



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**COMBINED SCIENCE**

**0653/11**

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)



**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 **17** printed pages and **3** blank pages.



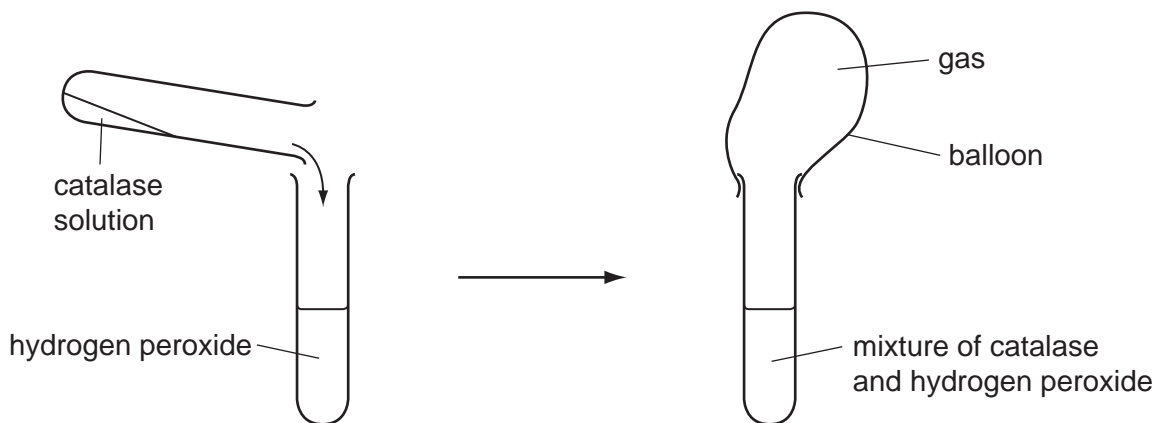
1 Which part of a plant cell controls what enters and leaves the cell?

- A cell sap
- B cell surface membrane
- C cellulose cell wall
- D cytoplasm

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

	into plant cells	out of plant cells
<b>A</b>	chlorophyll	oxygen
<b>B</b>	oxygen	water
<b>C</b>	starch	chlorophyll
<b>D</b>	water	starch

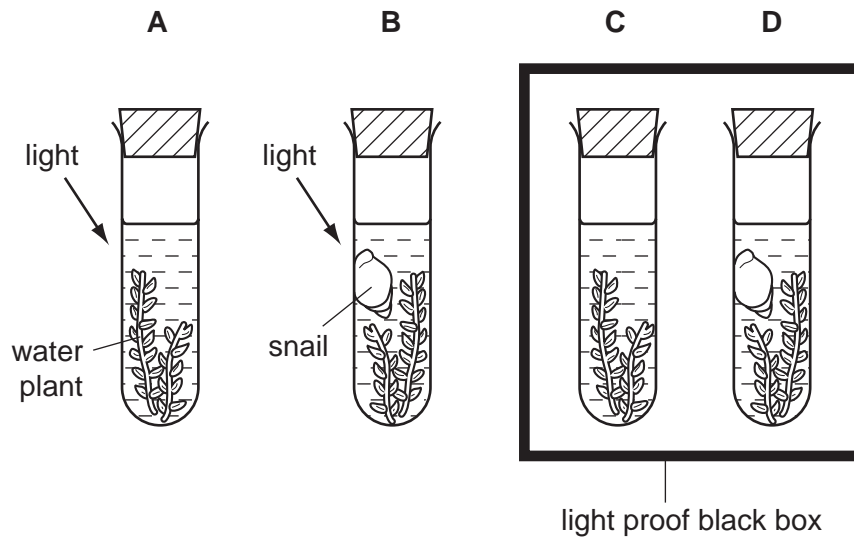
3 The diagram shows a simple experiment using a solution of the enzyme catalase.



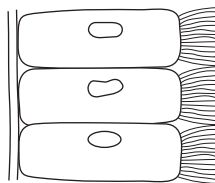
Which gas is collected in the balloon?

- A carbon dioxide
- B hydrogen
- C nitrogen
- D oxygen

- 4 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?



- 5 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
- 6 The diagram shows some cells from the lining of the human trachea.

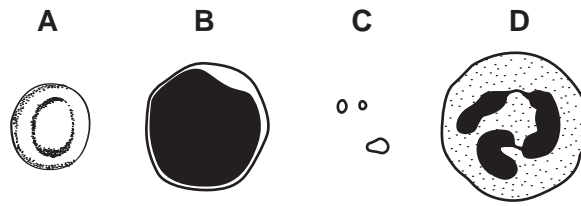


What is the function of these cells?

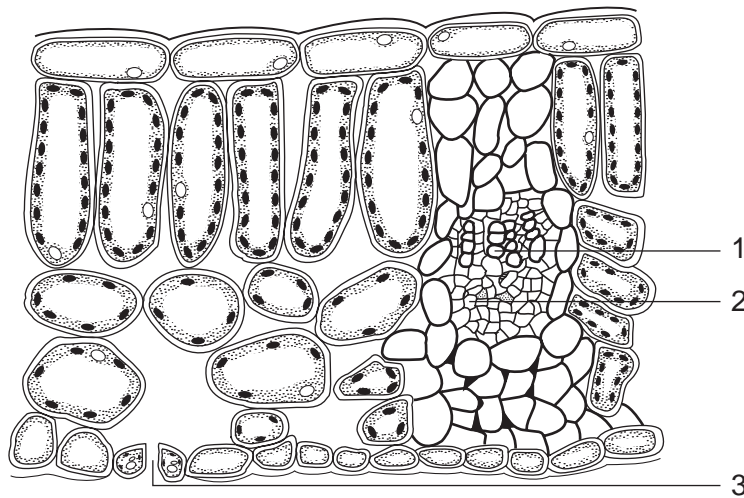
- A absorption of oxygen into the blood  
 B excretion of carbon dioxide from the blood  
 C removal of mucus from the trachea  
 D secretion of mucus into the trachea

7 The diagram shows four components of blood.

Which component contains haemoglobin?



8 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
<b>A</b>	1	2
<b>B</b>	1	3
<b>C</b>	2	1
<b>D</b>	3	1

9 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
<b>A</b>	faster	longer
<b>B</b>	faster	shorter
<b>C</b>	slower	longer
<b>D</b>	slower	shorter

10 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.

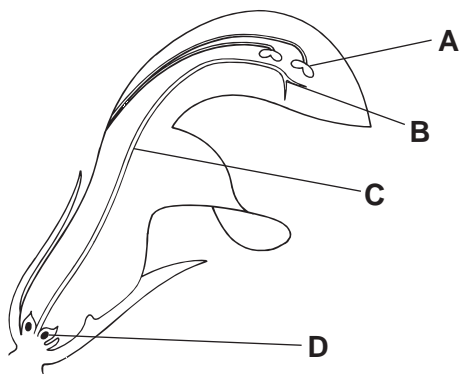
11 The table shows three ways in which different methods of birth control work.

Which correctly links the methods with how they work?

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

12 The diagram shows a section through a flower.

Where does fertilisation occur?

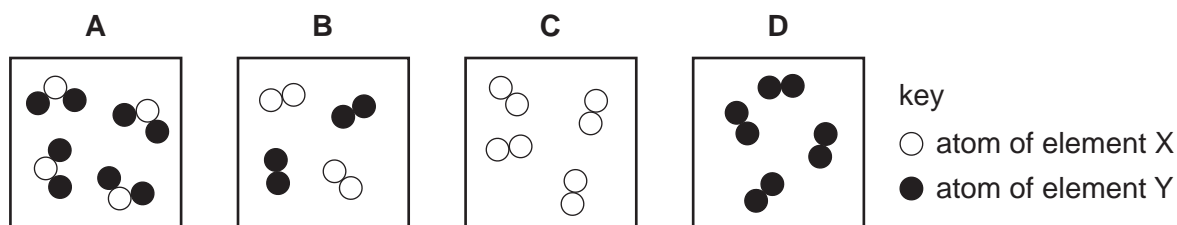


13 Rain forests have high species diversity.

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.

14 Which diagram represents a mixture of elements?

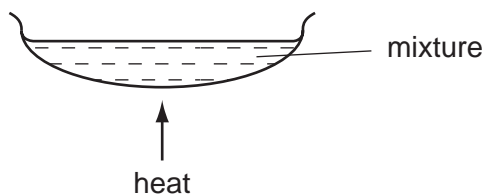


15 A solid is ionic.

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

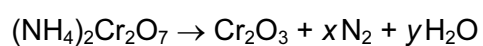
- 16 The diagram shows apparatus used to separate a mixture.



Which mixture could it be used to separate?

- A sand and salt
  - B sand and sugar
  - C salt and sugar
  - D salt and water
- 17 Which letter shows the position in the Periodic Table of an unreactive non-metal?


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



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

	$x$	$y$
<b>A</b>	1	2
<b>B</b>	1	4
<b>C</b>	2	2
<b>D</b>	2	4

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

	chlorination	distillation	filtration
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	x
<b>C</b>	✓	x	✓
<b>D</b>	x	✓	✓

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

- A** combustion
- B** electrolysis
- C** reduction
- D** thermal decomposition

21 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.

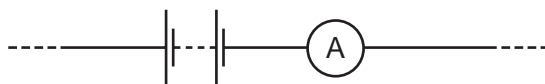
The mixture is added to dilute sulfuric acid in a test-tube until the acid is just used up. Some powder then remains at the bottom of the test-tube.

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

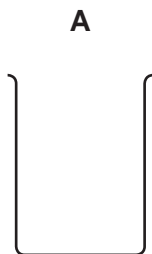
	powder	solution
<b>A</b>	grey	blue
<b>B</b>	grey	colourless
<b>C</b>	red-brown	blue
<b>D</b>	red-brown	colourless



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



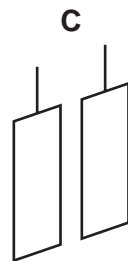
Which piece of apparatus is **not** required in this experiment?



beaker



bulb



electrodes



electrolyte

23 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

24 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

25 This description of a plastic is incomplete.

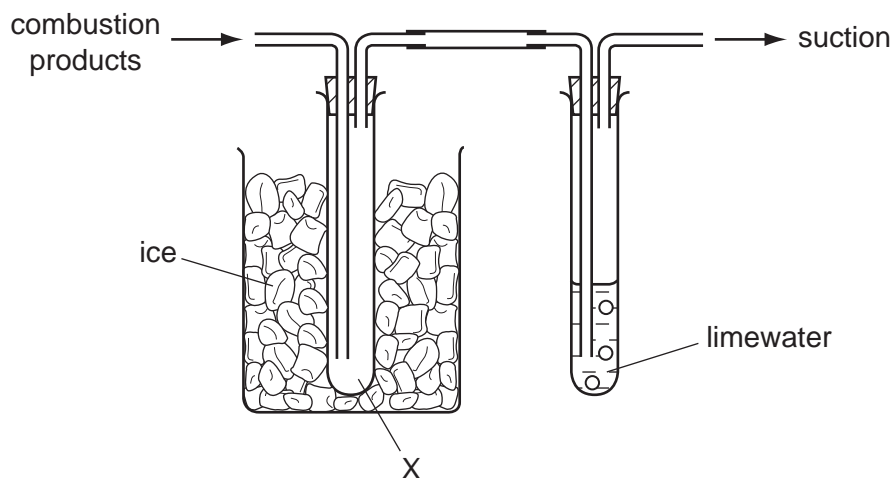
To make a plastic, .....1..... of a .....2..... combine to form a long chain .....3..... .

Which words correctly complete the gaps?

	1	2	3
<b>A</b>	atoms	monomer	polymer
<b>B</b>	atoms	polymer	monomer
<b>C</b>	molecules	monomer	polymer
<b>D</b>	molecules	polymer	monomer

26 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
<b>A</b>	soot	cloudy
<b>B</b>	soot	red
<b>C</b>	water	cloudy
<b>D</b>	water	red

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

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

	solids	liquids	gases
<b>A</b>	0	2	2
<b>B</b>	1	1	2
<b>C</b>	1	2	1
<b>D</b>	2	2	0

28 The table shows the dimensions of four rectangular blocks.

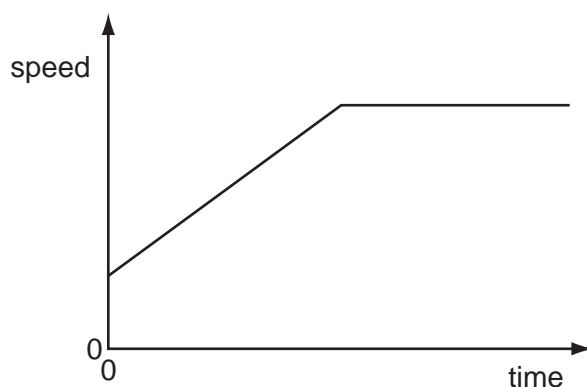
Which block has a volume of  $3\text{ m}^3$ ?

	height / cm	width / cm	depth / cm
<b>A</b>	100	100	100
<b>B</b>	300	100	100
<b>C</b>	300	300	100
<b>D</b>	300	300	300

29 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.

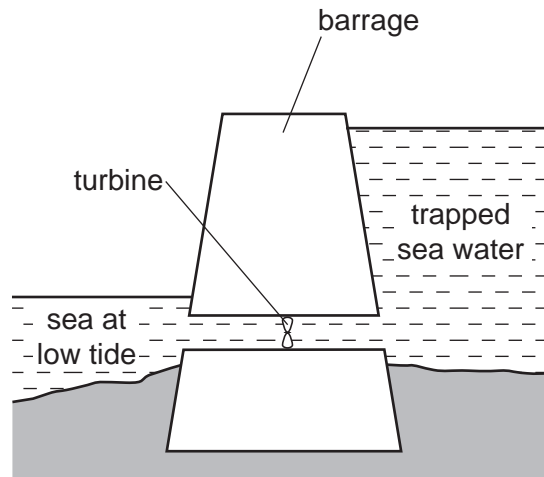
30 The data from an aeroplane flight recorder is used to plot the speed / time graph for part of the flight.



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.

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



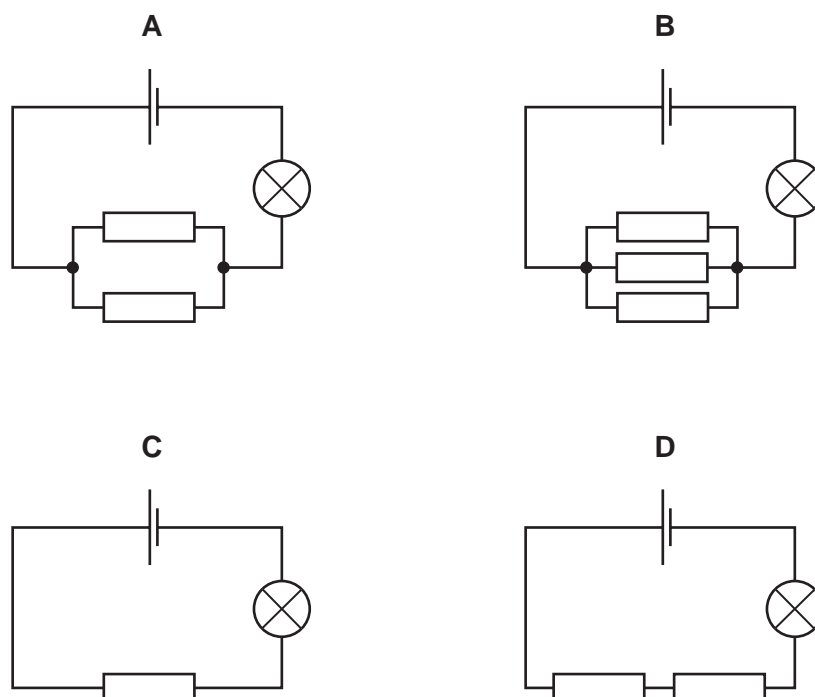
At low tide the water is allowed to flow back into the sea through a turbine.

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

- A electrical energy  $\rightarrow$  kinetic energy
- B electrical energy  $\rightarrow$  potential energy
- C kinetic energy  $\rightarrow$  potential energy
- D potential energy  $\rightarrow$  electrical energy

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

In which circuit will the lamp glow most brightly?

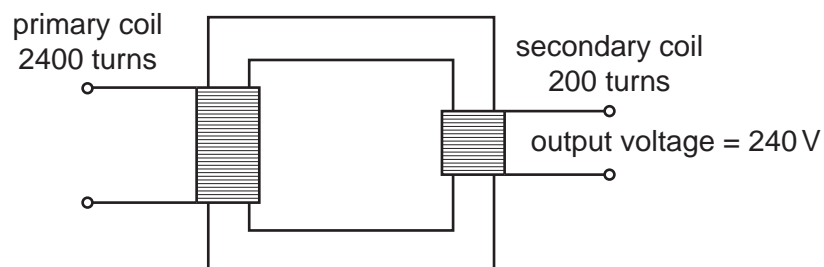


34 Electrical appliances are often fitted with a fuse.

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

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

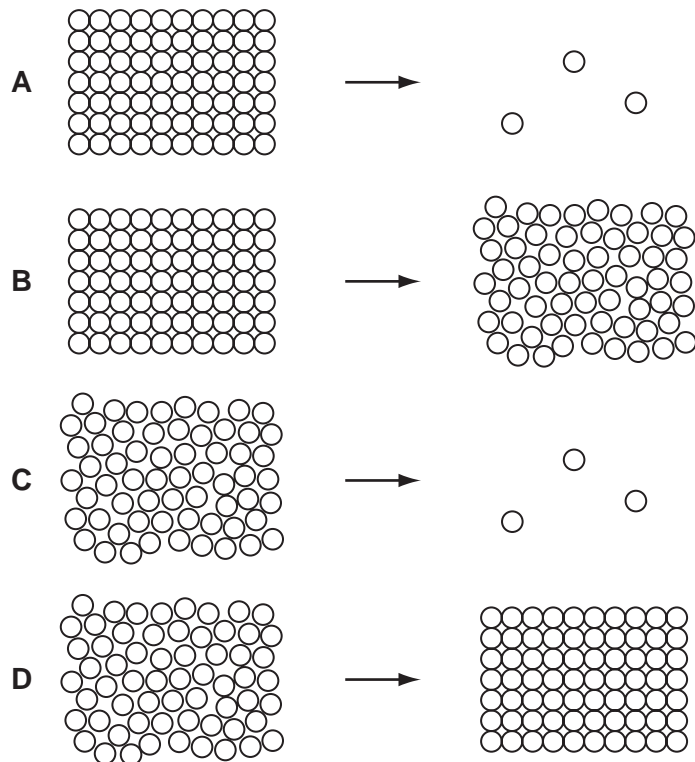


Assuming the transformer is 100 % efficient, what input voltage is needed to give an output voltage of 240V?

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

36 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?



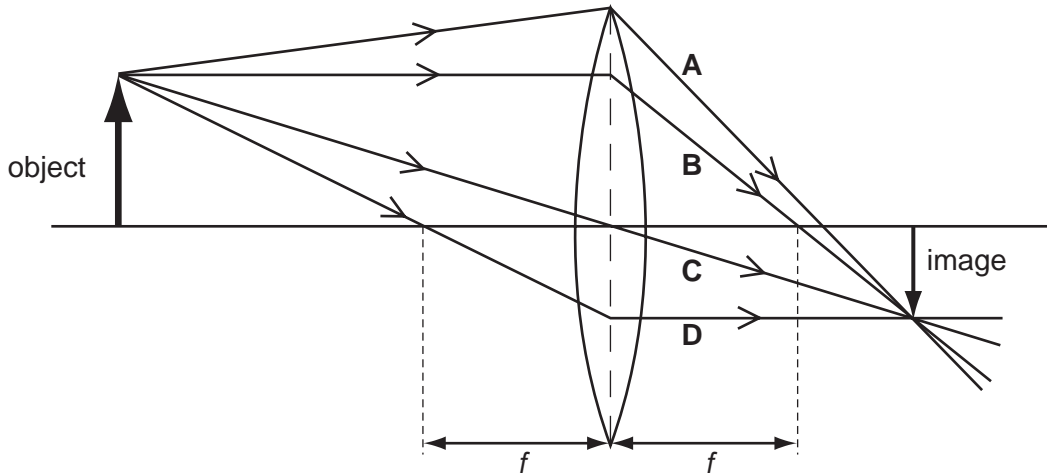
37 There is a vacuum between the double walls of a vacuum flask.

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

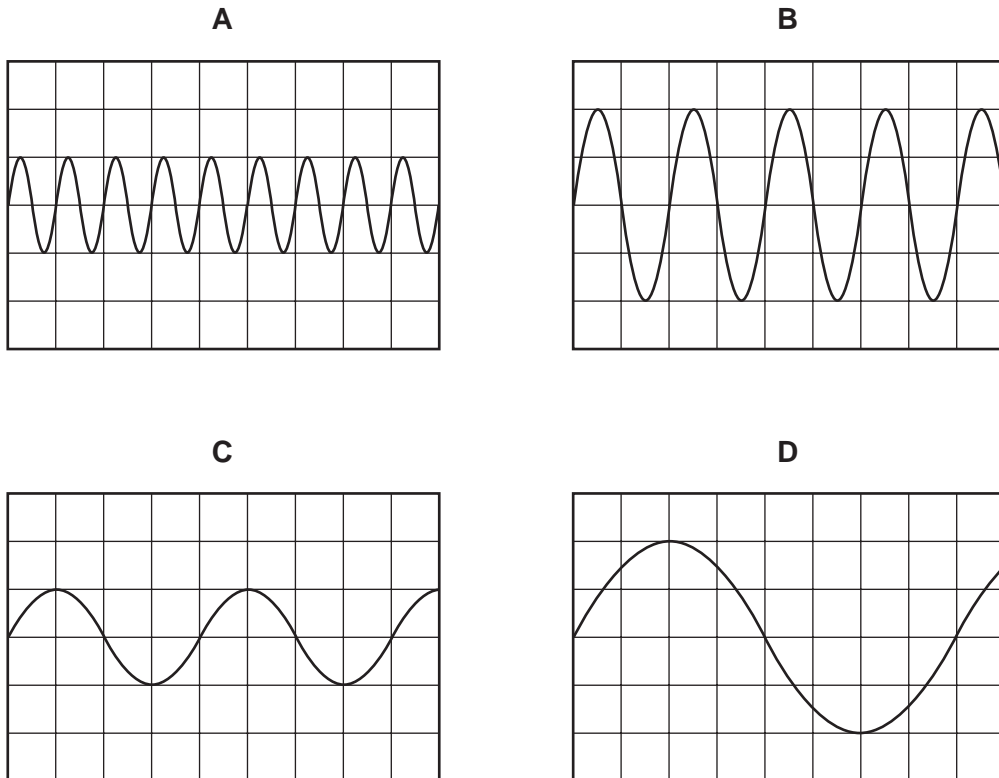
38 A ray diagram is drawn to locate the position of the image formed by a converging lens of focal length  $f$ .

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

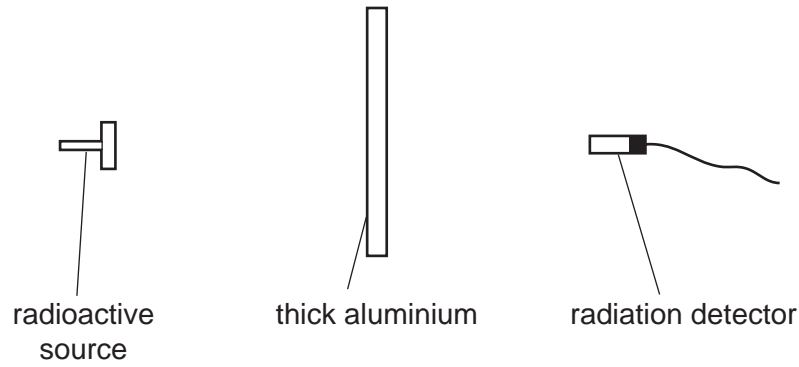


39 The diagrams show the wave patterns of four notes shown on a cathode ray oscilloscope. The oscilloscope controls are set the same for each sound.

Which note has the highest pitch?



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	VIII	IX	X	O														
		1 <b>H</b> Hydrogen 1																								
7	9																									
<b>Li</b> Lithium 3	<b>Be</b> Beryllium 4																									
23	24																									
<b>Na</b> Sodium 11	<b>Mg</b> Magnesium 12																									
39	40																									
<b>K</b> Potassium 19	<b>Ca</b> Calcium 20	45	48	51	52	55	56	59	59	64	65	70	73	75	79	80	84									
<b>Sc</b> Scandium 21	<b>Ti</b> Titanium 22	<b>V</b> Vanadium 23	<b>Cr</b> Chromium 24	<b>Mn</b> Manganese 25	<b>Fe</b> Iron 26	<b>Co</b> Cobalt 27	<b>Ni</b> Nickel 28	<b>Cu</b> Copper 29	<b>Zn</b> Zinc 30	<b>Ga</b> Gallium 31	<b>Ge</b> Germanium 32	<b>As</b> Arsenic 33	<b>Se</b> Selenium 34	<b>Br</b> Bromine 35	<b>Kr</b> Krypton 36											
85	88	89	91	93	101	103	106	108	112	115	119	122	128	127	131											
<b>Rb</b> Rubidium 37	<b>Sr</b> Strontium 38	<b>Y</b> Yttrium 39	<b>Zr</b> Zirconium 40	<b>Nb</b> Niobium 41	<b>Ru</b> Ruthenium 44	<b>Rh</b> Rhodium 45	<b>Pd</b> Palladium 46	<b>Ag</b> Silver 47	<b>Cd</b> Cadmium 48	<b>In</b> Indium 49	<b>Sn</b> Tin 50	<b>Sb</b> Antimony 51	<b>Te</b> Tellurium 52	<b>I</b> Iodine 53	<b>Xe</b> Xenon 54											
133	137	139	178	181	190	192	195	197	201	204	207	209	209	209	209											
<b>Cs</b> Caesium 55	<b>Ba</b> Barium 56	<b>La</b> Lanthanum 57	<b>Hf</b> Hafnium 72	<b>Ta</b> Tantalum 73	<b>Os</b> Osmium 76	<b>Ir</b> Iridium 77	<b>Pt</b> Platinum 78	<b>Au</b> Gold 79	<b>Hg</b> Mercury 80	<b>Tl</b> Thallium 81	<b>Pb</b> Lead 82	<b>Bi</b> Bismuth 83	<b>Po</b> Polonium 84	<b>At</b> Astatine 85	<b>Rn</b> Radon 86											
226	227																									
<b>Fr</b> Francium 87	<b>Ra</b> Radium 88	<b>Ac</b> Actinium 89																								
*58-71 Lanthanoid series													140	141	144	150	152	157	159	162	165	167	169	173	175	
†90-103 Actinoid series													58	59	60	61	62	63	64	65	66	68	69	70	71	
													<b>Ce</b> Cerium	<b>Pr</b> Praseodymium	<b>Nd</b> Neodymium	<b>Pm</b> Promethium	<b>Sm</b> Samarium	<b>Eu</b> Europium	<b>Gd</b> Gadolinium	<b>Tb</b> Terbium	<b>Dy</b> Dysprosium	<b>Ho</b> Holmium	<b>Er</b> Erbium	<b>Tm</b> Thulium	<b>Yb</b> Ytterbium	<b>Lu</b> Lutetium
													90	91	92	93	94	95	96	97	98	100	101	102	103	
													<b>Th</b> Thorium	<b>Pa</b> Protactinium	<b>U</b> Uranium	<b>Np</b> Neptunium	<b>Pu</b> Plutonium	<b>Am</b> Americium	<b>Cm</b> Curium	<b>Bk</b> Berkelium	<b>Cf</b> Californium	<b>Fm</b> Fermium	<b>Md</b> Mendelevium	<b>No</b> Nobelium	<b>Lr</b> Lawrencium	
													90	91	92	93	94	95	96	97	98	100	101	102	103	

Key

a	<b>X</b>	= relative atomic mass
b	<b>X</b>	= atomic symbol
	<b>X</b>	= proton (atomic) number

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

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