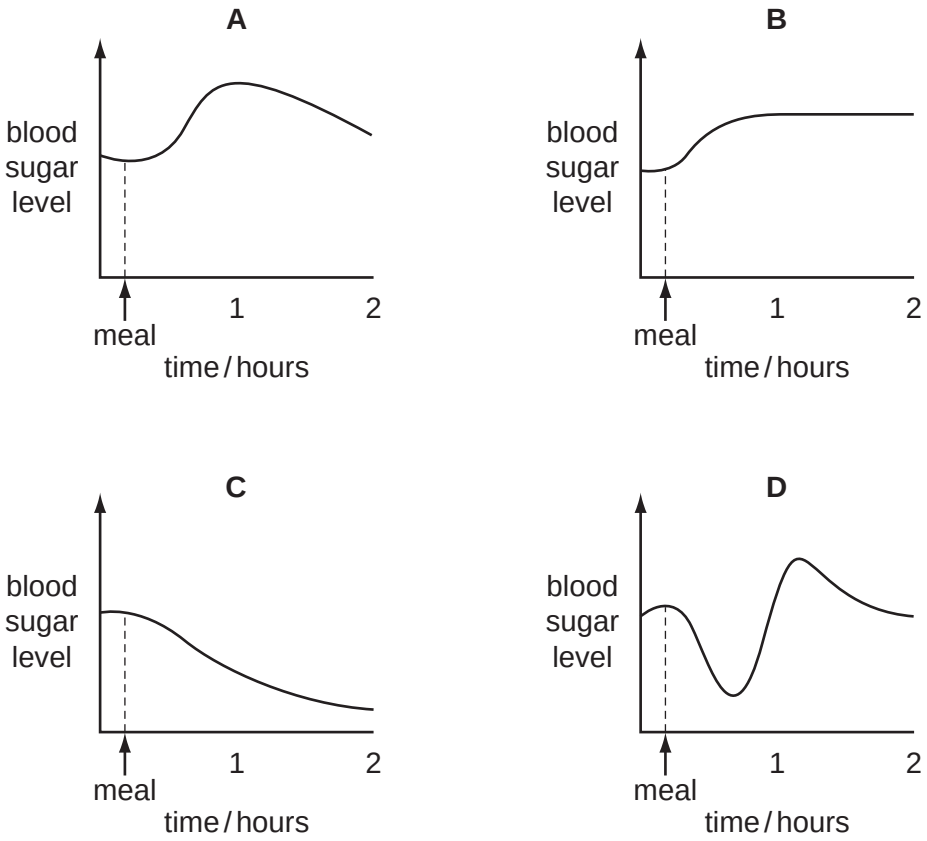
B platelets

C red blood cells

D white blood cells

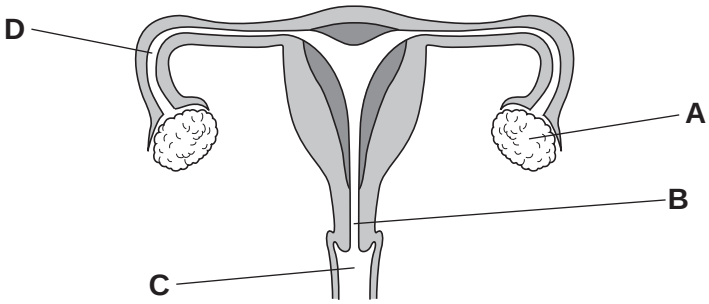
8 A person does not eat for several hours but then has a meal rich in carbohydrate.

Which graph shows how the person's blood sugar level changes after the meal?



9 The diagram shows the human female reproductive system.

Where is the egg fertilised?



10 Which structures in flowers contain female gametes?

A anthers

B ovules

C stamens

D stigmas

11 It is possible to grow plants that are genetically identical.

What are plants grown in this way called?

A clones

B gametes

C seeds

D zygotes

12 Some of the gases present in the atmosphere are listed.

1 carbon dioxide

2 methane

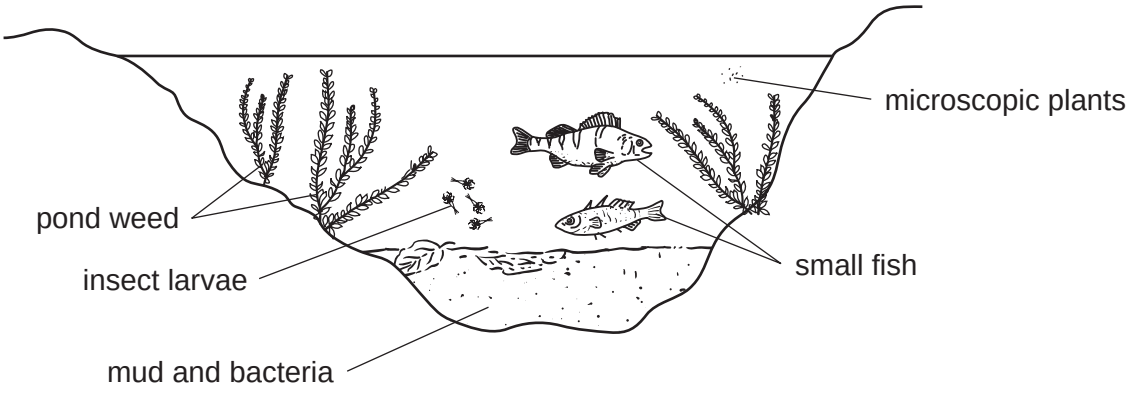
3 nitrogen

4 oxygen

Which gases increase global warming when their levels in the atmosphere increase?

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

13 The diagram shows the organisms in a pond.



Which is a food chain in this pond?

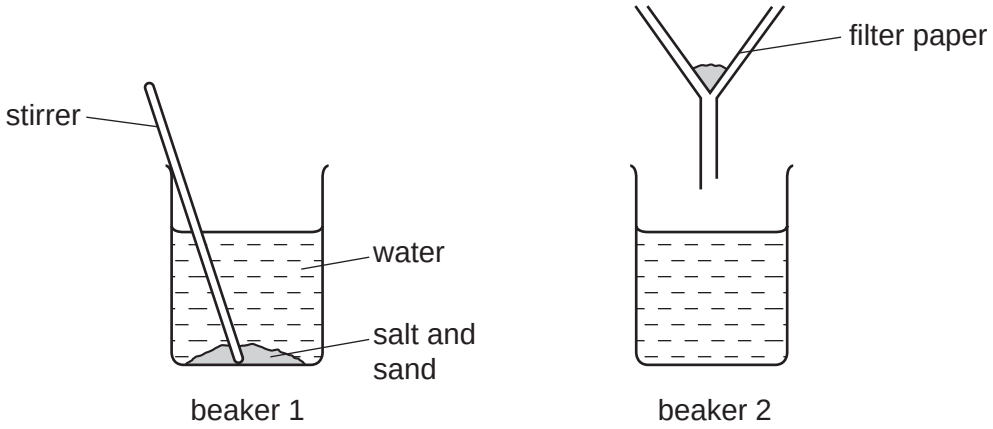
A bacteria → pond weed → insect larvae → small fish

B microscopic plants → insect larvae → small fish → bacteria

C pond weed → small fish → bacteria → microscopic plants

D small fish → insect larvae → microscopic plants → pond weed

14 The apparatus shown is used to remove sand from a mixture of salt and sand.



The contents of beaker 1 are filtered.

What is obtained in beaker 2?

A a mixture of an element and a compound

B a mixture of two compounds

C one compound only

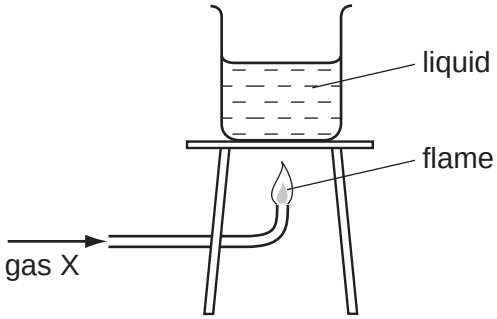
D one element only

15 The electronic configurations of four elements are given.

Which element is found on the left-hand side of the Periodic Table?

A 2 **B** 2, 8, 7 **C** 2, 8, 8 **D** 2, 8, 8, 2

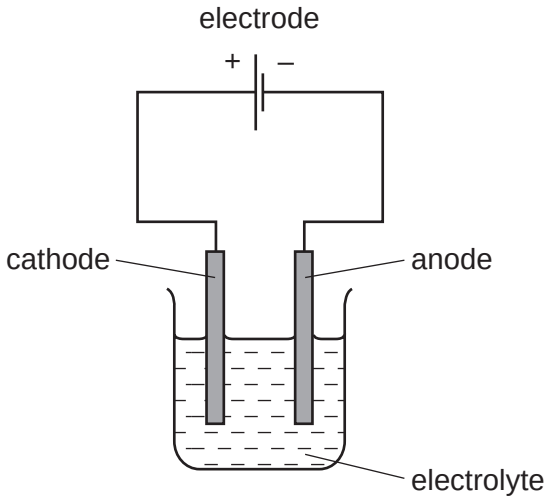
16 The diagram shows gas X burning and heating a liquid.



Which row is correct?

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

17 The diagram shows a simple cell.



Which label on the diagram is correct?

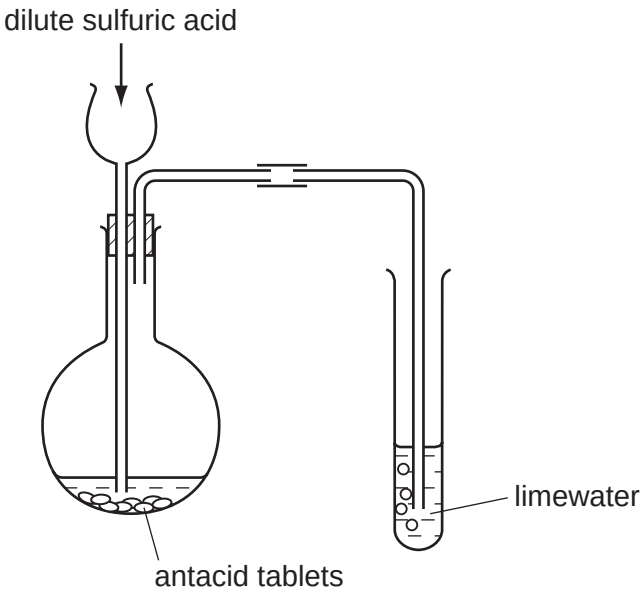
A anode

B cathode

C electrode

D electrolyte

18 Dilute sulfuric acid is added to antacid tablets in the apparatus shown.



The limewater turns milky.

What does the experiment show these antacid tablets contain?

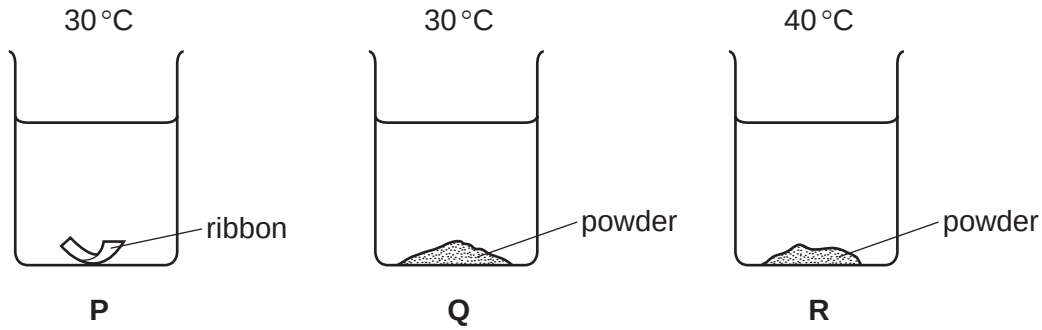
A magnesium

B magnesium carbonate

C magnesium hydroxide

D magnesium oxide

19 In the beakers, equal masses of magnesium are added to equal volumes of acid of the same concentration.



What is the order of the speed of reaction in the beakers?

	slowest →		fastest
A	P	Q	R
B	P	R	Q
C	Q	P	R
D	Q	R	P

20 Which ion gives a white precipitate **both** with aqueous sodium hydroxide **and** with aqueous ammonia?

A $Cu^{2+}(aq)$ **B** $Fe^{2+}(aq)$ **C** $Fe^{3+}(aq)$ **D** $Zn^{2+}(aq)$

21 Platinite is a material used for parts of light bulbs. It is made by mixing iron and zinc.

Which type of substance is platinite?

A alloy

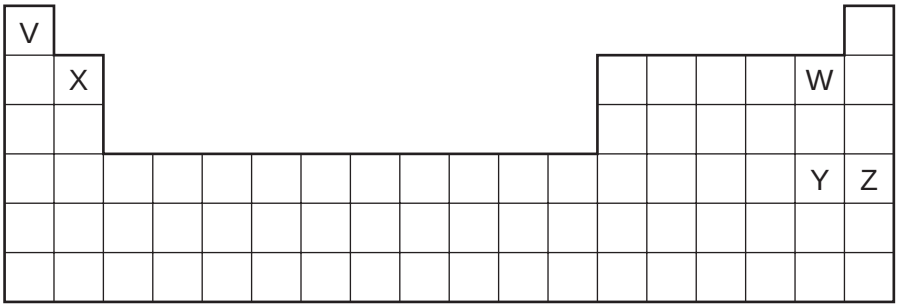
B hydrocarbon

C ionic compound

D transition metal

22 The diagram shows an outline of the Periodic Table.

Which two elements have similar chemical properties?



A V and W **B** V and X **C** W and Y **D** Y and Z

23 Element X is unaffected by acids and is used in an alloy to make jewellery.

X is ……1…… transition metal and the alloy is ……2…… than the pure element.

Which words correctly complete gaps 1 and 2?

	1	2
A	an unreactive	harder
B	an unreactive	softer
C	a reactive	harder
D	a reactive	softer

24 The list shows different properties.

1 density

2 melting point

3 reactivity

Which properties show an increase for elements in Group VII as the group is descended?

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

25 Petroleum is a source of hydrocarbon fuels.

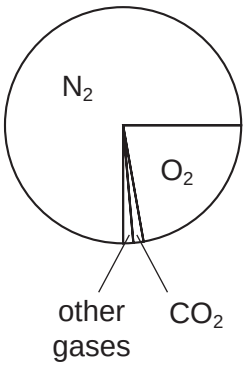
Other fuels are coal and wood.

Which of these are fossil fuels?

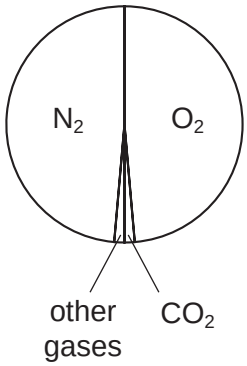
	coal	wood	petroleum
A	yes	yes	no
B	yes	no	yes
C	no	yes	yes
D	yes	yes	yes

26 Which pie chart correctly shows the proportions of gases in the air?

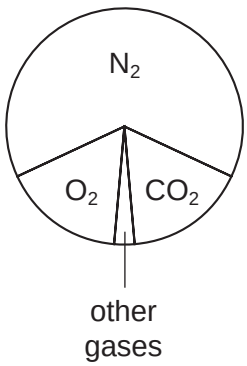
A



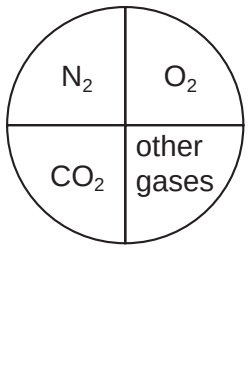
B



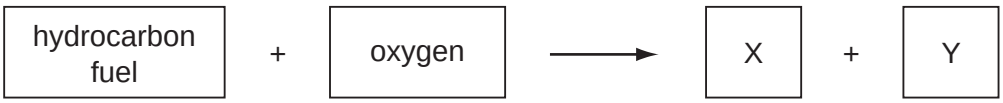
C



D



27 A hydrocarbon fuel is burned completely.



What are X and Y?

	X	Y
A	CO	H_2
B	CO	H_2O
C	CO_2	H_2
D	CO_2	H_2O

28 What is the unit of work?

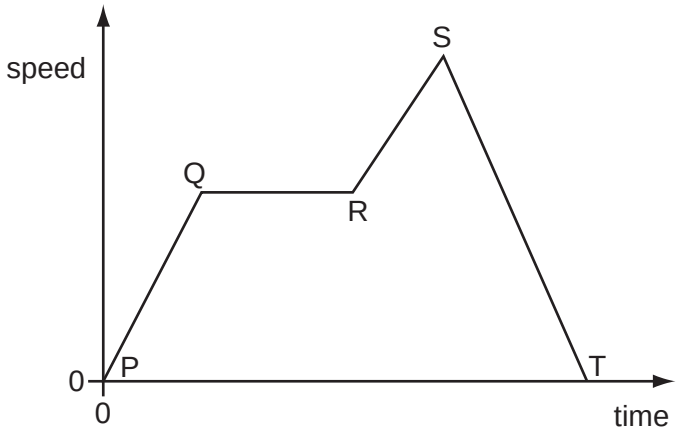
A joule

B kilogram

C newton

D watt

29 The diagram is a speed / time graph for a car travelling along a city street.



Where on the graph is the car moving with changing speed?

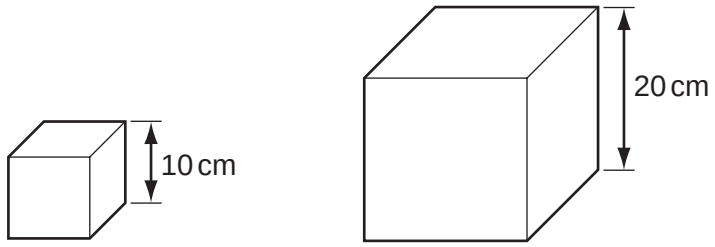
A PQ, QR, RS and ST

B PQ, RS and ST only

C PQ and RS only

D QR only

30 The diagram shows two cubes P and Q. The lengths of their sides and their masses are given.



mass = 2000 g

cube P

mass = 16 000 g

cube Q

What is the density of the material of cube Q?

A half that of cube P

B the same as that of cube P

C twice that of cube P

D four times that of cube P

31 In which state(s) of matter can convection occur?

A solids and liquids

B solids and gases

C liquids and gases

D liquids only

32 The melting point of water is 0 °C and the boiling point of water is 100 °C.

Which statement about water is correct?

A At 100 °C boiling occurs throughout the water.

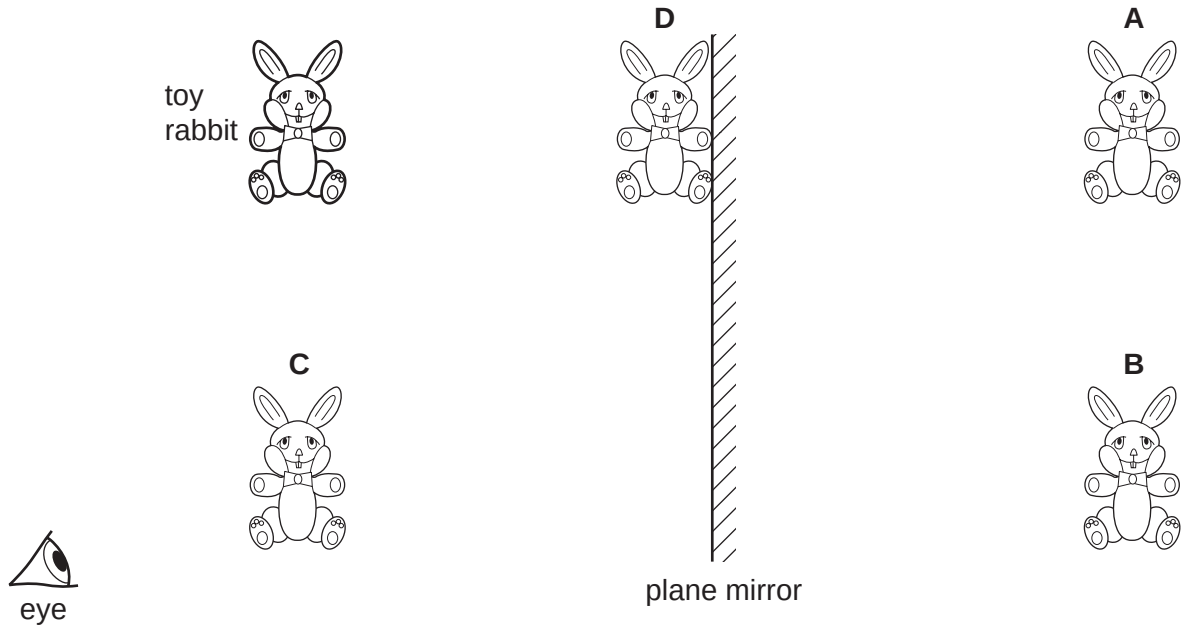
B Between 0 °C and 100 °C the lowest energy molecules escape.

C Between 0 °C and 100 °C water does not evaporate.

D Ice only melts when its temperature is above 0 °C.

33 The diagram shows the position of the eye of a person looking at the reflection of a toy rabbit in a plane mirror.

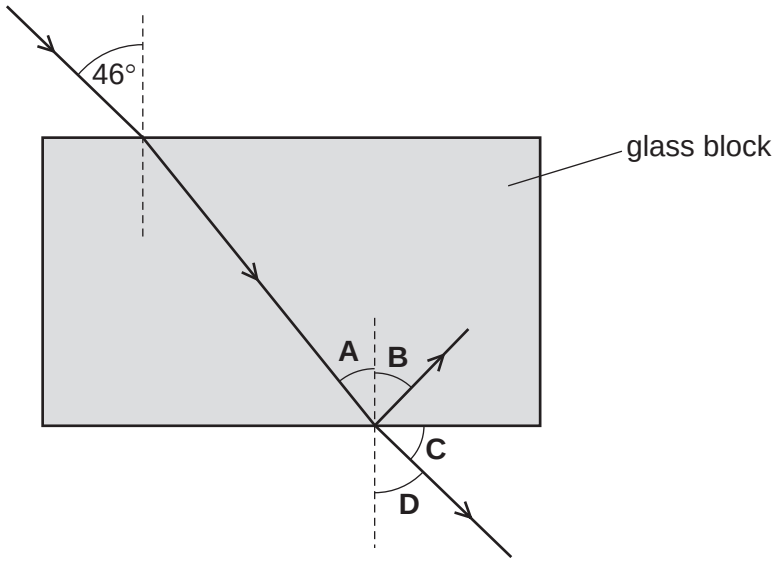
At which position is the image seen?



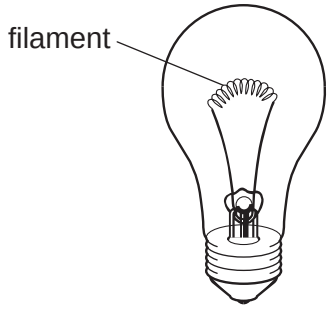
34 A ray of light strikes one face of a parallel-sided glass block. The angle of incidence is 46°.

At the opposite face, part of the ray is reflected and part is refracted into the air.

Which other angle has a value of 46°?



35 The diagram shows a filament lamp.



What are the main types of wave given out by the filament once the lamp is lit?

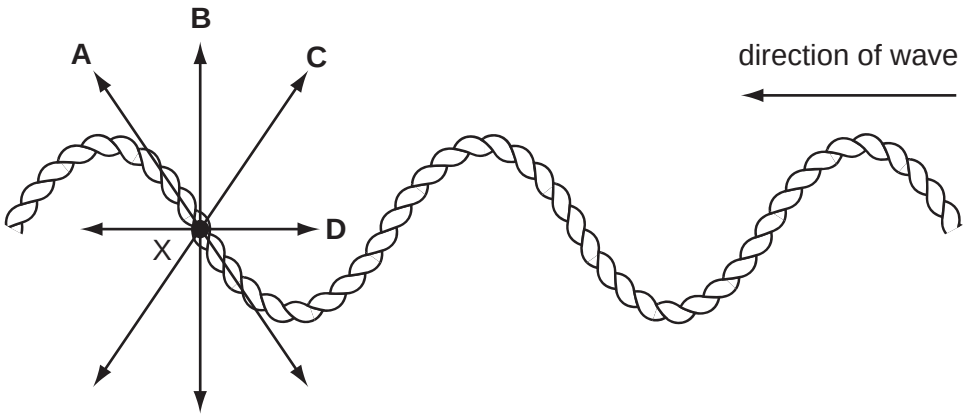
A visible light and infra-red

B visible light and microwaves

C visible light and radio

D visible light and ultraviolet

36 A wave is sent along a rope in the direction shown in the diagram.



Which arrow shows the direction of vibration of the rope at point X?

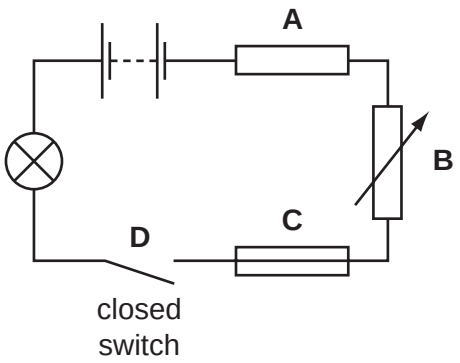
37 A starting pistol is fired. An echo from a wall 150 m away is heard one second later.

What is the speed of sound calculated from these results?

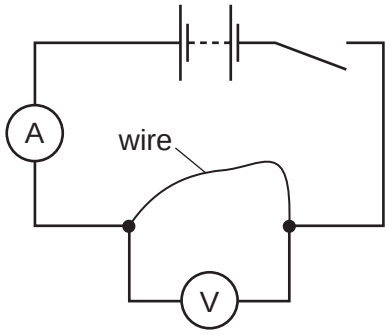
A 75 m/s **B** 150 m/s **C** 225 m/s **D** 300 m/s

38 When the switch in the circuit shown is closed, the lamp glows dimly.

Which component can be adjusted to make the lamp brighter?



39 A student sets up a circuit to find the resistance of a length of wire.



When the switch is closed, the ammeter reads 2 A and the voltmeter reads 10 V.

What is the resistance of the length of wire?

A 0.2 Ω **B** 5 Ω **C** 8 Ω **D** 20 Ω

40 In an electrical circuit, what is the purpose of a fuse?

A to connect the metal case of an appliance to the earth

B to cut off the electrical supply if too much current flows

C to keep an electrical appliance dry in damp conditions

D to maintain a steady voltage as the current varies

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DATA SHEET
The Periodic Table of the Elements

Group																		
I	II										III	IV	V	VI	VII	0
																4 He Helium 2
					1 H Hydrogen 1											
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.).