



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice

October/November 2013

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, 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.

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.

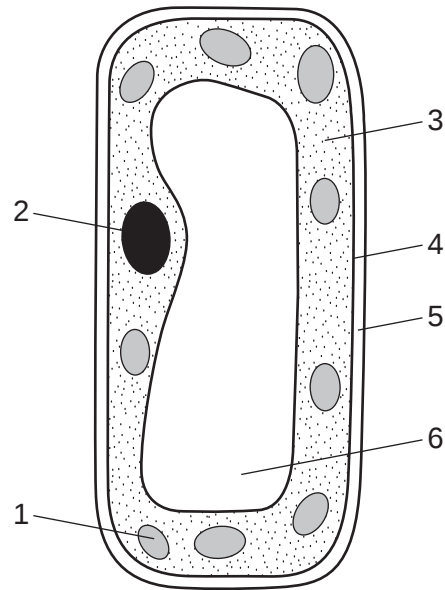
A copy of the Periodic Table is printed on page 20.

Electronic calculators may be used.

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



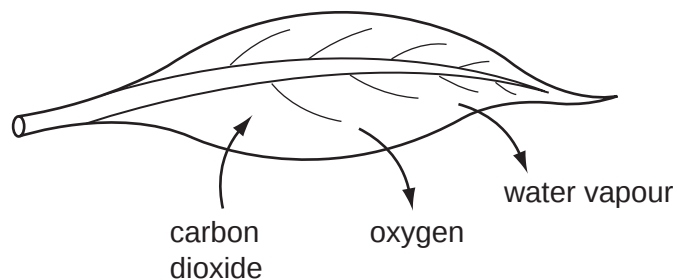
1 The diagram shows a plant cell.



Which parts of the cell are found in plant cells **only**?

- A** 1, 2 and 3 **B** 2, 3 and 4 **C** 4, 5 and 6 **D** 1, 5 and 6

2 The diagram shows a leaf in sunlight and some of the substances that diffuse into and out of it.



Which of the following has a higher concentration outside the leaf than inside the leaf?

- A** carbon dioxide only
B carbon dioxide and oxygen
C oxygen and water vapour
D water vapour only

3 Enzymes are made from

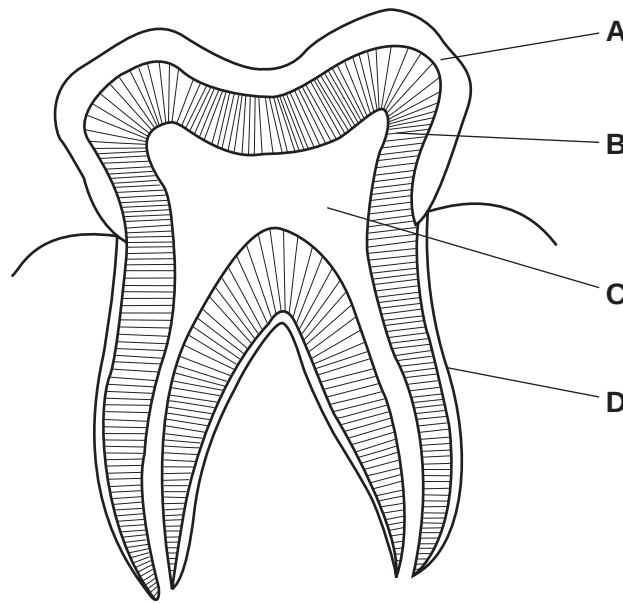
- A** fat.
B hormones.
C proteins.
D starch.

4 What are the main products of photosynthesis?

- A carbon dioxide + oxygen
- B carbon dioxide + water
- C simple sugars + oxygen
- D simple sugars + water

5 The diagram shows a section through a human tooth.

Which part is made of the hardest material?



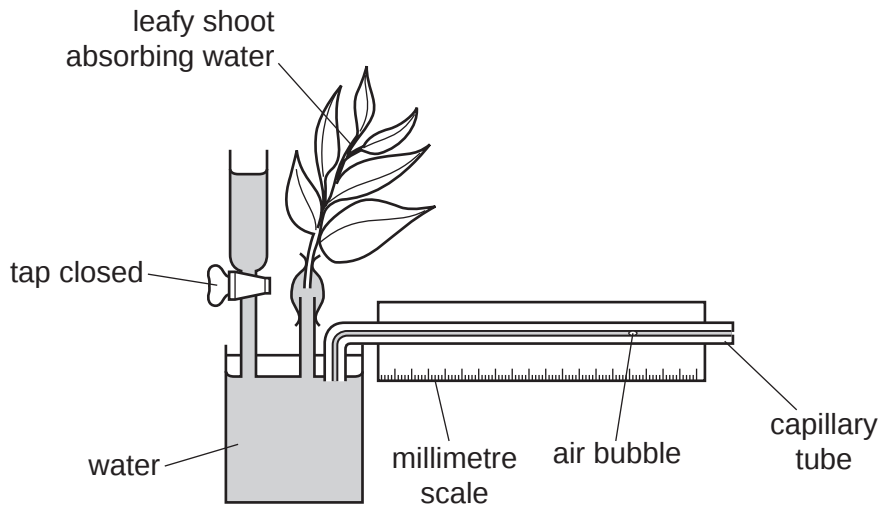
6 How do the contents of expired air differ from those of inspired air?

	carbon dioxide	nitrogen	oxygen
A	less	less	more
B	more	more	less
C	more	same	less
D	same	more	same

7 Which chambers of the heart have the thickest and most muscular walls?

- A left atrium and right atrium
- B left atrium and right ventricle
- C left ventricle and right atrium
- D left ventricle and right ventricle

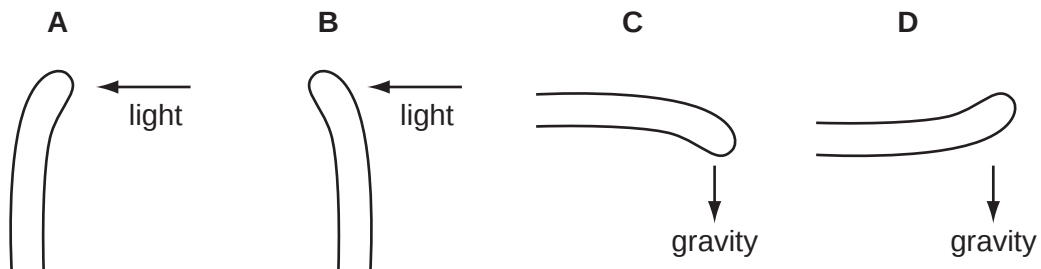
- 8 The diagram shows an apparatus that was used to measure the uptake of water by a leafy shoot.



What will happen to the air bubble during the measurement?

- A It will get larger.
 - B It will get smaller.
 - C It will move to the left.
 - D It will move to the right.
- 9 The diagrams show shoots of maize seedlings.

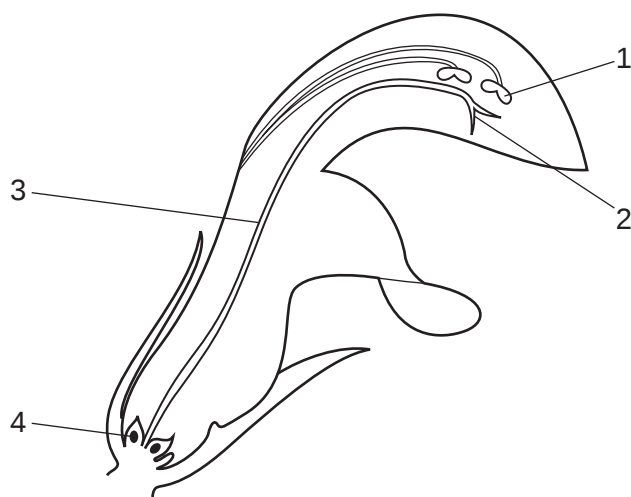
Which shoot shows a geotropic response in which it grows away from the stimulus?



- 10 How often is an egg usually released from the ovaries of a woman?

- A once a week
- B once every 14 days
- C once every 28 days
- D once every 9 months

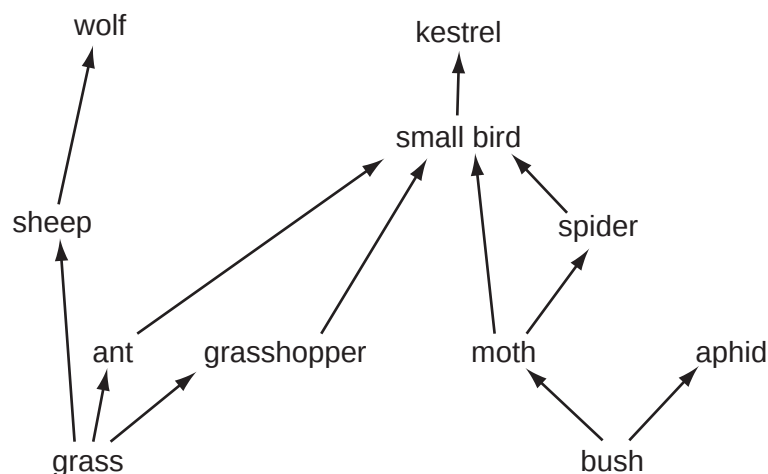
11 The diagram shows a section through a flower.



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

12 The diagram shows part of a food web.



How many different types of carnivores and herbivores are shown?

	carnivores	herbivores
A	2	3
B	3	4
C	4	5
D	5	4

13 Which is a greenhouse gas that plants help to remove from the atmosphere?

- A** carbon dioxide
- B** hydrogen
- C** methane
- D** oxygen

14 Which method of separation can be used to obtain pure water from aqueous potassium chloride?

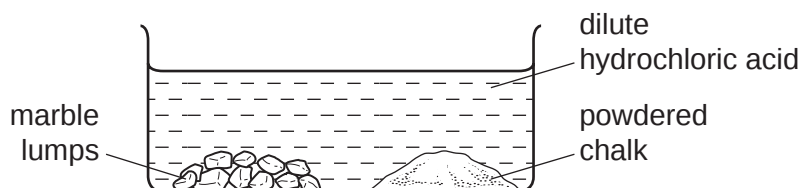
- A** chromatography
- B** crystallisation
- C** distillation
- D** filtration

15 Which reaction involves combustion?

- A calcium carbonate $\rightarrow$ calcium oxide + carbon dioxide
- B methane + oxygen $\rightarrow$ carbon dioxide + water
- C sodium carbonate + hydrochloric acid $\rightarrow$ sodium chloride + water + carbon dioxide
- D sodium hydroxide + hydrochloric acid $\rightarrow$ sodium chloride + water

16 Marble and chalk are two forms of calcium carbonate.

The diagram shows equal masses of lumps of marble and powdered chalk placed in dilute hydrochloric acid.

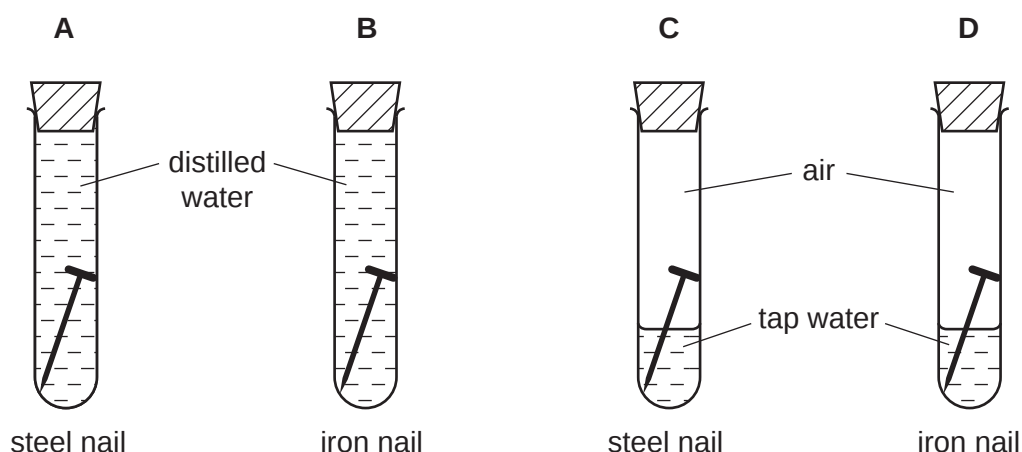


The marble takes longer than the chalk to dissolve in the acid.

Why is this?

- A Marble is more reactive than chalk.
- B Marble is more soluble than chalk.
- C The marble has the smaller surface area.
- D The marble is more basic.

17 In which test-tube does rusting occur most quickly?



18 The table shows the properties of four substances.

Which substance is an alkali?

	solubility in water	reaction with an acid
A	insoluble	reacts
B	insoluble	does not react
C	soluble	reacts
D	soluble	does not react

19 A sodium atom has a proton number of 11 and a nucleon number of 23.

Which row shows the correct number of protons, neutrons and electrons in the atom of sodium?

	protons	neutrons	electrons
A	11	11	12
B	11	12	11
C	11	23	11
D	11	23	12

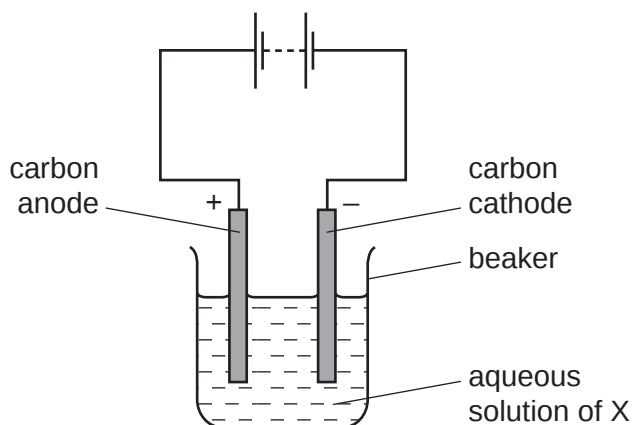
20 The breakdown of molten lead bromide by1..... forms the elements lead and bromine.

Lead is formed at the2..... .

Which words correctly complete gaps 1 and 2?

	1	2
A	electrolysis	anode
B	electrolysis	cathode
C	reduction	anode
D	reduction	cathode

21 An aqueous solution of X is electrolysed.

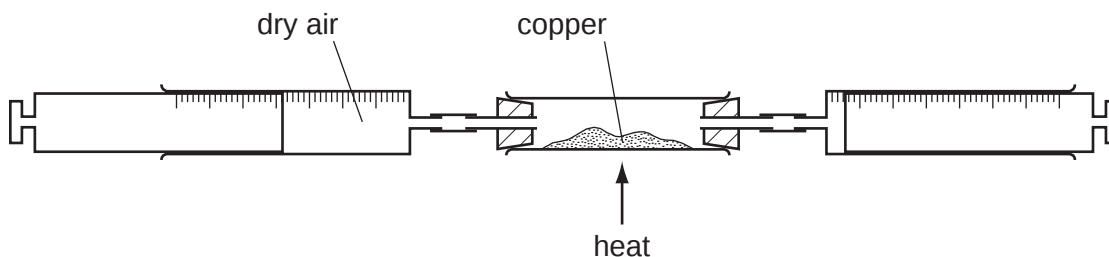


The cathode increases in mass and turns red-brown.

What is X?

- A** copper(II) chloride
- B** iodine
- C** lead(II) bromide
- D** sodium chloride

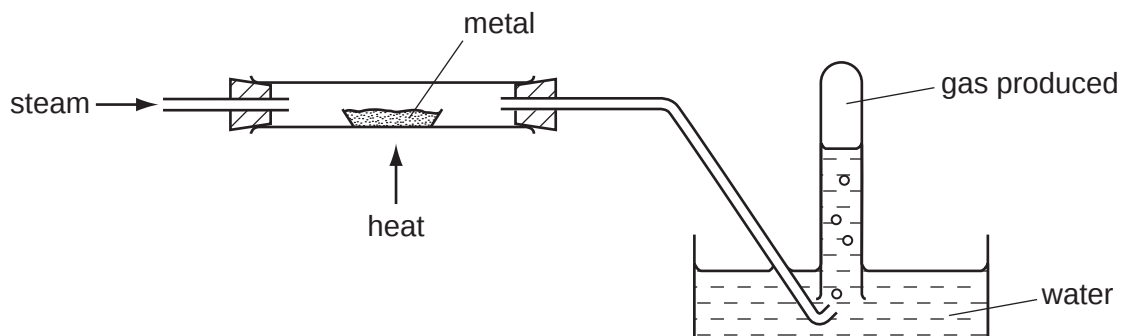
22 60 cm³ of dry air is passed over hot copper until all the oxygen has reacted.



Which volume of gas remains at the end of the reaction?

- A** 6 cm³
- B** 12 cm³
- C** 48 cm³
- D** 54 cm³

23 Steam is passed over a heated metal.



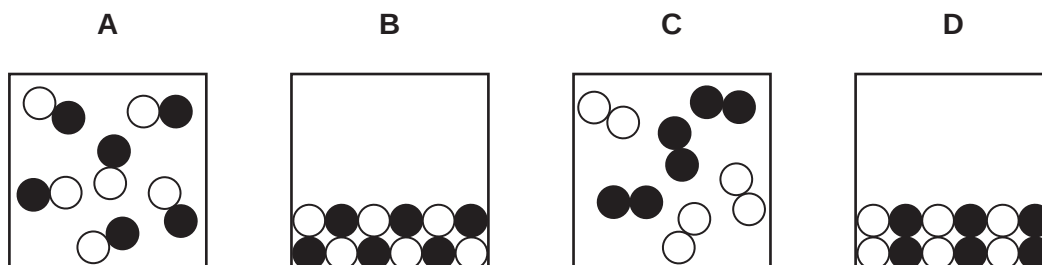
The metal reacts and a gas is produced.

The gas ignites with a pop when tested with a lighted splint.

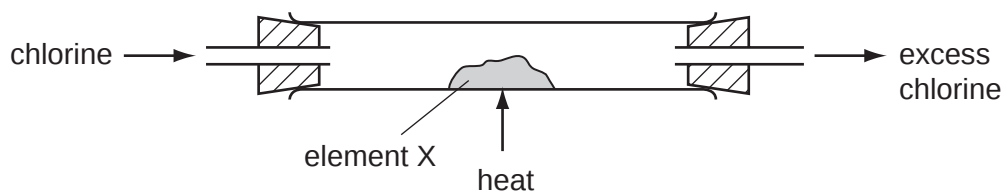
What are the metal and the gas?

	metal	gas
A	copper	hydrogen
B	copper	oxygen
C	magnesium	oxygen
D	zinc	hydrogen

24 Which diagram represents gaseous hydrogen chloride, HCl ?



25 Element X reacts with chlorine to form a red-brown compound.



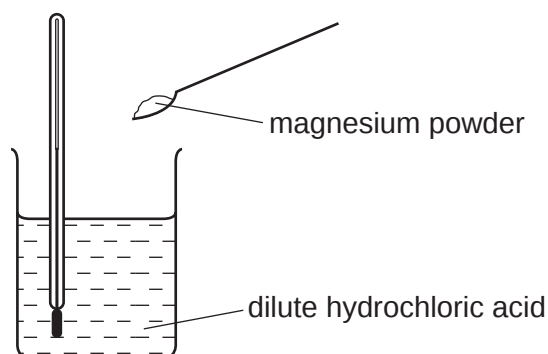
Which row describes element X and its melting point?

	type of element	melting point of X
A	alkali metal	high
B	alkali metal	low
C	transition element	high
D	transition element	low

26 Which row describes the physical state of some of the Group VII elements at room temperature?

	chlorine	bromine	iodine
A	gas	gas	liquid
B	gas	liquid	solid
C	liquid	liquid	gas
D	liquid	solid	solid

- 27 The diagram shows how the temperature change can be measured when magnesium reacts with hydrochloric acid.

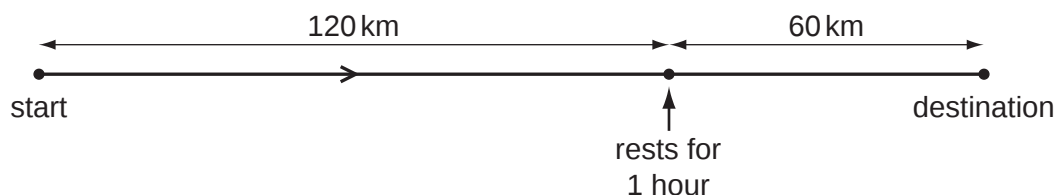


Thermometer reading before adding magnesium powder = 20.6°C

Thermometer reading after adding magnesium powder = 32.4°C

Which statement is correct?

- A The reaction is endothermic and gives out heat.
 - B The reaction is endothermic and takes in heat.
 - C The reaction is exothermic and gives out heat.
 - D The reaction is exothermic and takes in heat.
- 28 A car travels between two towns. After 1 hour the driver has travelled 120 km. She then stops and rests for an hour. She takes another hour to travel a further 60 km to reach her destination.

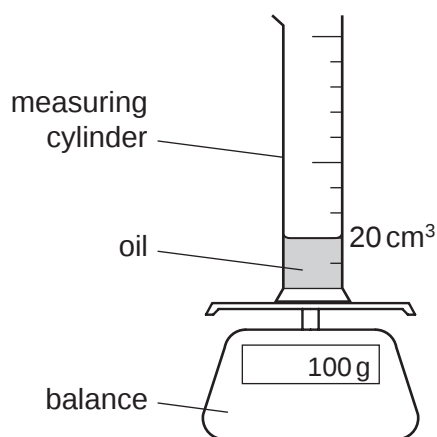


What is the average speed of the car for the whole journey?

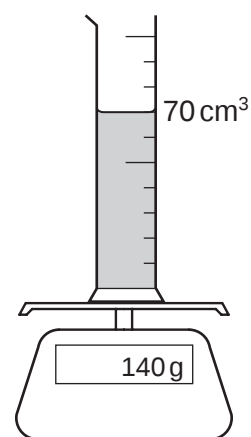
- A 60 km/h B 90 km/h C 120 km/h D 180 km/h

- 29 A measuring cylinder contains 20 cm^3 of oil. The measuring cylinder is placed on a balance and the reading on the balance is 100 g.

The volume of oil in the measuring cylinder is now increased to 70 cm^3 . The reading on the balance is now 140 g.



before extra oil is added

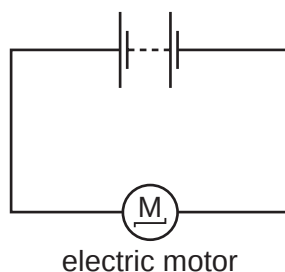


after extra oil is added

What is the density of the oil?

- A** 0.50 g/cm^3 **B** 0.80 g/cm^3 **C** 1.25 g/cm^3 **D** 2.00 g/cm^3

- 30 An electric circuit contains a battery and an electric motor.



electric motor

Which energy transfer takes place in the battery and which takes place in the electric motor?

	battery	electric motor
A	chemical to electrical	electrical to kinetic
B	chemical to electrical	kinetic to electrical
C	electrical to chemical	electrical to kinetic
D	electrical to chemical	kinetic to electrical

- 31** A drop of liquid falls on a student's skin and evaporates quickly.

What is the effect on the skin and the reason for this effect?

- A** The skin cools because the most energetic molecules escape from the liquid.
- B** The skin cools because the most energetic molecules remain in the liquid.
- C** The skin warms because the most energetic molecules escape from the liquid.
- D** The skin warms because the most energetic molecules remain in the liquid.

- 32** Benzene and glycerine are two substances.

The table gives the melting point and the boiling point of benzene and of glycerine.

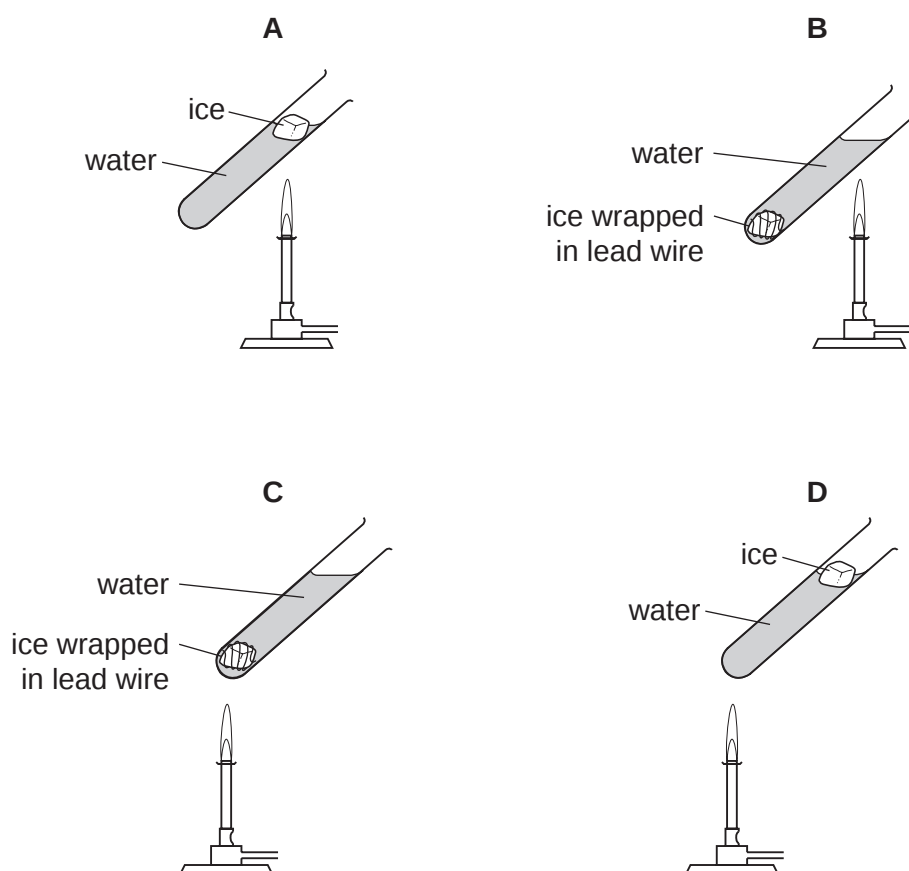
	melting point	boiling point
benzene	5.4 °C	80 °C
glycerine	18 °C	290 °C

At which temperature will both benzene and glycerine be liquid?

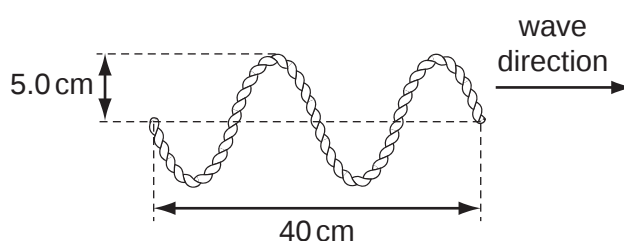
- A** 0 °C **B** 50 °C **C** 100 °C **D** 150 °C

- 33 The diagrams show four identical pieces of ice that are heated in test-tubes of water. All four burners provide heat at the same rate.

In which test-tube does the ice take the longest time to melt?



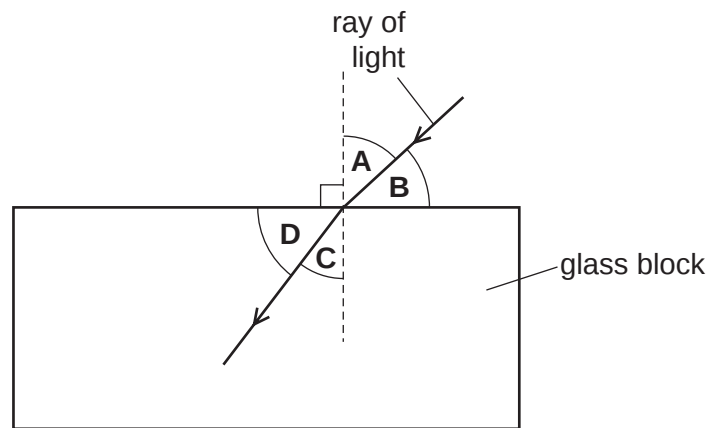
- 34 A student vibrates the end of a horizontal rope and sends a wave along the rope. The wave is shown in the diagram.



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

	amplitude / cm	wavelength / cm
A	5.0	10
B	5.0	20
C	10	10
D	10	20

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

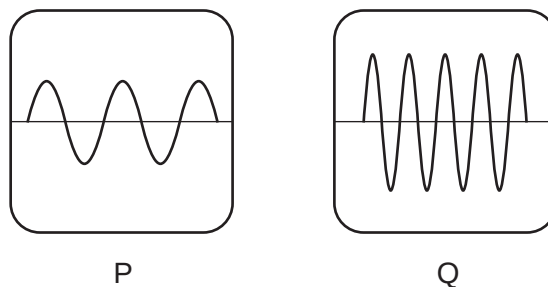


Which of the labelled angles is the angle of refraction?

36 Which two colours of the visible spectrum of light have the greatest difference in their wavelengths?

- A blue and red
- B red and green
- C orange and red
- D yellow and blue

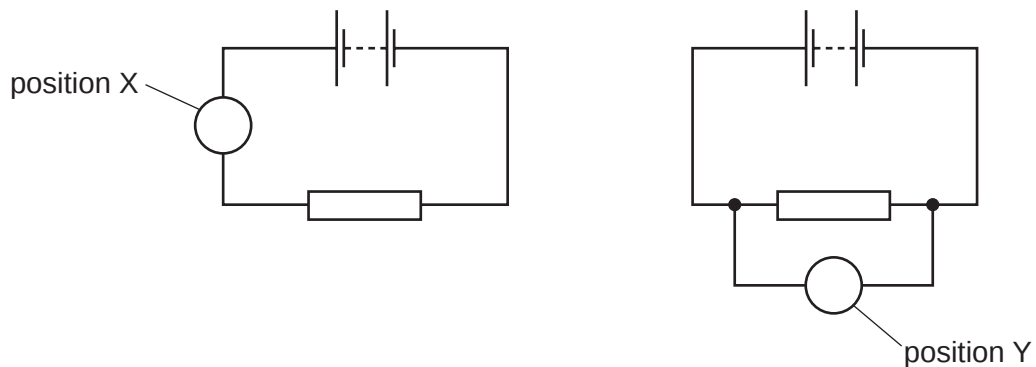
37 Two sound waves P and Q are displayed on an oscilloscope. The settings on the oscilloscope are the same for P and Q.



Which statement correctly compares the pitch and the loudness of the two sounds?

- A P has a higher pitch and is louder than Q.
- B P has a higher pitch and is quieter than Q.
- C P has a lower pitch and is louder than Q.
- D P has a lower pitch and is quieter than Q.

- 38 A student wishes to measure the potential difference across a resistor. The circuits show two different positions in which a meter can be connected.



What meter is used, and where is it connected in the circuit?

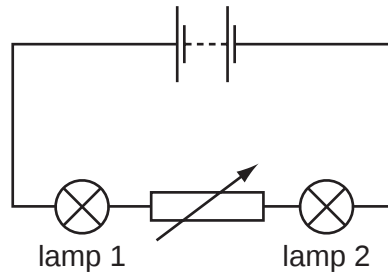
- A an ammeter in position X
 - B an ammeter in position Y
 - C a voltmeter in position X
 - D a voltmeter in position Y
- 39 When a computer is switched on, the current rises quickly to 3.1 A and then falls slowly to a steady value of 1.0 A whilst the computer is in use.

The mains plug for the computer contains a fuse.

Which value of fuse would be suitable to use and would provide the greatest protection?

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

40 A circuit contains two lamps and a variable resistor.



The resistance of the variable resistor is increased.

What happens to the brightness of lamp 1 and what happens to the brightness of lamp 2?

	brightness of lamp 1	brightness of lamp 2
A	decreases	decreases
B	decreases	increases
C	no change	decreases
D	no change	increases

DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
												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	101 Ru Ruthenium 44	101 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	127 Te Tellurium 52	131 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	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															
58-71 Lanthanoid series																	
90-103 Actinoid series																	
175 Lu Lutetium 71																	
173 Yb Ytterbium 70																	
169 Tm Thulium 69																	
167 Er Erbium 68																	
165 Ho Holmium 67																	
162 Dy Dysprosium 66																	
159 Tb Terbium 65																	
157 Gd Gadolinium 64																	
152 Eu Europium 63																	
150 Sm Samarium 62																	
144 Nd Neodymium 60																	
141 Pr Praseodymium 59																	
140 Ce Cerium 58																	
238 U Uranium 92																	
238 Pa Protactinium 91																	
232 Th Thorium 90																	
238 Pu Plutonium 94																	
238 Am Americium 95																	
238 Cm Curium 96																	
238 Bk Berkelium 97																	
238 Cf Californium 98																	
238 Es Einsteinium 99																	
238 Fm Fermium 100																	
238 Md Mendelevium 101																	
238 No Nobelium 102																	
238 Lr Lawrencium 103																	
Key		X ^a		a = relative atomic mass													
		X ^b		X = atomic symbol													
				b = proton (atomic) number													

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

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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