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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.

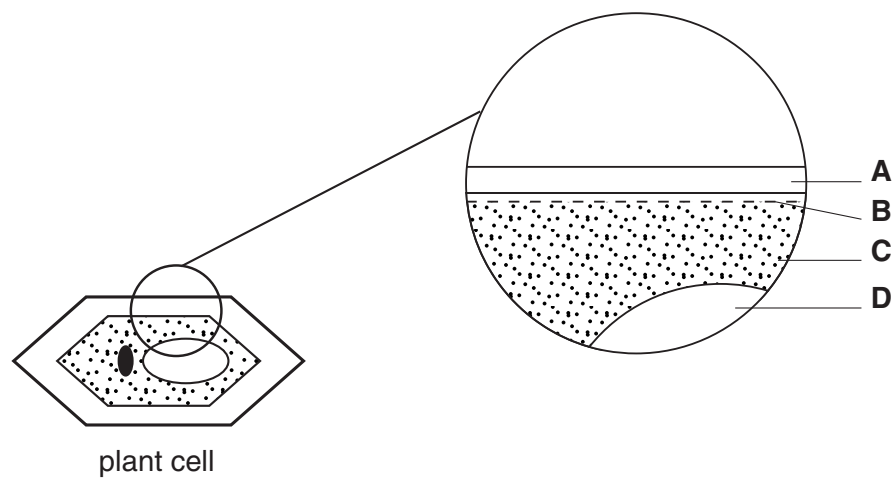


- 1 Which pair of features is found in plant cells but **not** in animal cells?

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.

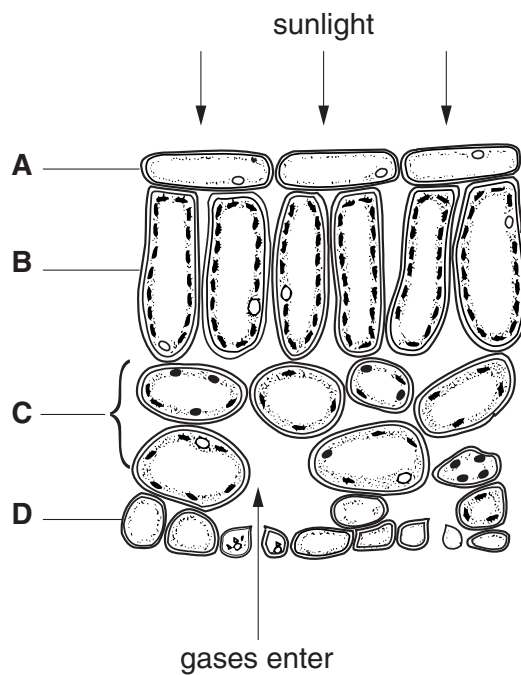
- 1 soften in hot water
- 2 stain with iodine
- 3 boil in alcohol
- 4 boil in water

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

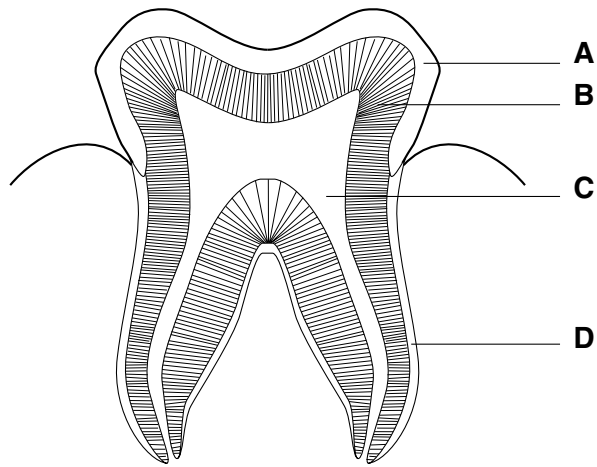
5 The diagram shows some cells in a leaf of a green plant.

In which layer of cells does most photosynthesis occur?



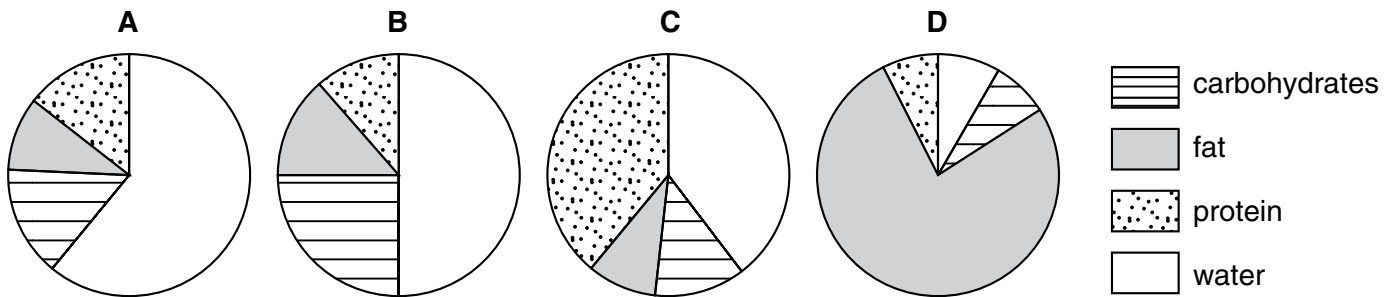
- 6 The diagram shows a section through a human tooth.

Which part is made of the hardest material?



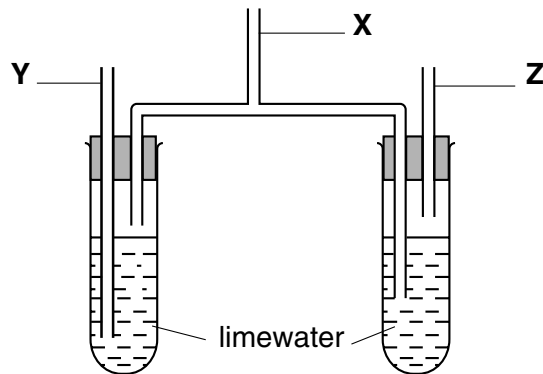
- 7 The pie-charts show the compositions of four different foods.

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?

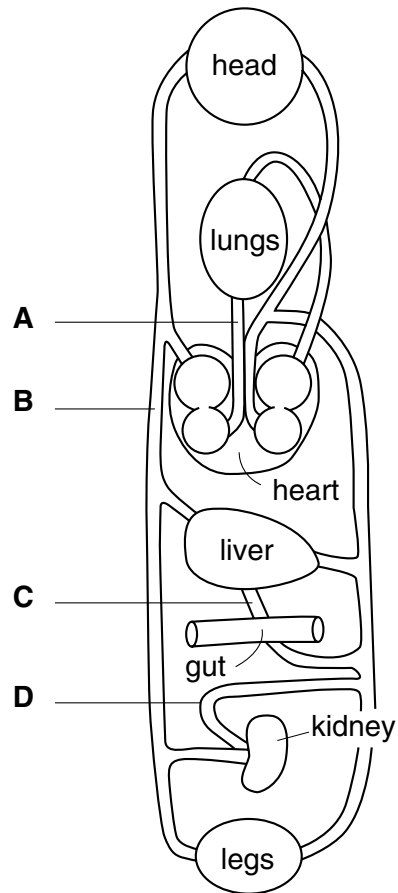
	air enters at	air leaves at
A	Y	Y
B	Y	Z
C	Z	Y
D	Z	Z

- 9 Which cells destroy harmful microorganisms in the blood?

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

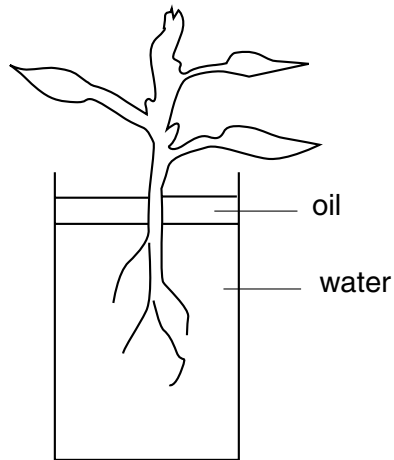
10 The diagram shows part of the human circulatory system.

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.

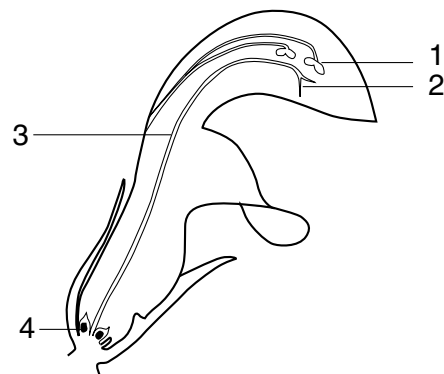
After two hours it weighs 296 g.



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.



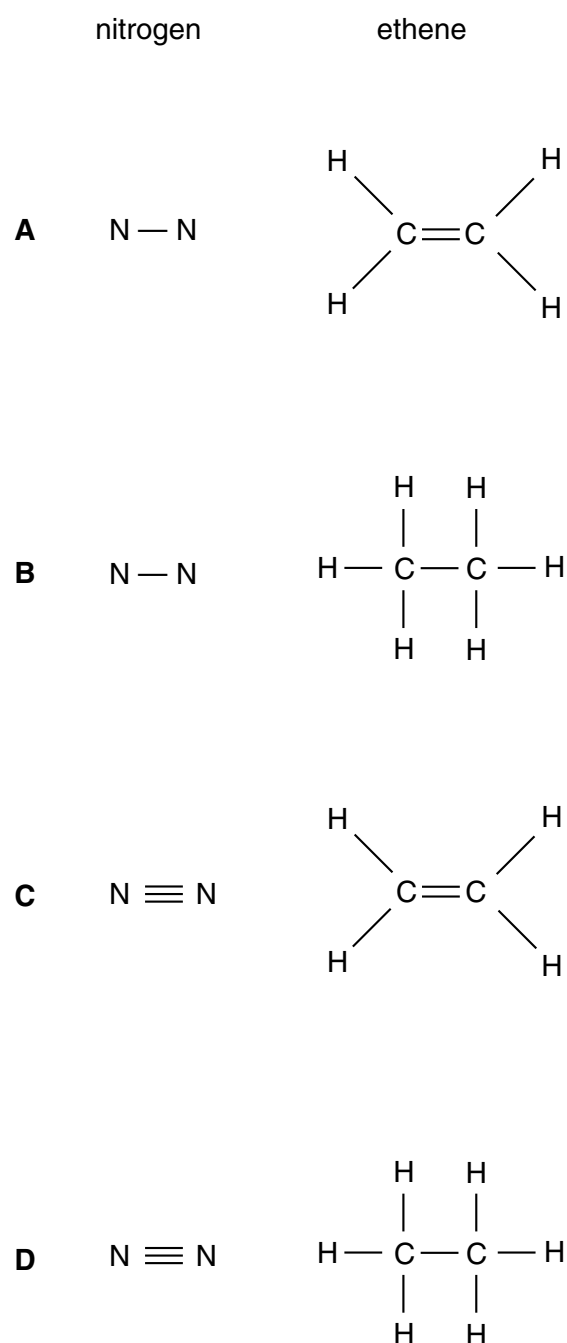
Where do the following occur?

	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.

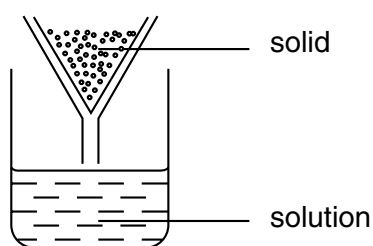
What are the colours of the flames?

	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.



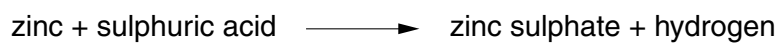
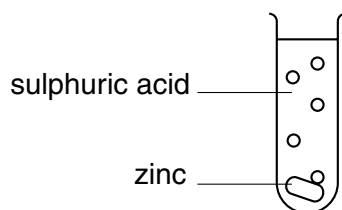
What is the solid left behind?

- 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?

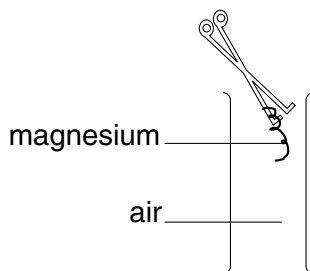
	how	why
A	boiled	bacteria cannot multiply
B	boiled	kills bacteria
C	chlorine added	bacteria cannot multiply
D	chlorine added	kills bacteria

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

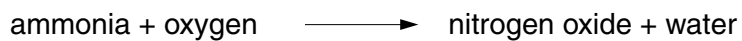
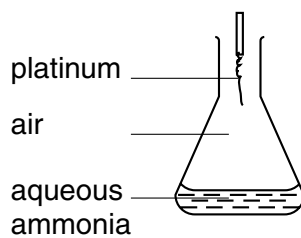
A



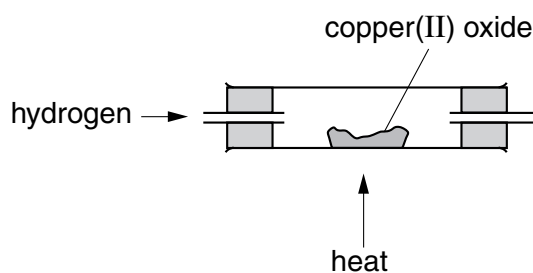
B



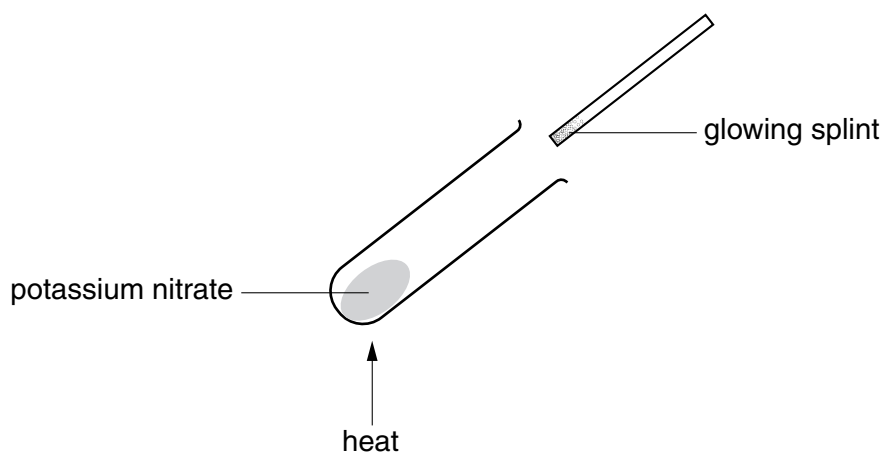
C



D



- 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.....

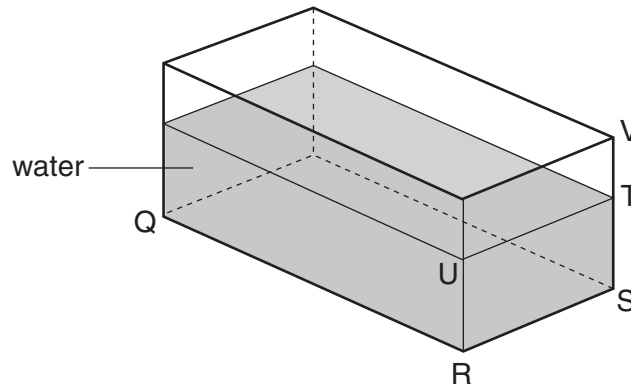
Which words correctly complete the gaps?

	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?

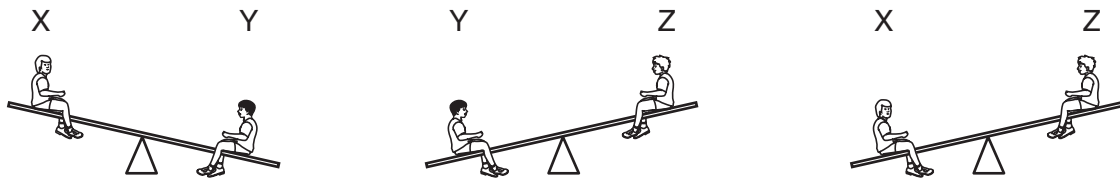
- A ST B SV C TU D TV

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

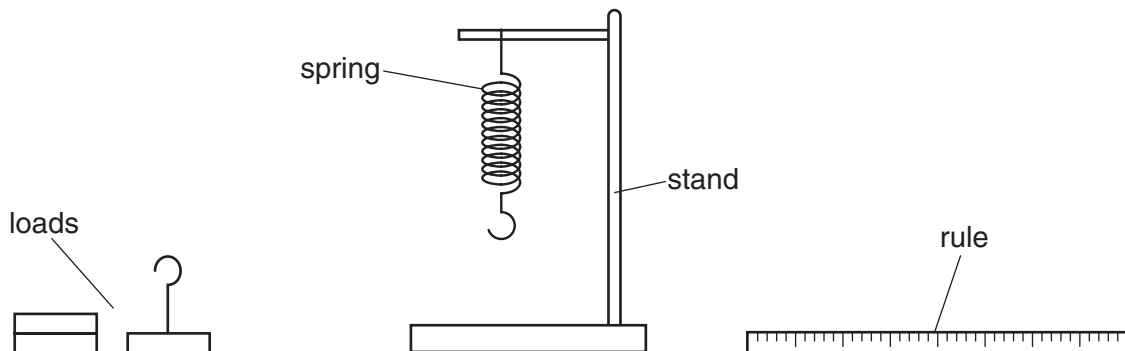
30 Three children, X, Y and Z, are using a see-saw to compare their weights.



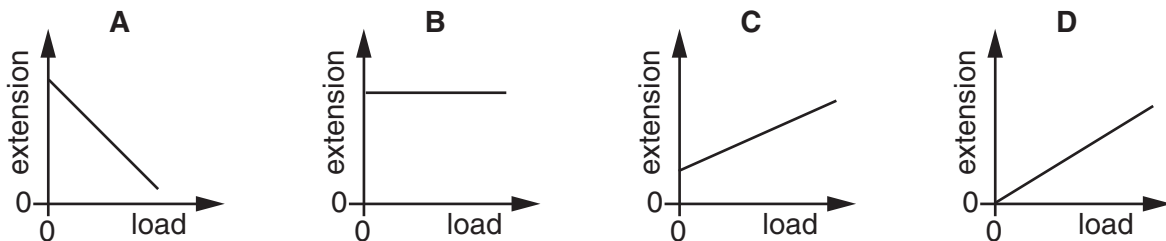
Which line in the table shows the correct order of the children's weights?

	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?

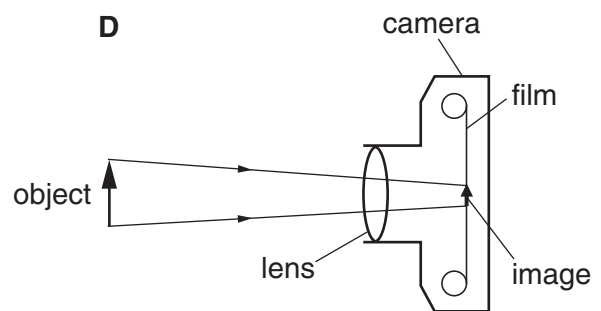
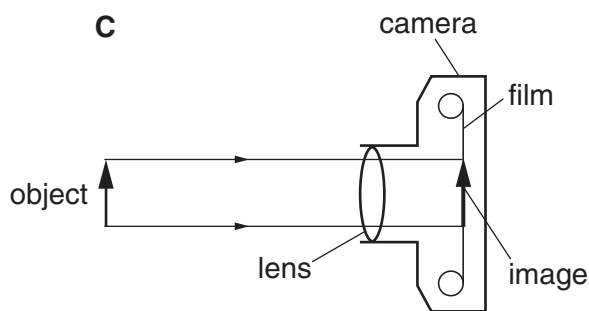
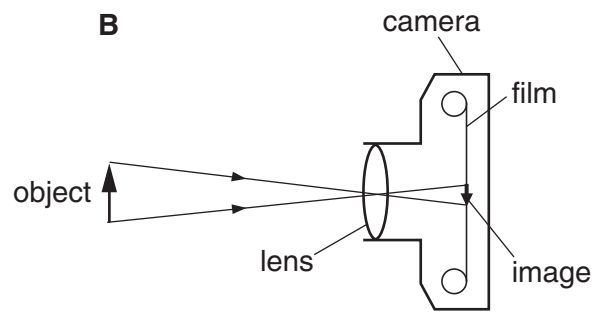
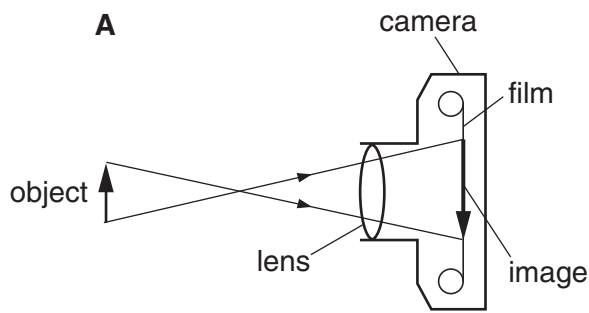
- A** Glass is a poor conductor of heat.
- B** Glass is a good conductor of heat.
- C** Water is a poor conductor of heat.
- D** Water is a good conductor of heat.

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

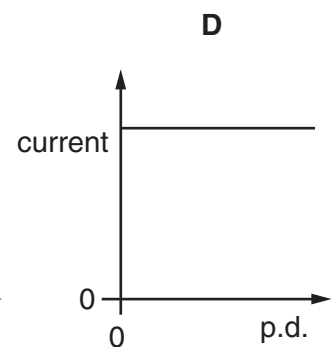
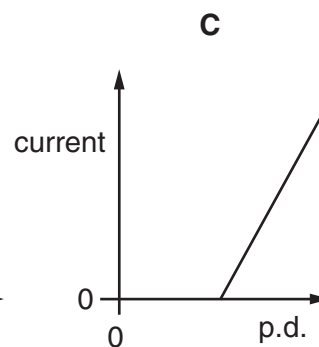
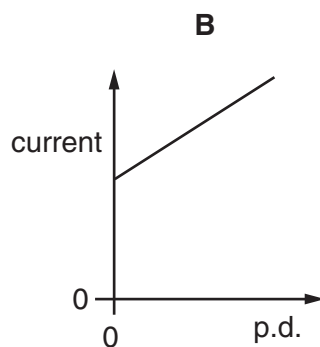
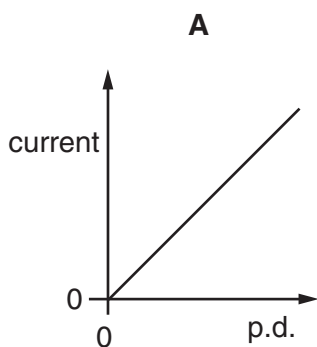
36 Which diagram correctly shows rays passing through a camera lens?



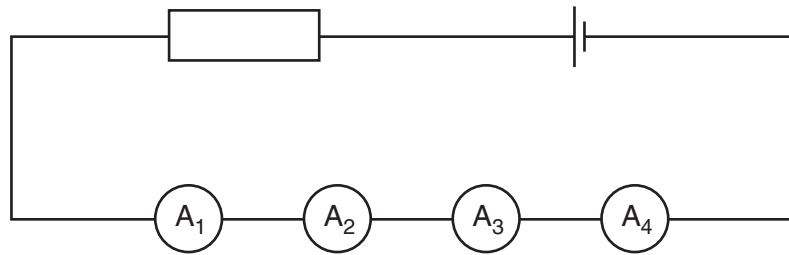
37 When the potential difference (p.d.) across a piece of resistance wire is changed, the current through the wire also changes.

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

A_1 2.9 A

A_2 3.1 A

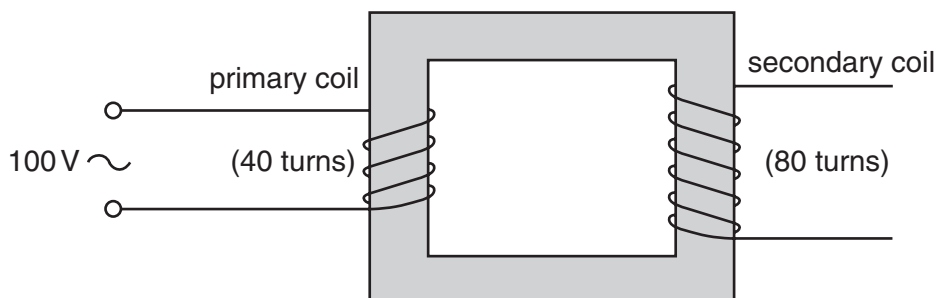
A_3 3.1 A

A_4 3.3 A

Which two ammeters are faulty?

- A** A_1 and A_2 **B** A_1 and A_4 **C** A_2 and A_3 **D** A_3 and A_4

- 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	0									
		1 H Hydrogen 1																4 He Helium 2								
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 Sulphur 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 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 Tc Technetium 43	101 Ru Ruthenium 44	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	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	210 Rn Radon 86										
87 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89																								
*58-71 Lanthanoid series																										
†90-103 Actinoid series																										
													140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	232 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	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													a X b a = relative atomic mass X = atomic symbol b = proton (atomic) number													

Key

a

X

b

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.).