UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/13**

Paper 1 Multiple Choice **May/June 2010**

45 minutes

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

4026085698

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 **16**.

1 Which part of a plant cell controls what enters and leaves the cell?

A cell sap

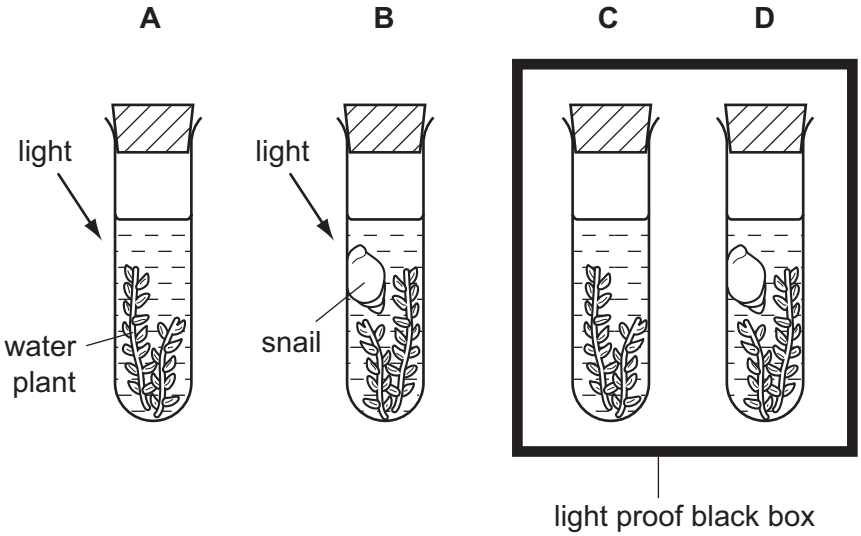
B cell surface membrane

C cellulose cell wall

D cytoplasm

2 The diagram shows the apparatus used in an investigation on gas exchange in organisms.

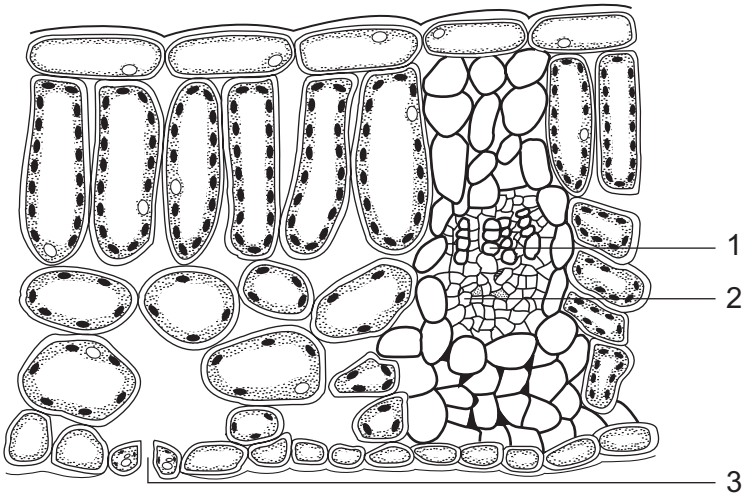
In which test-tube would the concentration of oxygen decrease most rapidly?



3 Which substances may diffuse into and out of plant cells?

	into plant cells	out of plant cells
A	chlorophyll	oxygen
B	oxygen	water
C	starch	chlorophyll
D	water	starch

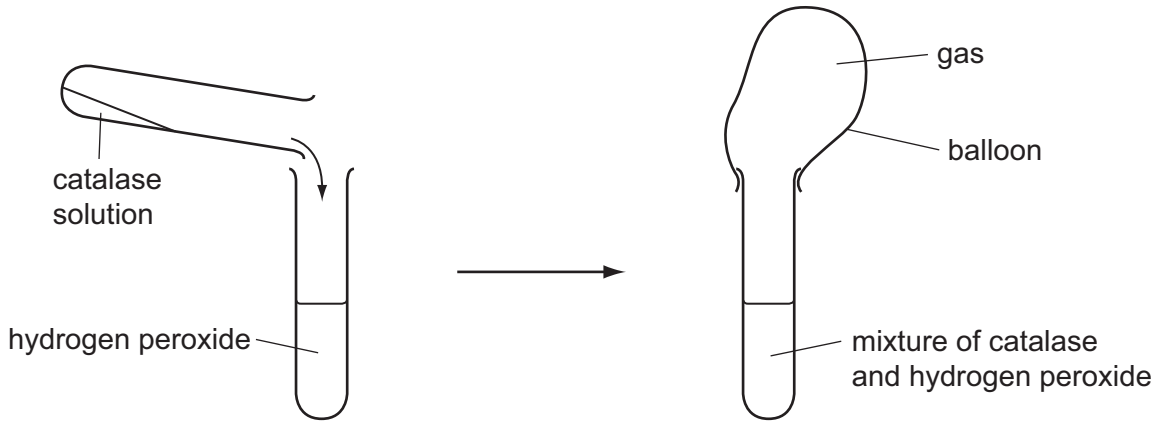
4 The diagram shows a section through a leaf.



Which part brings water to the leaf and through which part does water leave the leaf?

	brings water	water leaves
A	1	2
B	1	3
C	2	1
D	3	1

5 The diagram shows a simple experiment using a solution of the enzyme catalase.



Which gas is collected in the balloon?

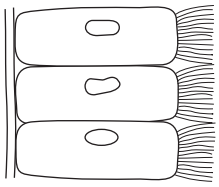
A carbon dioxide

B hydrogen

C nitrogen

D oxygen

6 The diagram shows some cells from the lining of the human trachea.



What is the function of these cells?

A absorption of oxygen into the blood

B excretion of carbon dioxide from the blood

C removal of mucus from the trachea

D secretion of mucus into the trachea

7 Which nutrients in the diet will help to prevent leg bones becoming deformed?

A calcium and vitamin C

B calcium and vitamin D

C iron and vitamin C

D iron and vitamin D

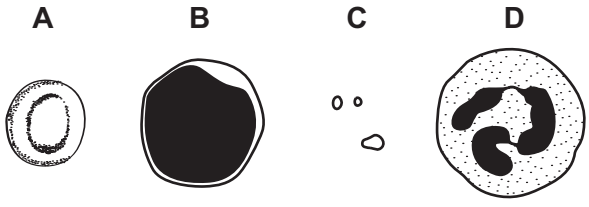
8 What effect does drinking alcohol have on the following:

- the rate at which signals pass along nerves,
- the length of reaction time?

	rate at which signals pass along nerves	length of reaction time
A	faster	longer
B	faster	shorter
C	slower	longer
D	slower	shorter

9 The diagram shows four components of blood.

Which component contains haemoglobin?



10 Rain forests have high species diversity.

What is meant by the term *species diversity*?

A Members of a species in the forest are scattered over a wide area.

B Members of a species show a wide range of variations.

C There are many different species present.

D The same species are found in many different rain forests in the world.

11 A variety of potato plant produces red tubers ('potatoes') that grow into new potato plants which then produce red 'potatoes' the following year.

Why is this?

A Asexual reproduction produces identical potato plants.

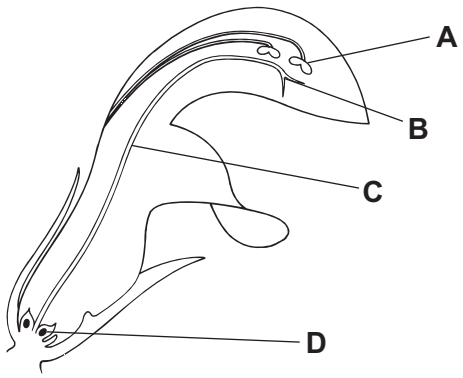
B Asexual reproduction results in different coloured 'potatoes'.

C Sexual reproduction produces only red 'potatoes'.

D Sexual reproduction requires the potato plant to produce flowers.

12 The diagram shows a section through a flower.

Where does fertilisation occur?

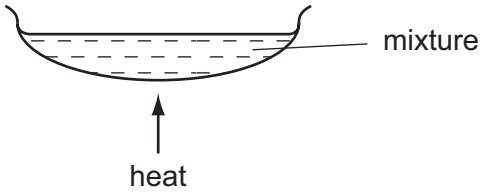


13 The table shows three ways in which different methods of birth control work.

Which correctly links the methods with how they work?

	prevents ovulation	prevents sperm release	prevents zygote implantation
A	IUD	sterilisation	cap
B	pill	rhythm	condom
C	pill	sterilisation	IUD
D	rhythm	condom	IUD

14 The diagram shows apparatus used to separate a mixture.



Which mixture could it be used to separate?

A sand and salt

B sand and sugar

C salt and sugar

D salt and water

15 A solid is ionic.

Which property best confirms this fact?

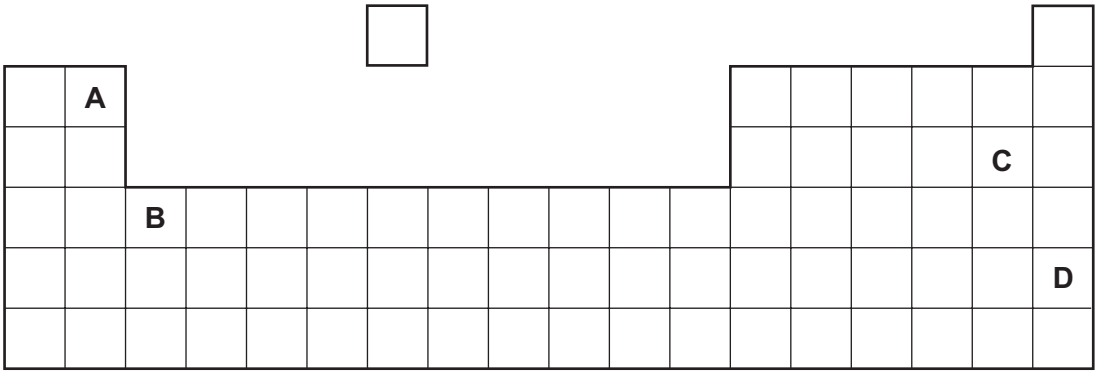
A its behaviour as an electrolyte

B its melting point

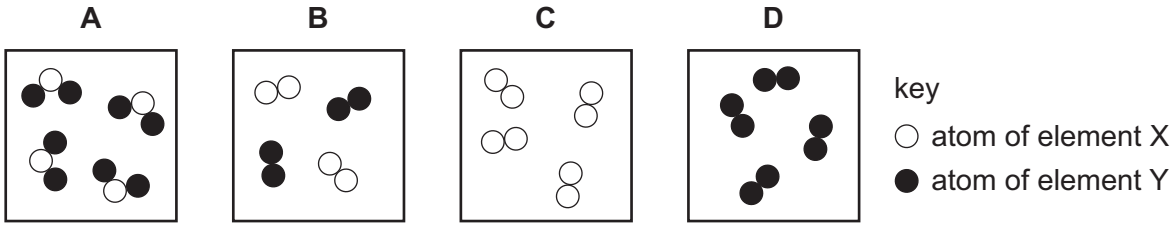
C its solubility in water

D the shape of its crystals

16 Which letter shows the position in the Periodic Table of an unreactive non-metal?



17 Which diagram represents a mixture of elements?



18 Which processes are used to purify the drinking water from reservoirs?

	chlorination	distillation	filtration
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

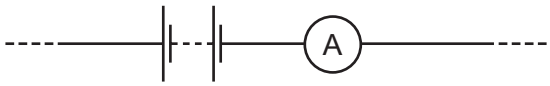
19 The salt ammonium dichromate(VI) readily decomposes when heated.

$$(NH_4)_2Cr_2O_7 \rightarrow Cr_2O_3 + x\,N_2 + y\,H_2O$$

Which values of *x* and *y* make this equation balanced?

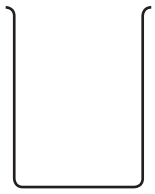
	x	*y*
A	1	2
B	1	4
C	2	2
D	2	4

20 Part of the apparatus used to electrolyse aqueous copper(II) chloride is shown.



Which piece of apparatus is **not** required in this experiment?

A

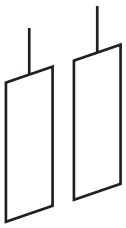


beaker

B

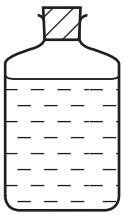
bulb

C



electrodes

D



electrolyte

21 Which method is used to obtain iron from iron(III) oxide?

A combustion

B electrolysis

C reduction

D thermal decomposition

22 A student carries out experiments with zinc and dilute hydrochloric acid.

Which change in conditions makes the reaction slower?

A adding a suitable catalyst

B increasing the concentration of the acid

C increasing the particle size of the zinc

D increasing the temperature

23 The table gives, for two metals, the colours of their solids and their aqueous ions.

metal	colour of	
	solid	aqueous ion
copper	red-brown	blue
zinc	grey	colourless

Equal amounts of powdered copper and powdered zinc are mixed together.

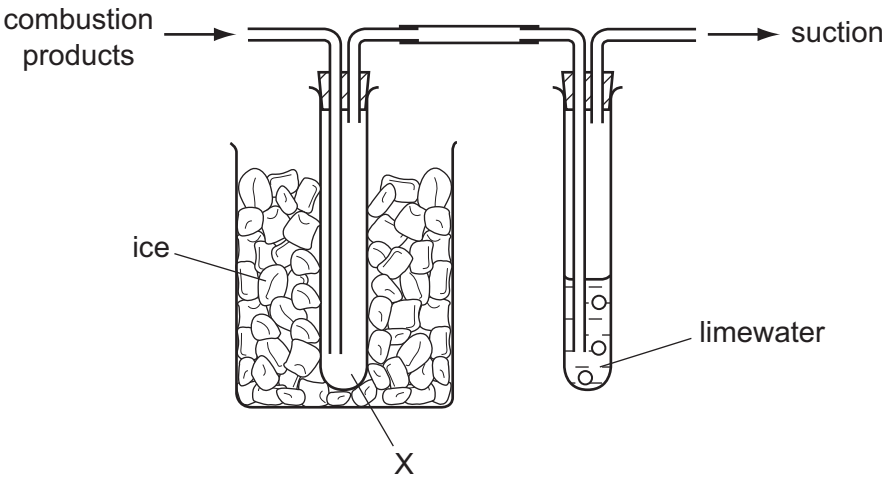
The mixture is added to dilute sulfuric acid in a test-tube until the acid is just used up. Some powder then remains at the bottom of the test-tube.

What are the colours of the remaining powder and the solution in the test-tube?

	powder	solution
A	grey	blue
B	grey	colourless
C	red-brown	blue
D	red-brown	colourless

24 A hydrocarbon is burned in excess oxygen.

The combustion products are passed through the apparatus shown.



What collects at X and what happens to the limewater?

	collects at X	limewater turns
A	soot	cloudy
B	soot	red
C	water	cloudy
D	water	red

25 What happens to a piece of magnesium when it burns in air?

A oxidation and combustion

B oxidation and thermal decomposition

C reduction and combustion

D reduction and thermal decomposition

26 Coal, hydrogen, methane and gasoline (petrol) are commonly used as fuels.

How many of these fuels are solids, liquids or gases?

	solids	liquids	gases
A	0	2	2
B	1	1	2
C	1	2	1
D	2	2	0

27 This description of a plastic is incomplete.

To make a plastic, ……1…… of a ……2…… combine to form a long chain ……3…… .

Which words correctly complete the gaps?

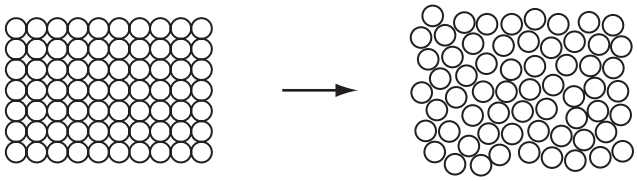
	1	2	3
A	atoms	monomer	polymer
B	atoms	polymer	monomer
C	molecules	monomer	polymer
D	molecules	polymer	monomer

28 Water spilled on the ground on a hot day evaporates.

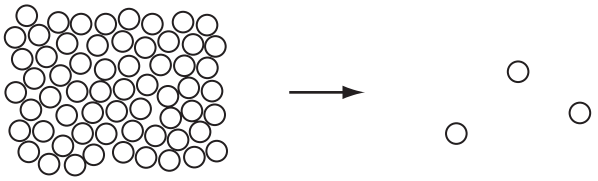
Which diagram represents the change in arrangement of the particles in the water as it evaporates?

A

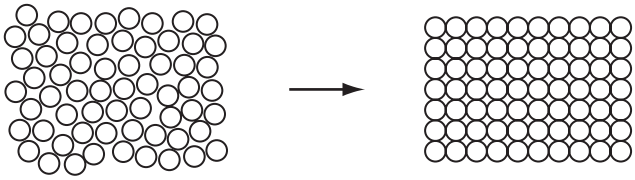
B



C



D



29 There is a vacuum between the double walls of a vacuum flask.

Which types of heat transfer are reduced by the vacuum?

A conduction and convection only

B conduction and radiation only

C convection and radiation only

D conduction, convection and radiation

30 In which situation would the object described be given an increase in its total energy?

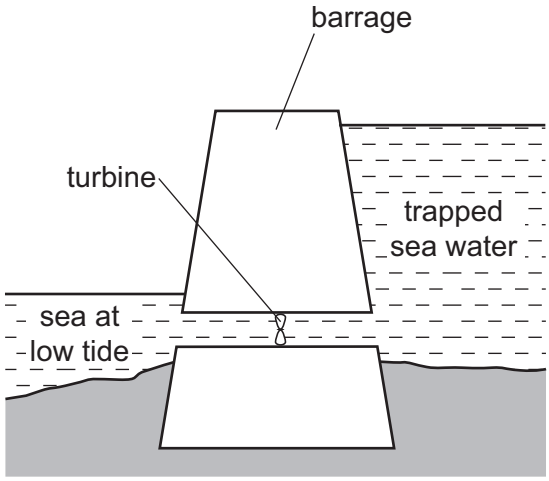
A a battery-powered torch being switched on

B a firework exploding

C a parachutist falling to the ground

D a skier being pulled up a slope

31 A tidal power station is made by building a barrage. At high tide the sea water is trapped behind the barrage.



At low tide the water is allowed to flow back into the sea through a turbine.

What is the useful energy change in a tidal power station?

A electrical energy → kinetic energy

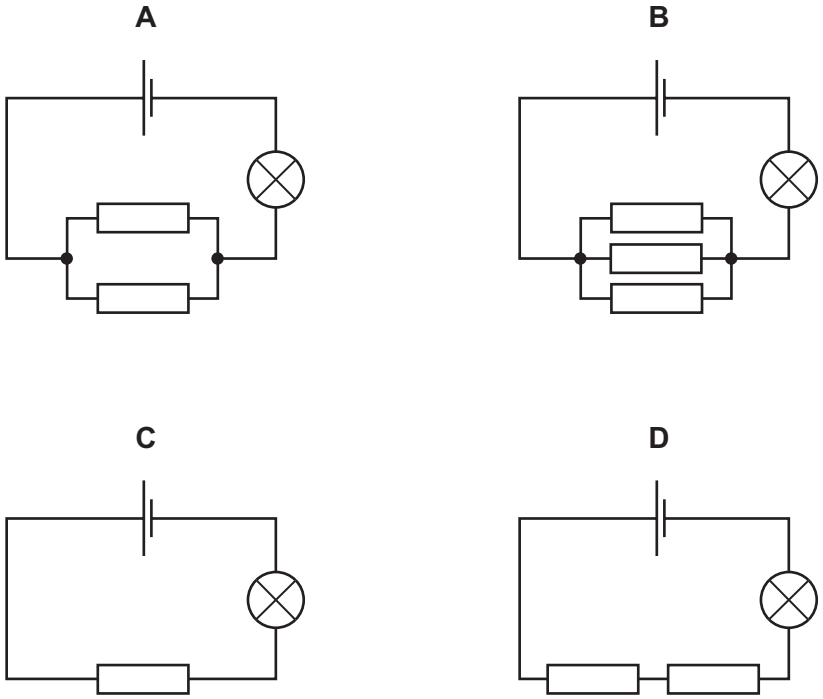
B electrical energy → potential energy

C kinetic energy → potential energy

D potential energy → electrical energy

32 In each of the circuits shown, identical resistors, cells and lamps are used.

In which circuit will the lamp glow most brightly?



33 Electrical appliances are often fitted with a fuse.

What is the purpose of the fuse?

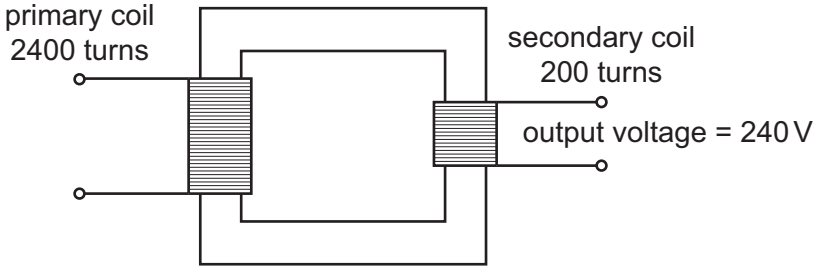
A to adjust the voltage supplied to the correct value

B to allow the appliance to be switched on by a small current

C to cut the power supply if the appliance is used too often

D to cut the power supply if the current becomes too large

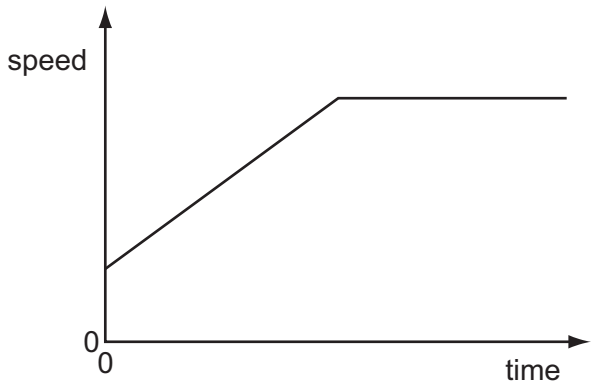
34 A transformer has 2400 turns on its primary coil and 200 turns on its secondary coil.



Assuming the transformer is 100 % efficient, what input voltage is needed to give an output voltage of 240 V?

A 12 V **B** 20 V **C** 240 V **D** 2880 V

35 The data from an aeroplane flight recorder is used to plot the speed / time graph for part of the flight.



Which statement describes this part of the flight?

A The aeroplane accelerates from rest to a constant speed.

B The aeroplane decelerates after flying at a constant speed.

C The aeroplane reaches a constant speed after a period of changing speed.

D The aeroplane travels at an increasing speed followed by a decreasing speed.

36 Which statement is correct?

A Mass is a force.

B Mass is measured in newtons.

C Weight is a force.

D Weight is measured in kilograms.

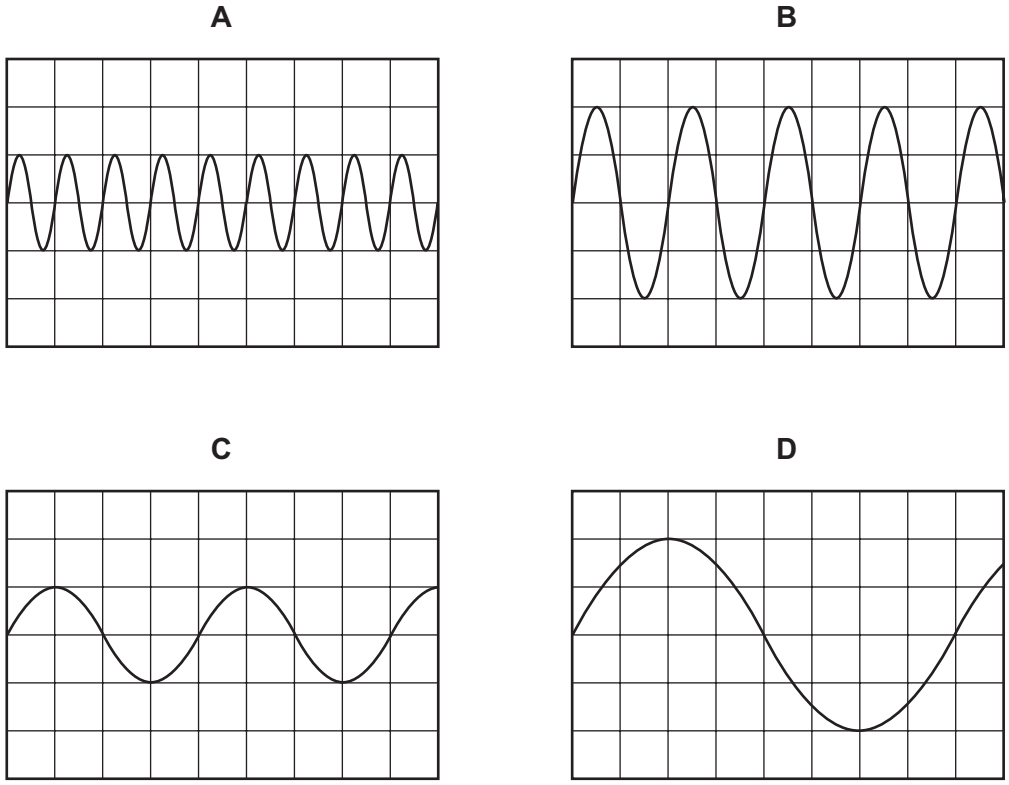
37 The table shows the dimensions of four rectangular blocks.

Which block has a volume of $3\,m^3$?

	height / cm	width / cm	depth / cm
A	100	100	100
B	300	100	100
C	300	300	100
D	300	300	300

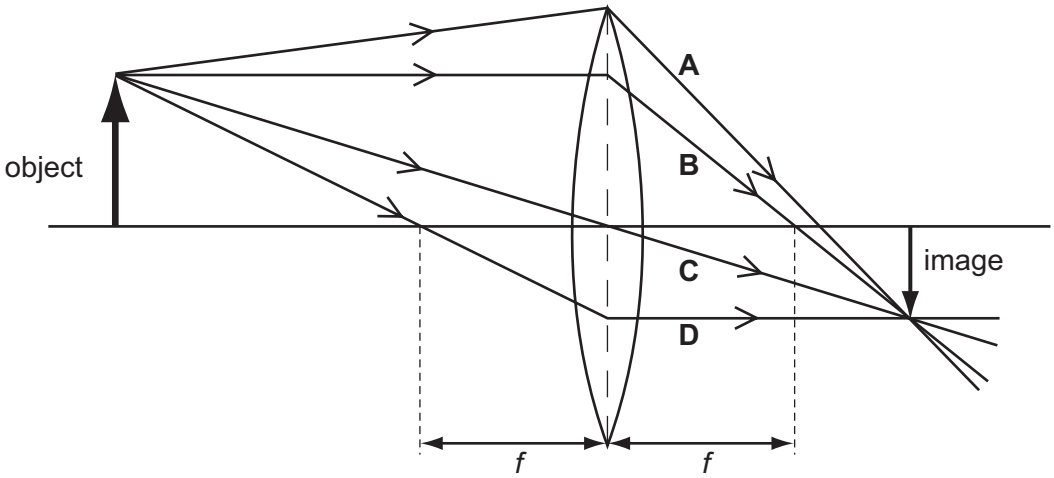
38 The diagrams show the wave patterns of four notes shown on a cathode ray oscilloscope. The oscilloscope controls are set the same for each sound.

Which note has the highest pitch?

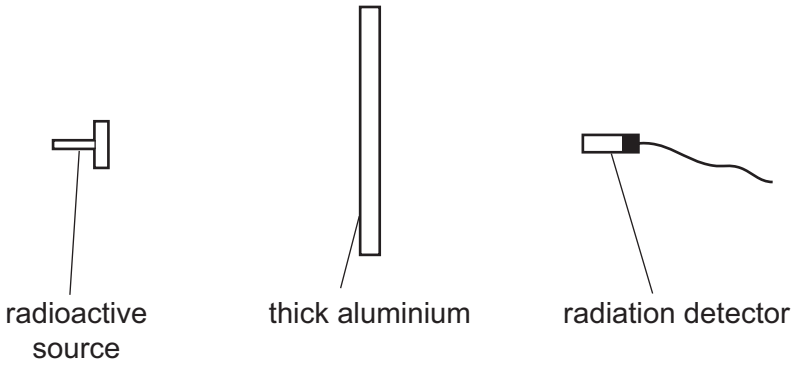


39 A ray diagram is drawn to locate the position of the image formed by a converging lens of focal length *f*.

Which ray **cannot** be drawn until the position of the image is known?



40 The diagram shows a radioactive source, a thick aluminium sheet and a radiation detector.



The radiation detector shows a reading greater than the background reading.

Which type of radiation is being emitted by the source and detected by the detector?

A alpha-radiation

B beta-radiation

C gamma-radiation

D infra-red radiation

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.).