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CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/01

Paper 1 Multiple Choice

May/June 2003

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.

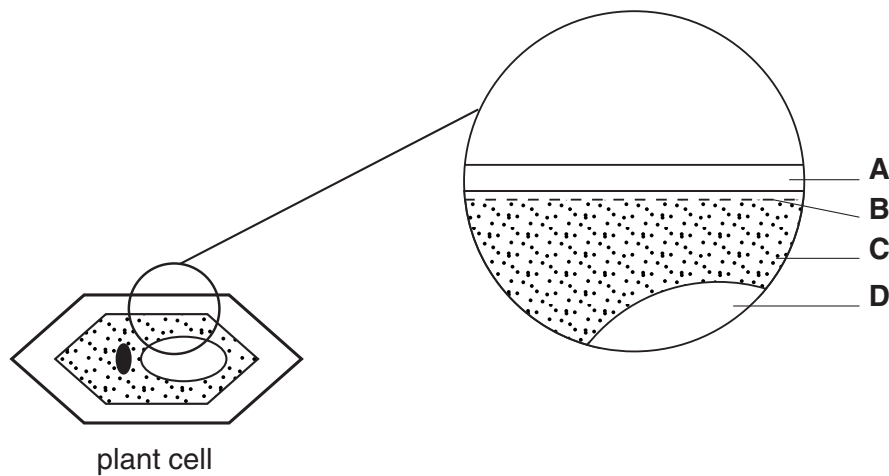
This document consists of **19** printed pages and **1** blank page.

1 Which pair of features is found in plant cells but **not** in animal cells?

A	cell membrane	cell sap
B	cell sap	cell wall
C	cell wall	nucleus
D	nucleus	cell membrane

2 The diagram shows a small part of a plant cell greatly magnified.

Which part controls what enters and leaves the cell?



3 When an enzyme molecule has catalysed a chemical reaction in a cell, what happens to it?

- A** It acts as a catalyst again.
- B** It is denatured.
- C** It is digested.
- D** It is used up by the reaction.

4 There are four stages in testing a leaf for starch.

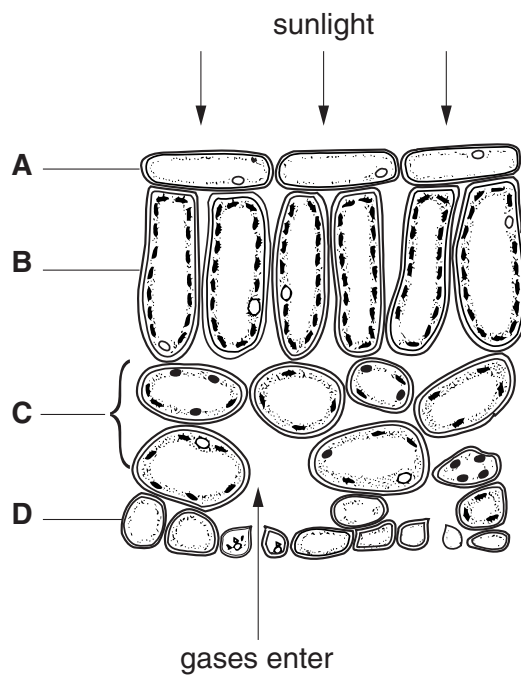
- 1 soften in hot water
- 2 stain with iodine
- 3 boil in alcohol
- 4 boil in water

What is the correct order for these stages?

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

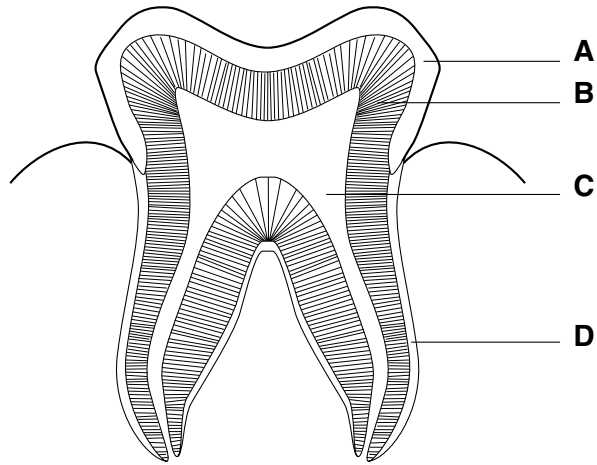
5 The diagram shows some cells in a leaf of a green plant.

In which layer of cells does most photosynthesis occur?



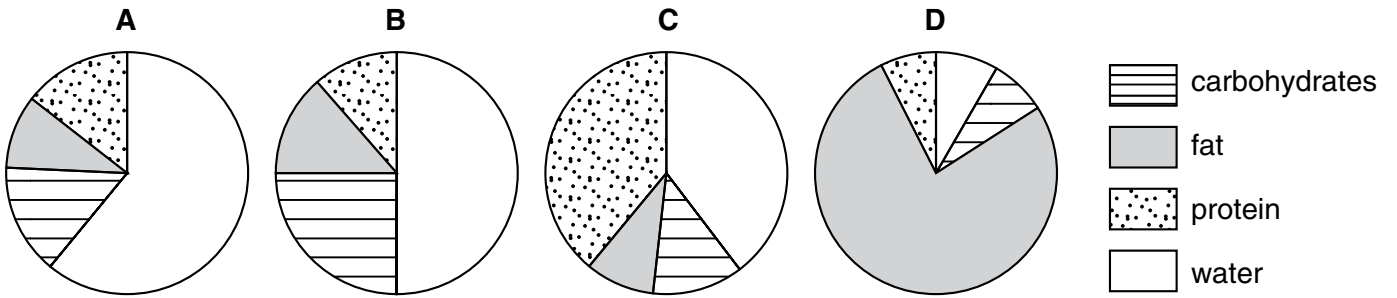
6 The diagram shows a section through a human tooth.

Which part is made of the hardest material?



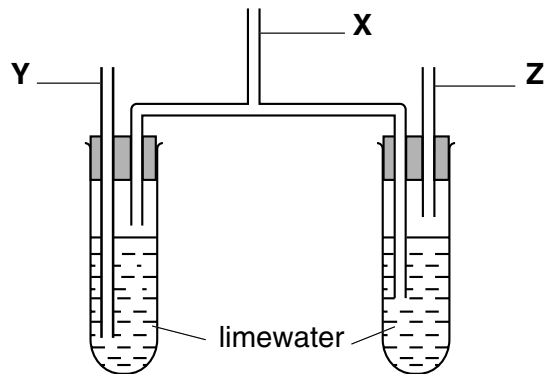
7 The pie-charts show the compositions of four different foods.

Which food contains the most energy?



- 8 The diagram shows apparatus that can be used to demonstrate that the air breathed out by a person contains more carbon dioxide than the air breathed in.

The person breathes in and out at **X**.



Where does air enter and leave the apparatus?

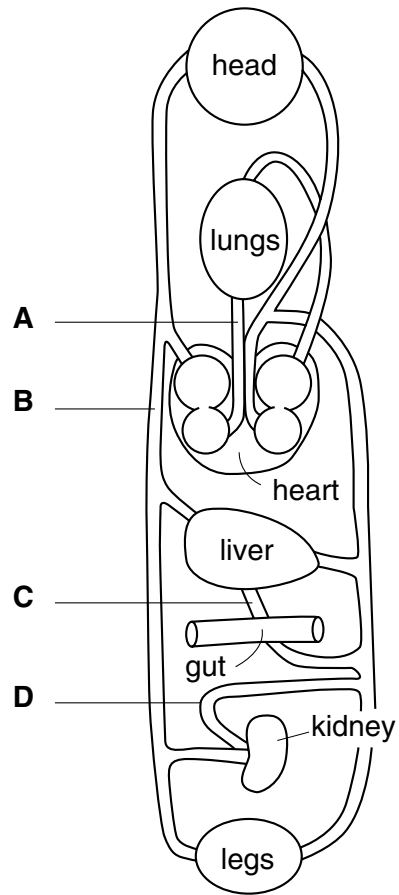
	air enters at	air leaves at
A	Y	Y
B	Y	Z
C	Z	Y
D	Z	Z

- 9 Which cells destroy harmful microorganisms in the blood?

- A** goblet cells
- B** platelets
- C** red blood cells
- D** white blood cells

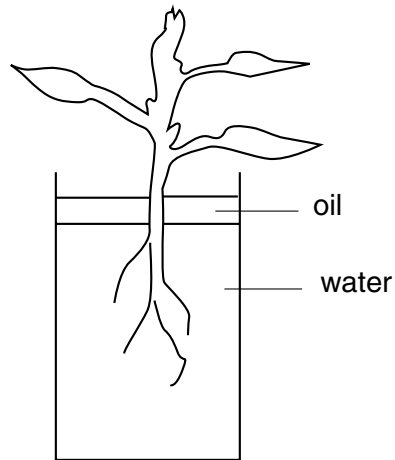
10 The diagram shows part of the human circulatory system.

Which structure carries oxygenated blood?



- 11 The drawing shows a plant in a container of water. There is a layer of oil on top of the water that stops the water evaporating. The apparatus weighs 300 g.

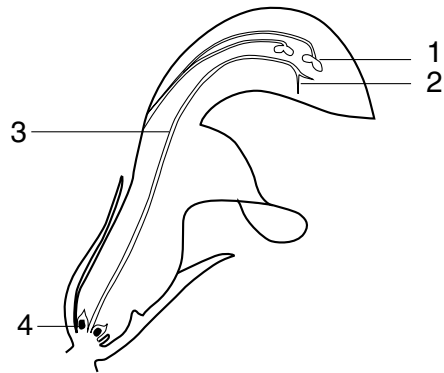
After two hours it weighs 296 g.



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
- 12 Which organ releases insulin when the blood sugar level is too high?
- A kidney
 - B liver
 - C pancreas
 - D stomach

13 The diagram shows a section through a flower.



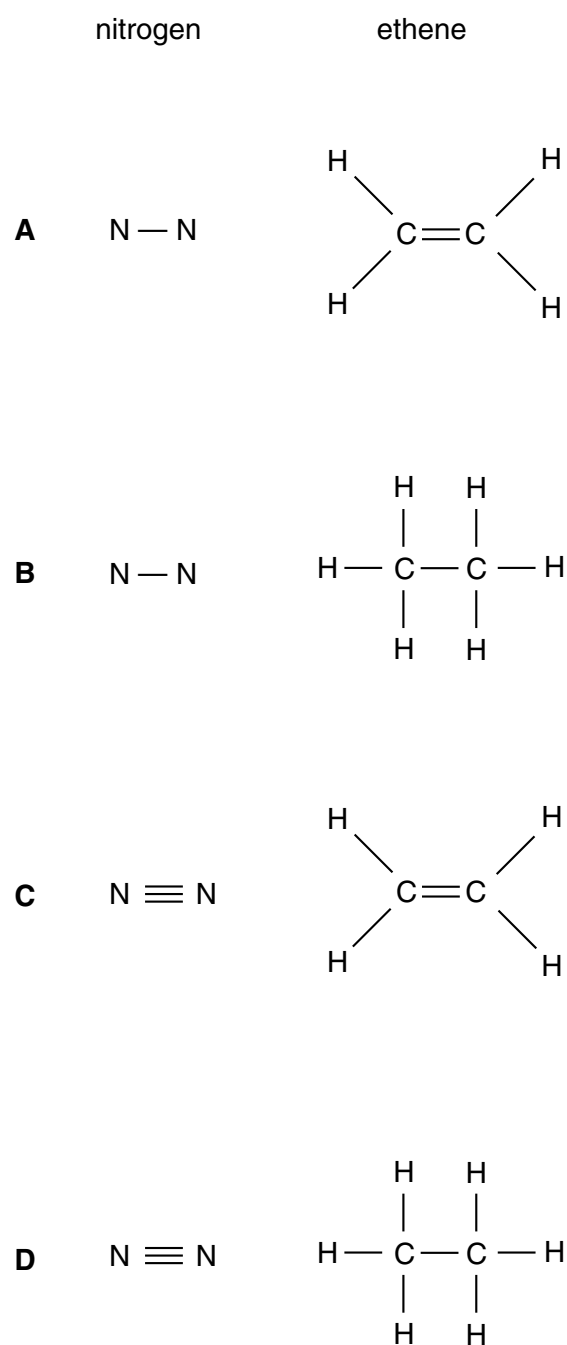
Where do the following occur?

	pollination	fertilisation
A	1	2
B	2	4
C	3	1
D	4	3

14 Which process takes place when a sperm joins with an ovum?

- A** fertilisation
- B** intercourse
- C** menstruation
- D** sterilisation

15 Which diagrams show the bonding in the molecules of nitrogen and ethene?



16 The reaction of zinc and sulphur to form zinc sulphide is exothermic.

Which information in the table is correct?

	elements in a mixture of zinc and sulphur	elements in zinc sulphide	energy change during the reaction
A	easy to separate	difficult to separate	heat given out
B	easy to separate	easy to separate	heat taken in
C	difficult to separate	difficult to separate	heat taken in
D	difficult to separate	easy to separate	heat given out

17 Which substance is an ionic compound?

	melting point	electrical conductivity when melted
A	high	high
B	high	low
C	low	high
D	low	low

18 Bromine is in the same group of the Periodic Table as chlorine.

What are the colour and formula of hydrobromic acid likely to be?

	colour	formula
A	brown	HOBBr
B	brown	HBr
C	colourless	HOBBr
D	colourless	HBr

19 Which equation shows an **insoluble** base reacting with an acid?

- A** barium chloride + sulphuric acid \rightarrow barium sulphate + hydrochloric acid
- B** magnesium oxide + hydrochloric acid \rightarrow magnesium chloride + water
- C** sodium carbonate + hydrochloric acid \rightarrow sodium chloride + water + carbon dioxide
- D** zinc + sulphuric acid \rightarrow zinc sulphate + hydrogen

20 Flame tests are carried out on calcium chloride and copper(II) chloride.

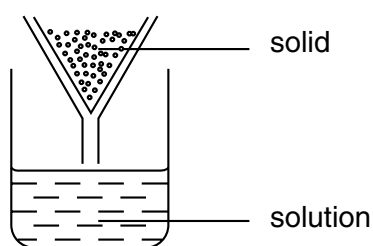
What are the colours of the flames?

	calcium chloride	copper(II) chloride
A	red	blue-green
B	blue-green	lilac
C	lilac	yellow
D	yellow	red

- 21 In an experiment, 100 cm^3 of dry air are passed over heated copper turnings until there is no further change in volume (at r.t.p.).

What volume of gas remains?

- A 89 cm^3
 B 79 cm^3
 C 21 cm^3
 D 11 cm^3
- 22 A mixture of copper, magnesium and zinc is added to an excess of dilute sulphuric acid. The resulting mixture is then filtered.

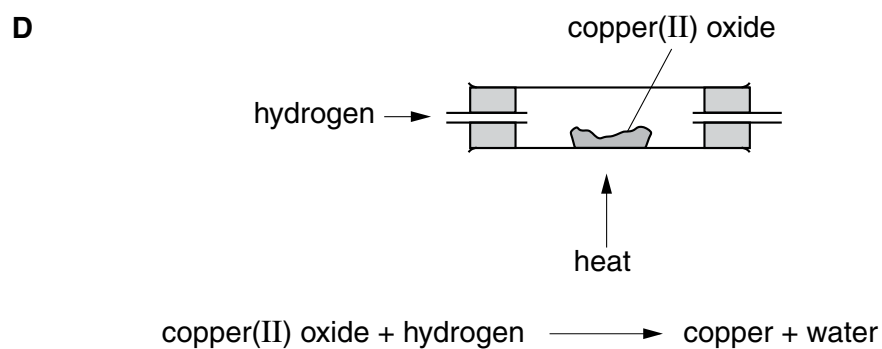
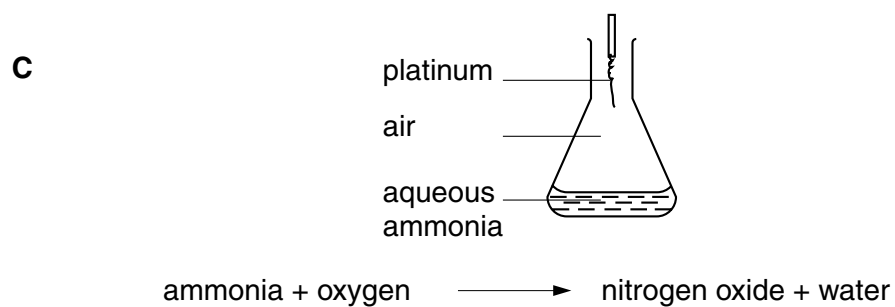
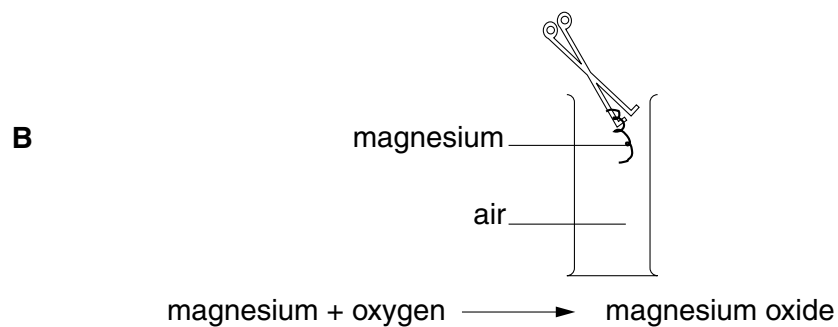
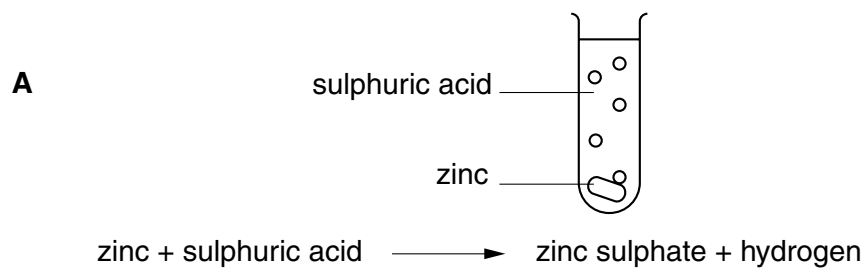


What is the solid left behind?

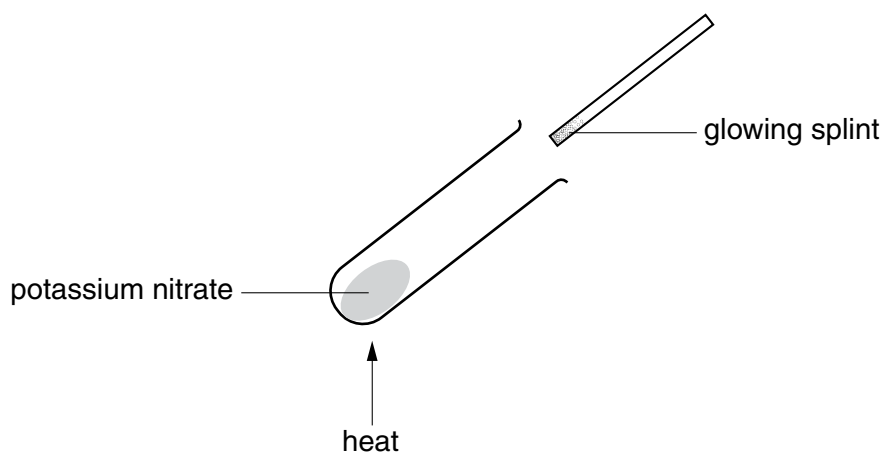
- A copper and magnesium
 B copper only
 C magnesium and zinc
 D zinc only
- 23 Which statement best describes how and why drinking water is sterilised?

	how	why
A	boiled	bacteria cannot multiply
B	boiled	kills bacteria
C	chlorine added	bacteria cannot multiply
D	chlorine added	kills bacteria

24 In which experiment does the metal act as a catalyst?



- 25 The diagram shows an experiment to investigate the effect of heat on potassium nitrate.



The glowing splint bursts into flame.

What happens to the potassium nitrate when it is heated?

	type of reaction	gas produced
A	combustion	hydrogen
B	combustion	oxygen
C	thermal decomposition	hydrogen
D	thermal decomposition	oxygen

- 26 The description below of a plastic is incomplete.

To make a plastic,1..... of a2..... combine to form a long chain3.....

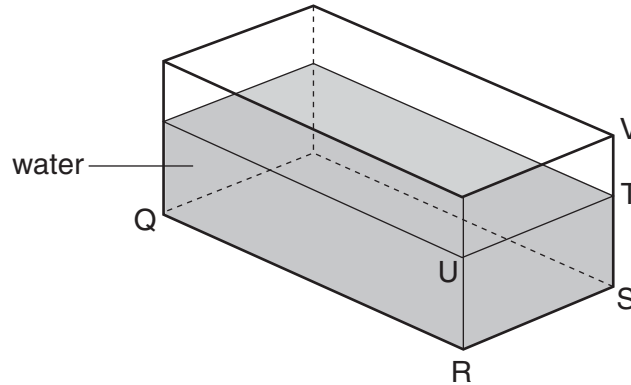
Which words correctly complete the gaps?

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

27 Why is water often used to extinguish fires?

- A The boiling point of water is 100°C .
- B Water is a compound containing oxygen and hydrogen.
- C Water removes heat from the fire.
- D Water reacts with most fuels.

28 A glass tank contains some water.



The length QR and the width RS of the tank are known.

What other distance needs to be measured in order to be able to calculate the volume of the water?

- A ST
- B SV
- C TU
- D TV

29 A tunnel has a length of 50 km. A car takes 20 min to travel between the two ends of the tunnel.

What is the average speed of the car?

- A 2.5 km/h
- B 16.6 km/h
- C 150 km/h
- D 1000 km/h

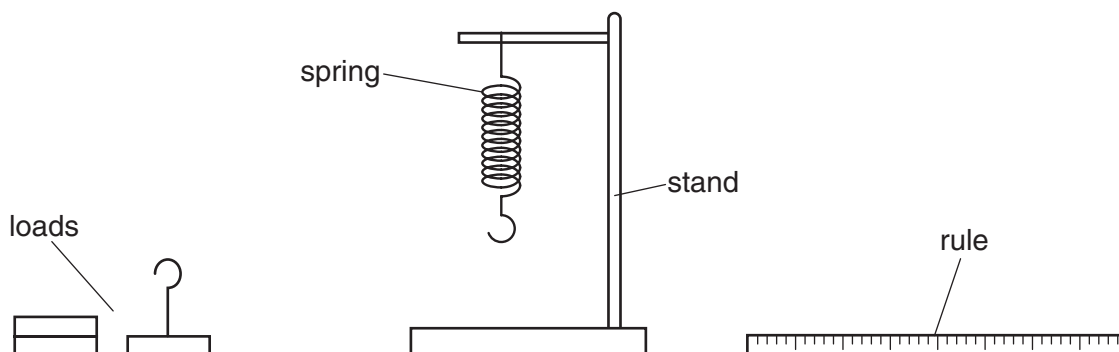
30 Three children, X, Y and Z, are using a see-saw to compare their weights.



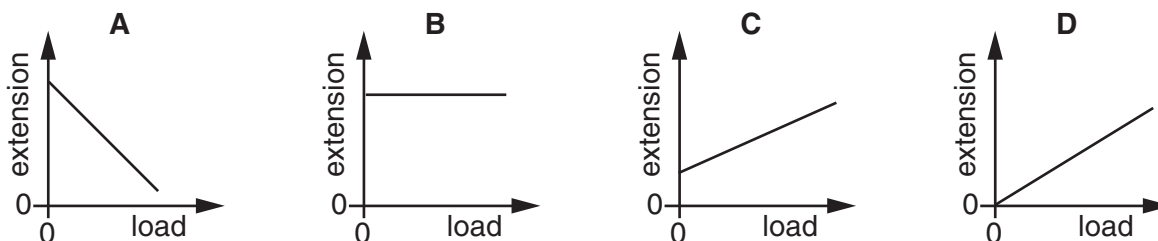
Which line in the table shows the correct order of the children's weights?

	heaviest	← →	lightest
A	X	Y	Z
B	X	Z	Y
C	Y	X	Z
D	Y	Z	X

31 A spring is suspended from a stand. Loads are added and the extensions are measured.



Which graph shows the result of plotting extension against load?



32 What is the source of the energy converted by a hydro-electric power station?

- A** hot rocks
- B** falling water
- C** oil
- D** waves

33 When water evaporates, some molecules escape.

Which molecules escape?

- A** the molecules at the bottom of the liquid with less energy than others
- B** the molecules at the bottom of the liquid with more energy than others
- C** the molecules at the surface with less energy than others
- D** the molecules at the surface with more energy than others

34 A person holds a glass beaker in one hand and fills it quickly with hot water. It takes several seconds before his hand starts to feel the heat.

Why is there this delay?

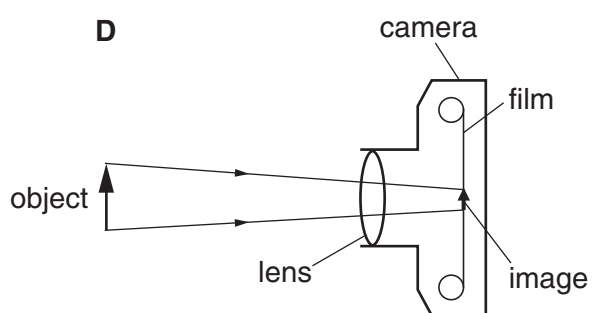
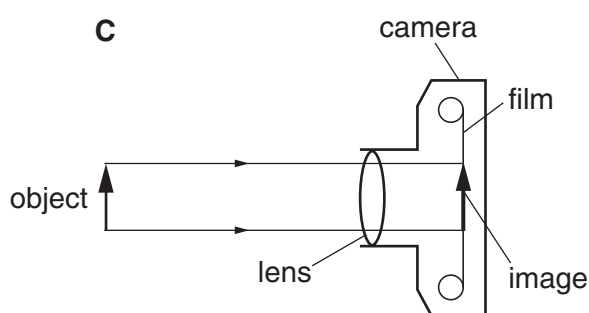
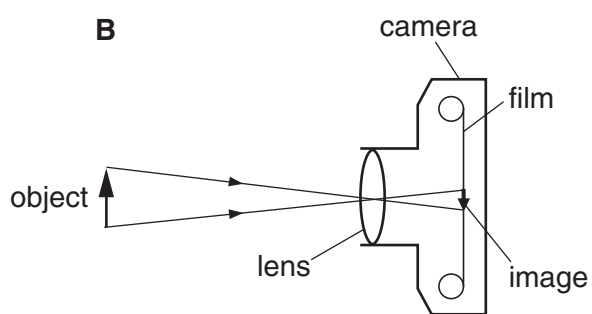
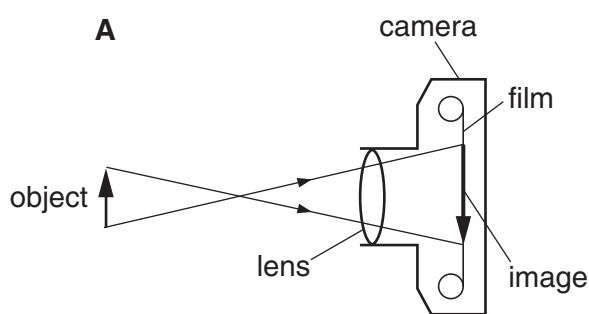
- A** Glass is a poor conductor of heat.
- B** Glass is a good conductor of heat.
- C** Water is a poor conductor of heat.
- D** Water is a good conductor of heat.

35 A woman tunes her radio to a station broadcasting on 200 m.

What does the 200 m tell her about the radio wave?

- A** its amplitude
- B** its frequency
- C** its speed
- D** its wavelength

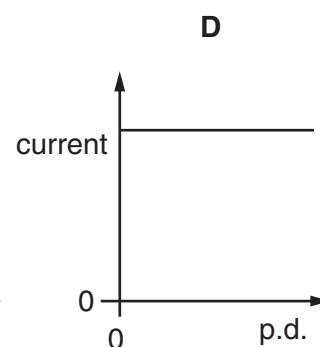
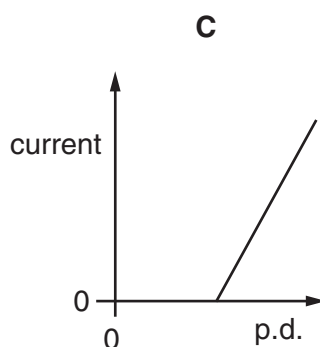
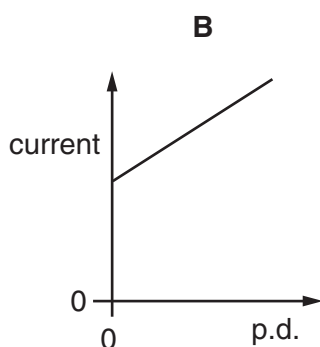
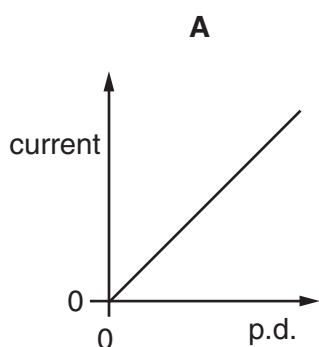
36 Which diagram correctly shows rays passing through a camera lens?



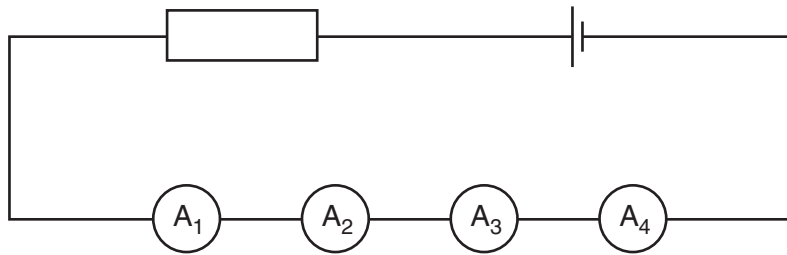
37 When the potential difference (p.d.) across a piece of resistance wire is changed, the current through the wire also changes.

The temperature of the wire is kept the same.

Which graph shows how the p.d. and current are related?



- 38 Two faulty ammeters and two perfect ammeters are connected in series in the circuit shown.



The readings on the ammeters are

A₁ 2.9 A

A₂ 3.1 A

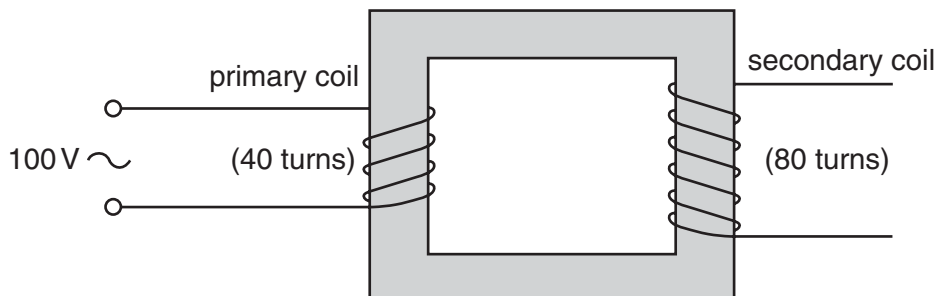
A₃ 3.1 A

A₄ 3.3 A

Which two ammeters are faulty?

- A** A₁ and A₂ **B** A₁ and A₄ **C** A₂ and A₃ **D** A₃ and A₄

- 39 The diagram shows a transformer with an alternating voltage of 100 V applied to the primary coil.



What is the voltage produced across the secondary coil?

- A** 50 V **B** 100 V **C** 200 V **D** 8000 V

- 40 Which type of radiation can be stopped by a sheet of paper?

- A** α -particles
B β -particles
C γ -rays
D X-ray

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DATA SHEET

The Periodic Table of the Elements

Group

	I	II	III	IV	V	VI	VII	O	
7 Li Lithium	9 Be Beryllium	1 H Hydrogen		11 B Boron	12 C Carbon	14 N Nitrogen	16 O Oxygen	19 F Fluorine	20 Ne Neon
23 Na Sodium	24 Mg Magnesium			27 Al Aluminium	28 Si Silicon	31 P Phosphorus	32 S Sulphur	35.5 Cl Chlorine	40 Ar Argon
39 K Potassium	40 Ca Calcium			59 Co Cobalt	64 Cu Copper	75 As Arsenic	79 Se Selenium	80 Br Bromine	84 Kr Krypton
85 Rb Rubidium	88 Sr Strontium	89 Y Yttrium	91 Zr Zirconium	103 Rh Rhodium	106 Pd Palladium	122 Sb Antimony	128 Te Tellurium	127 I Iodine	131 Xe Xenon
133 Cs Caesium	137 Ba Barium	139 La Lanthanum	178 Hf Hafnium	192 Ir Iridium	195 Pt Platinum	209 Pb Lead	207 Po Polonium	209 At Astatine	226 Ra Radium
55 Fr Francium	87 Ra Radium	89 Ac Actinium	72 Hf Hafnium	77 Ir Iridium	78 Pt Platinum	80 Hg Mercury	84 Po Polonium	85 At Astatine	86 Rn Radon
58 Ce Cerium	140 Pr Praseodymium	141 Nd Neodymium	144 Pm Promethium	150 Sm Samarium	152 Eu Europium	157 Gd Gadolinium	162 Dy Dysprosium	169 Tm Thulium	173 Yb Ytterbium
90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	98 Cf Californium	101 Md Mendelevium	102 No Nobelium
90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	98 Cf Californium	101 Md Mendelevium	103 Lr Lawrencium

*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 dm³ at room temperature and pressure (r.t.p.).