International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

CO-ORDINATED SCIENCES 0654/1

PAPER 1 Multiple Choice

OCTOBER/NOVEMBER SESSION 2002

45 minutes

Additional materials:
Multiple Choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in 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 very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

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.

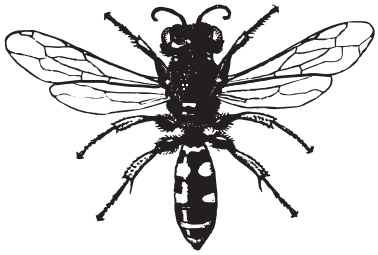
A copy of the Periodic Table is printed on page 20.

This question paper consists of 20 printed pages.

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

[Turn over

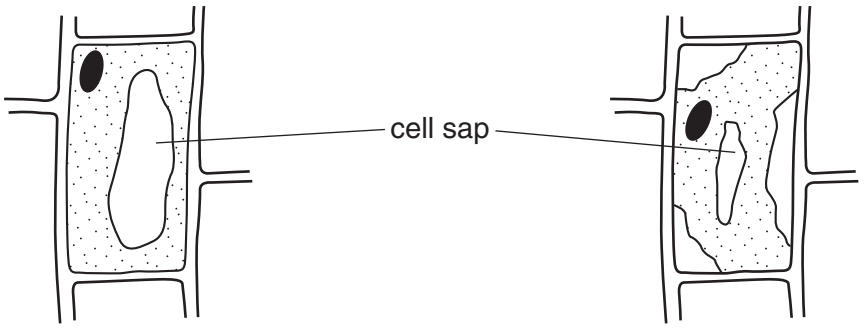
1 The diagram shows an insect.



Use the key to identify the insect.

1.	Wings present	go to 2
	Wings absent	**A**
2.	Two pairs of wings	go to 3
	One pair of wings	**B**
3.	Wings with circular markings	**C**
	Wings without circular markings	**D**

2 The diagrams show a normal plant cell, and a cell from the same plant, which has been in a sugar solution for 20 minutes.



normal cell

after 20 minutes in sugar solution

Which statement explains this change?

A The sugar solution is less concentrated than the cell sap.

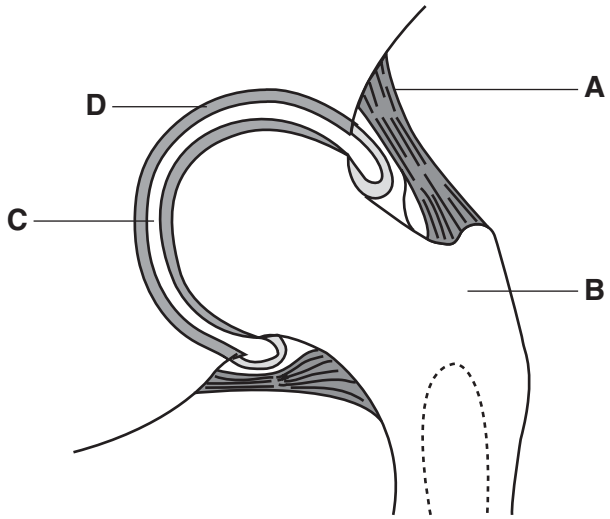
B The sugar solution is more concentrated than the cell sap.

C The sugar solution is the same concentration as the cell sap.

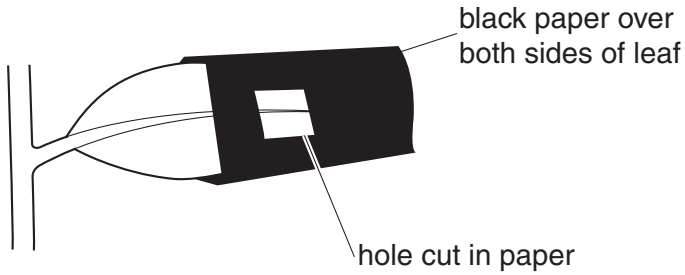
D The sugar solution has killed the cell.

3 The diagram shows a section through a human joint.

Which part contains a fluid that reduces friction?



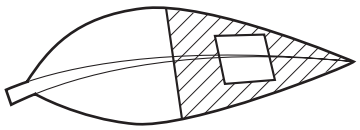
4 A destarched plant is placed in light with black paper over part of one leaf, as shown.



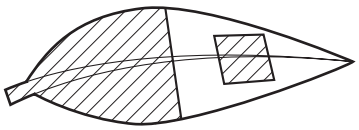
After 8 hours, the leaf is tested for starch.

Which diagram shows the appearance of the leaf after this test?

A



B

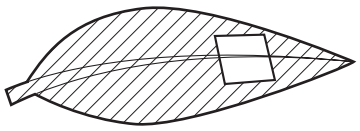


key

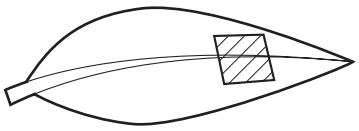
starch present

no starch present

C



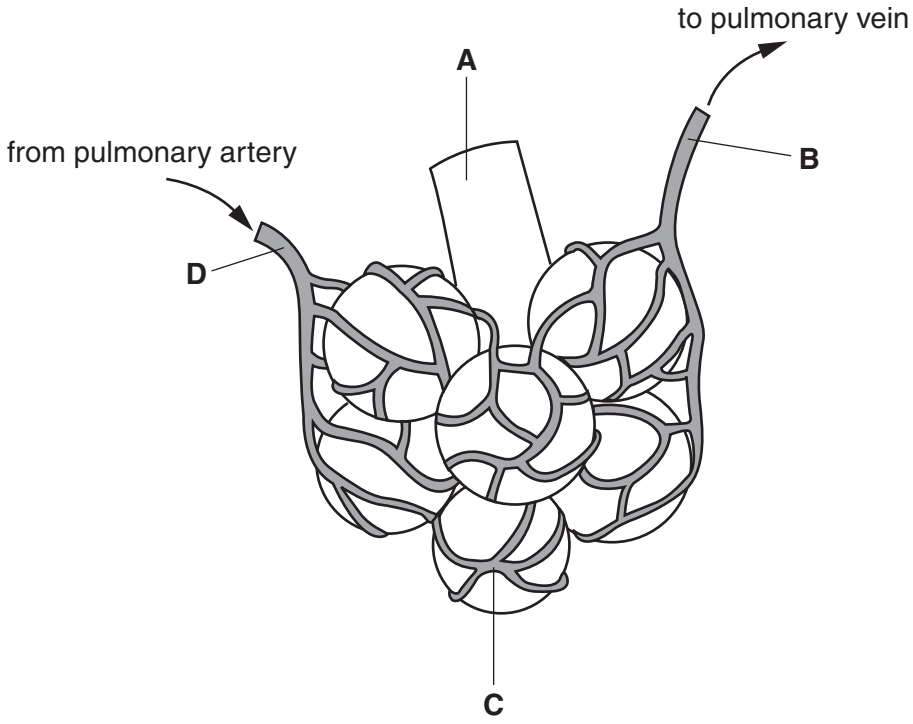
D



[Turn over

5 The diagram shows some of the structures in a human lung.

Where is the oxygen concentration highest?



6 Which statement is correct for **all** arteries in the human body?

A They carry blood with no pulse.

B They contain valves.

C They have thin walls.

D They take blood away from the heart.

7 Which substance is produced in the muscles by anaerobic respiration?

A ethanol (alcohol)

B glucose

C lactic acid

D oxygen

8 Which person has the greatest need for calcium in the diet?

A a labourer

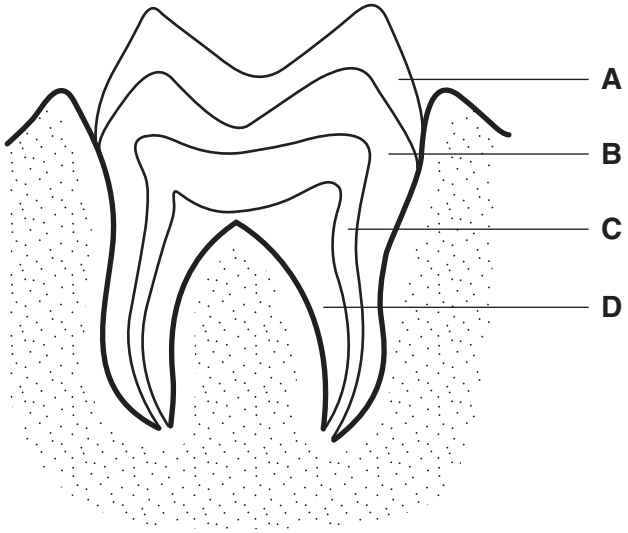
B an office worker

C an old man

D a pregnant woman

9 The diagram shows a section through a human tooth.

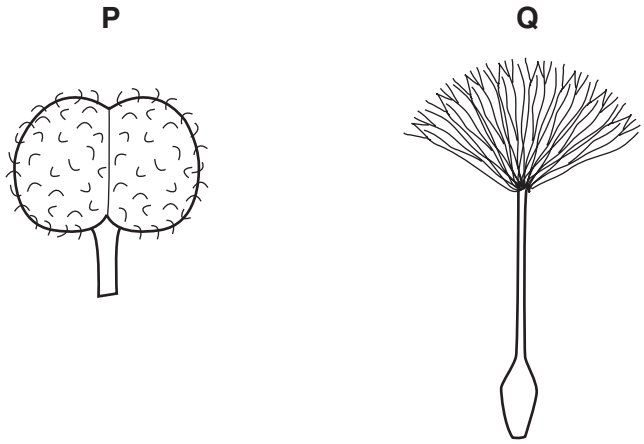
Which part contains blood vessels?



10 How does a lot of sugar entering the blood affect the activity of the pancreas and liver?

	pancreas	liver
A	secretes less insulin	adds sugar to blood
B	secretes less insulin	removes sugar from blood
C	secretes more insulin	adds sugar to blood
D	secretes more insulin	removes sugar from blood

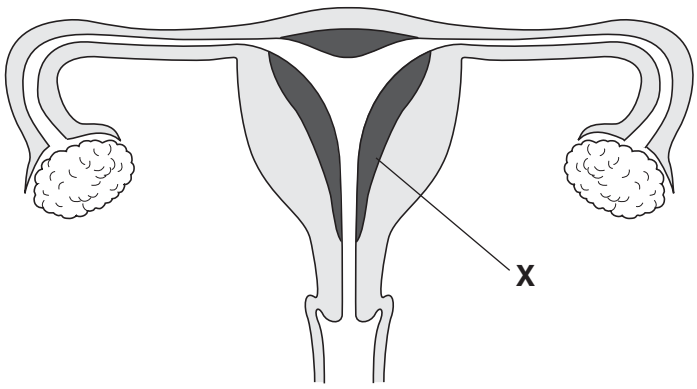
11 The diagram shows two fruits.



How are these fruits dispersed?

	P	Q
A	animals	animals
B	animals	wind
C	wind	animals
D	wind	wind

12 The diagram shows the female reproductive organs.



Which hormone is responsible for keeping structure **X** in a thickened condition?

A insulin

B oestrogen

C progesterone

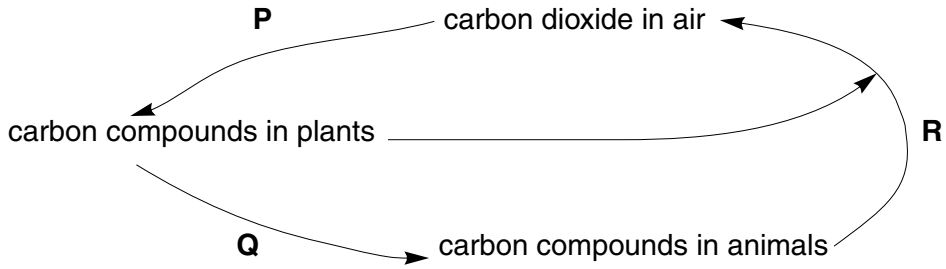
D testosterone

13 The table gives information about a human sperm and a human egg.

Which information is correct?

	sperm		egg	
	where formed	chromosome number	where formed	chromosome number
A	ovary	23	testis	23
B	testis	46	ovary	46
C	ovary	46	testis	46
D	testis	23	ovary	23

14 The diagram shows part of the carbon cycle.

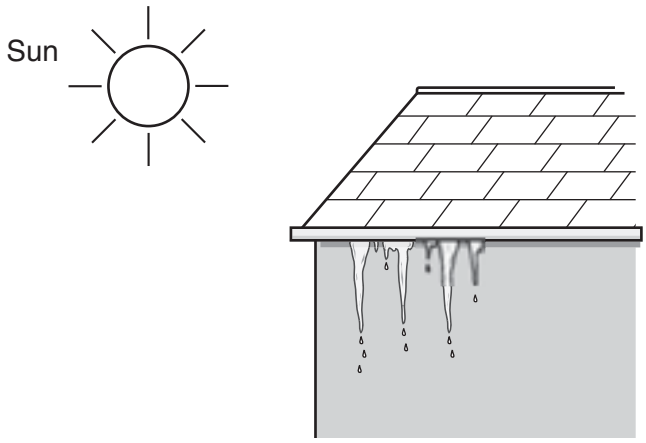


Which processes are occurring at **P**, **Q** and **R**?

	P	**Q**	**R**
A	combustion	photosynthesis	feeding
B	feeding	respiration	photosynthesis
C	photosynthesis	feeding	respiration
D	respiration	feeding	combustion

[Turn over

15 The diagram shows ice melting in sunlight.



What happens when ice melts?

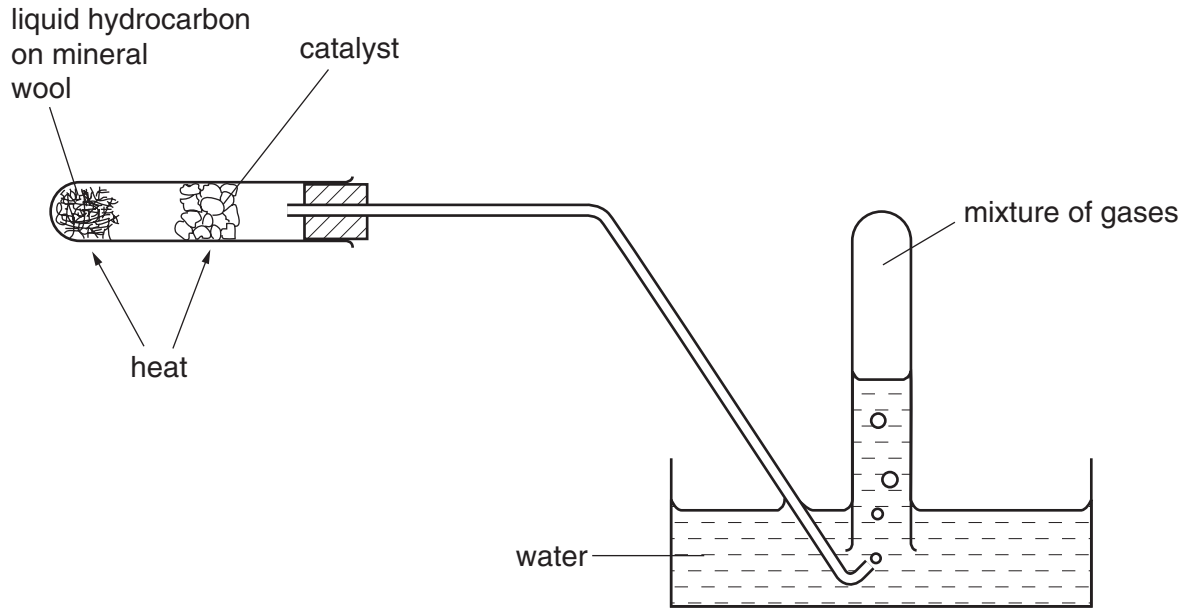
A Irregularly arranged molecules change to regularly arranged molecules.

B Regularly arranged molecules change to irregularly arranged molecules.

C Water molecules change to hydrogen and oxygen atoms.

D Water molecules change to water atoms.

16 The diagram shows the result of an experiment on a liquid hydrocarbon.



Which change takes place?

A combustion

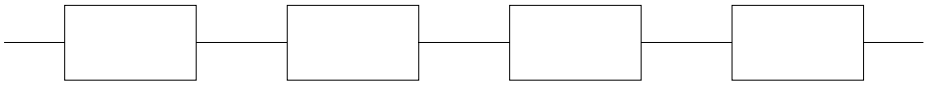
B cracking

C fractional distillation

D polymerisation

17 The structure of sugar obtained from plants may be simplified as shown.

Compound **X**, also obtained from plants, has the following structure.



What could **X** be?

	protein	starch
A	✔	✔
B	✔	✘
C	✘	✔
D	✘	✘

18 Which material is made from silicon(IV) oxide combined with metal oxides?

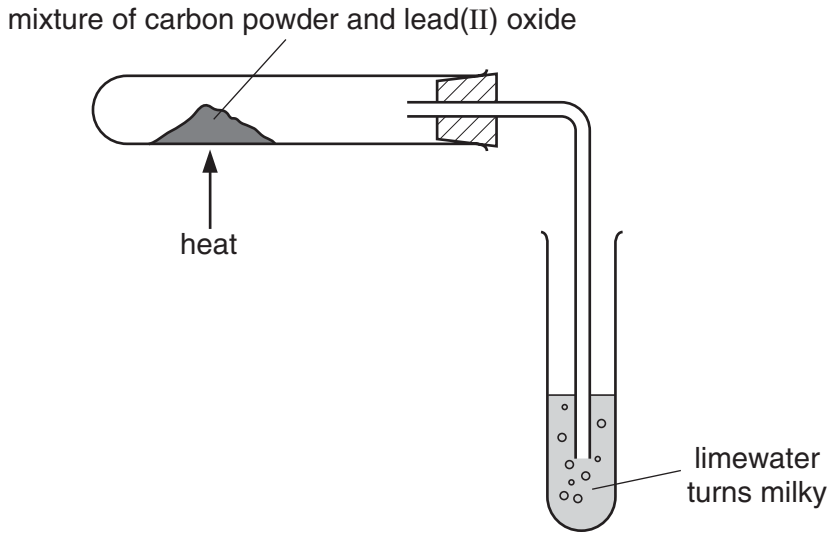
A brass

B glass

C polythene

D steel

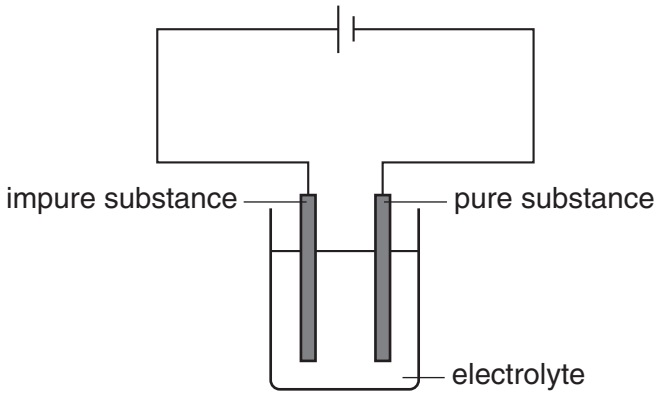
19 The apparatus shown can be used to extract lead from lead(II) oxide.



Which line in the table is correct?

	substance that is reduced	substance that is oxidised	gas given off
A	carbon	lead(II) oxide	carbon dioxide
B	carbon	lead(II) oxide	oxygen
C	lead(II) oxide	carbon	carbon dioxide
D	lead(II) oxide	carbon	oxygen

20 The diagram shows an electrolysis circuit.



Which substance can be purified as shown?

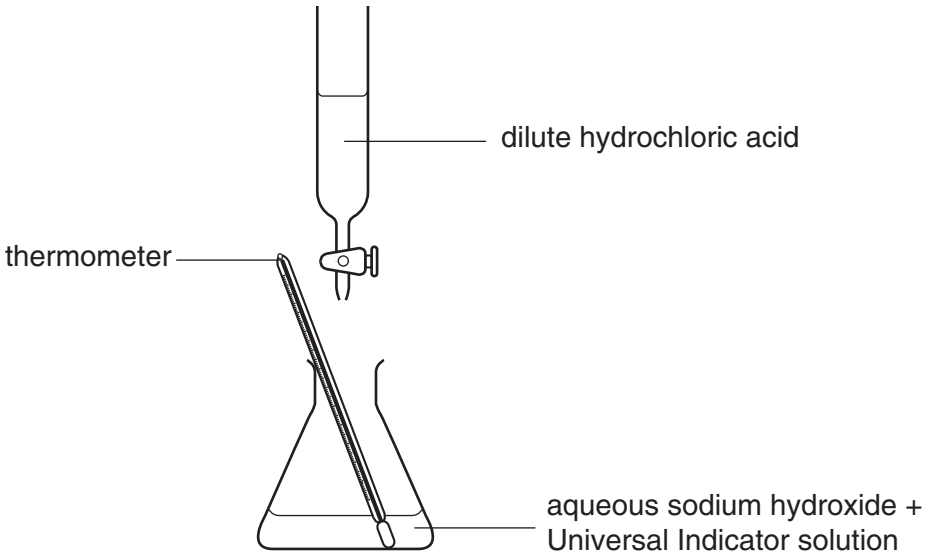
A aluminium

B copper

C salt

D sodium

21 The diagram shows a neutralisation experiment.



Dilute hydrochloric acid is run from a burette into the flask until a neutral solution is formed.

Which changes occur in the flask?

	the temperature	the Universal Indicator turns fro
A	falls	green to blue
B	falls	green to red
C	rises	blue to green
D	rises	red to green

22 Chlorophyll can be separated from other dyes by using

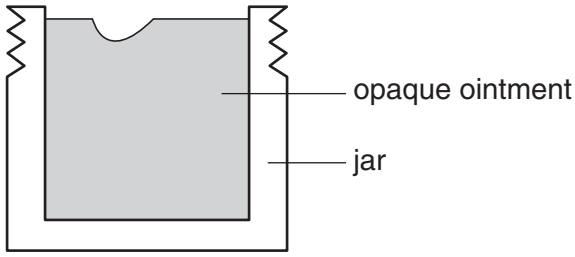
A chromatography.

B condensation.

C distillation.

D electrolysis.

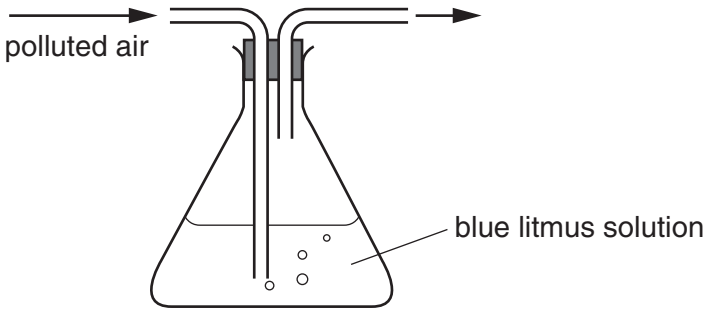
23 A person uses a finger to remove some opaque ointment from a full jar, as shown.



Which of the terms “gel” and “suspension” describe this ointment?

	gel	suspension
A	✔	✔
B	✔	✘
C	✘	✔
D	✘	✘

24 Samples of air, one polluted with nitrogen dioxide and the other polluted with sulphur dioxide, are passed through the apparatus shown.



For which of these polluted samples of air does the blue litmus solution change colour?

	sample with nitrogen dioxide	sample with sulphur dioxide
A	✘	✘
B	✘	✔
C	✔	✘
D	✔	✔

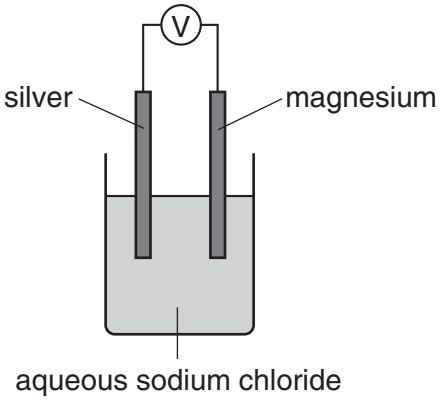
25 Methane is a commonly used compound. It is a .....1..... used as a .....2.....

Which words correctly fill the gaps?

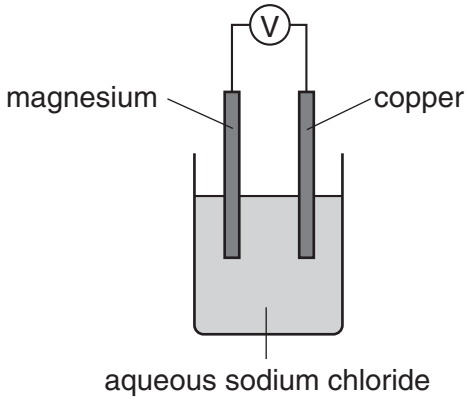
	gap 1	gap 2
A	gas	fuel
B	gas	monomer
C	liquid	fuel
D	liquid	monomer

26 In which arrangement of apparatus is the reading on the voltmeter, V, zero?

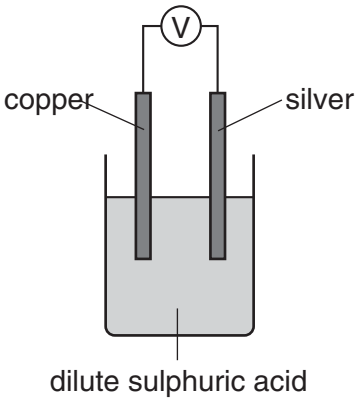
A



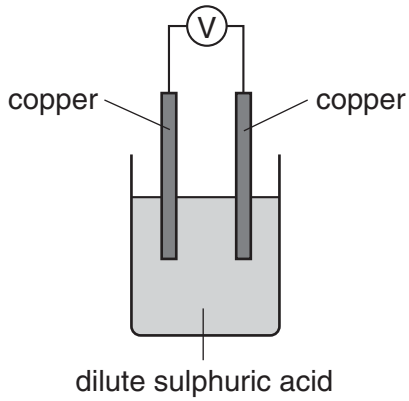
B



C



D



27 Lead has a high density of 11.3 g / cm^3 and lead(II) iodide is a bright yellow solid.

Which property explains why lead is **not** an example of a transition metal?

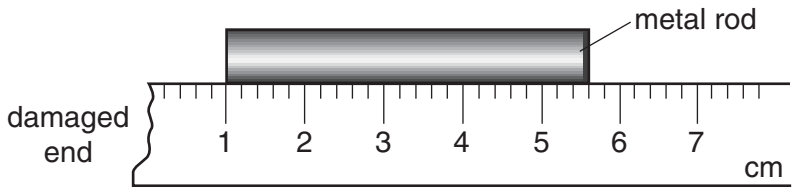
A Lead conducts electricity.

B Lead(II) carbonate is insoluble in water.

C Lead melts at 327 °C.

D Lead(II) oxide is basic.

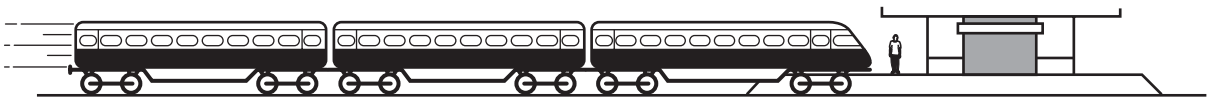
28 A girl uses a rule to measure the length of a metal rod. Because the end of the rule is damaged, she places one end of the rod at the 1 cm mark as shown.



How long is the metal rod?

A 43 mm **B** 46 mm **C** 53 mm **D** 56 mm

29 A child is standing on the platform of a station, watching the trains.



A train travelling at 30 m/s takes 3 s to pass the child.

What is the length of the train?

A 10 m **B** 30 m **C** 90 m **D** 270 m

30 Which of the following statements is correct?

A Mass and weight are different names for the same thing.

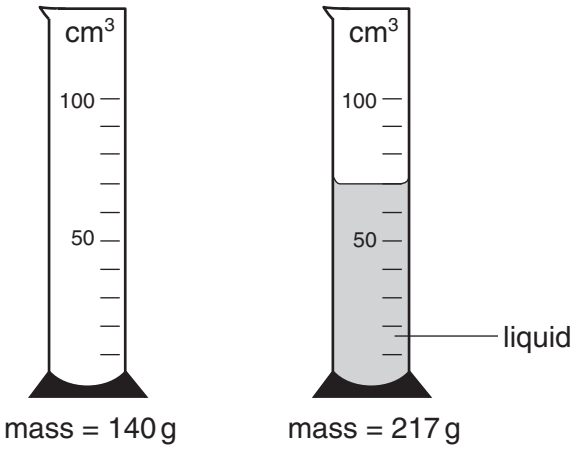
B The mass of an object is different if the object is taken to the Moon.

C The weight of a car is one of the forces acting on the car.

D The weight of a chocolate bar is measured in kilograms.

[Turn over

31 The masses of a measuring cylinder before and after pouring some liquid are shown in the diagram.



What is the density of the liquid?

A $\frac{217}{52}$ g/cm^3 **B** $\frac{217}{70}$ g/cm^3 **C** $\frac{77}{52}$ g/cm^3 **D** $\frac{77}{70}$ g/cm^3

32 In which of these situations is no resultant force needed?

A a car changing direction

B a car moving at a steady speed

C a car slowing down

D a car speeding up

33 In a car engine, energy stored in the fuel is converted into thermal energy (heat energy) and energy of motion (kinetic energy).

In which form is the energy stored in the fuel?

A chemical

B geothermal

C hydroelectric

D nuclear

34 How does thermal energy (heat energy) travel through the vacuum between the Earth and the Sun?

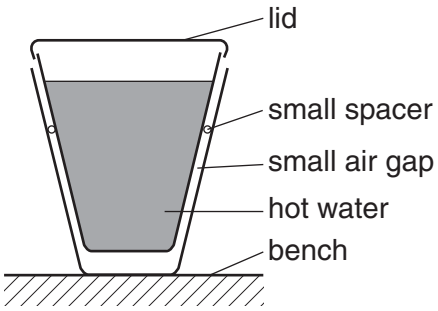
A by conduction

B by convection

C by radiation

D by radioactive decay

35 Two plastic cups are placed one inside the other. Hot water is poured into the inner cup and a lid is put on top as shown.



Which statement is correct?

A Heat loss by radiation is prevented by the small air gap.

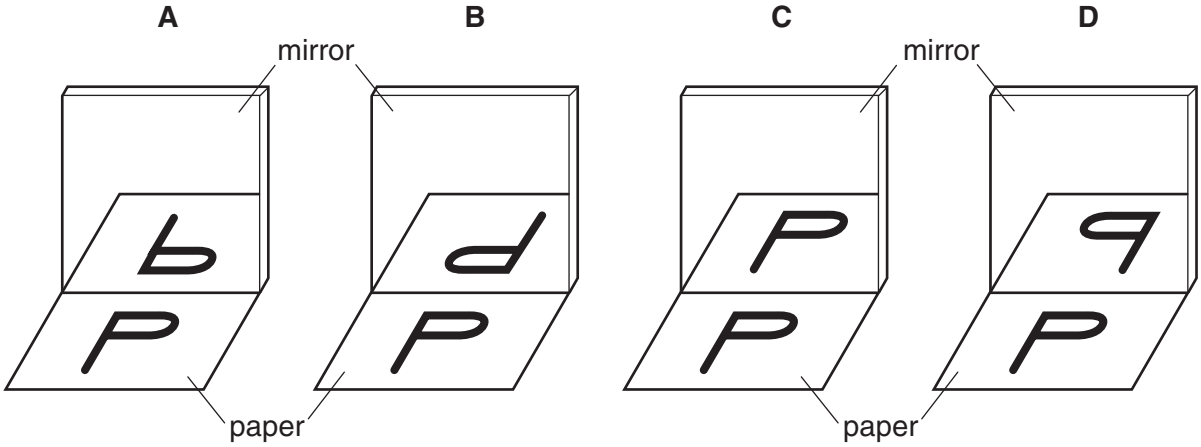
B No heat passes through the sides of either cup.

C The bench is heated by convection from the bottom of the outer cup.

D The lid is used to reduce heat loss by convection.

36 A student looks at the letter P on a piece of paper, and at its reflection in a mirror.

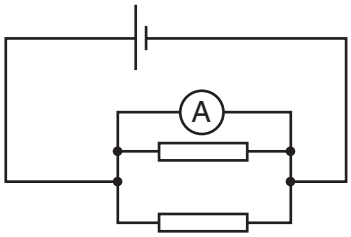
What does he see?



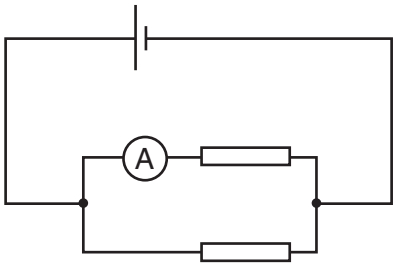
[Turn over

37 In which circuit does the ammeter read the total current through both resistors?

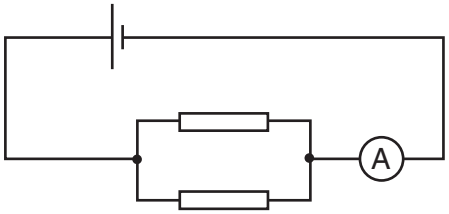
A



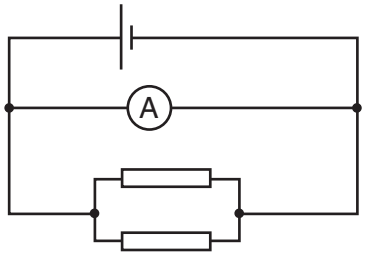
B



C



D

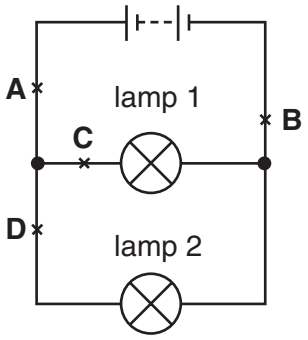


38 The table shows the voltage and current ratings for four light bulbs.

Which bulb has the greatest resistance when used normally?

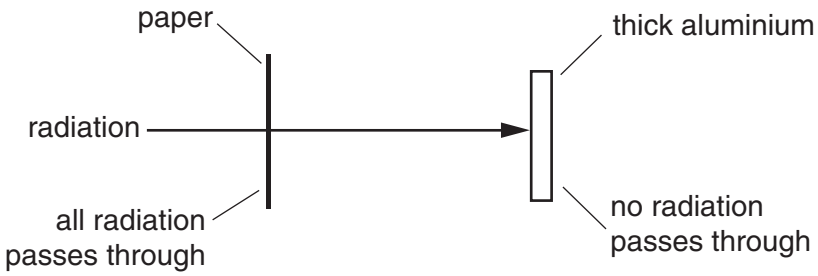
	voltage / V	current / A
A	2	0.5
B	3	0.2
C	6	12
D	12	1.0

39 The diagram shows a circuit, with four possible positions to place a switch.



At which labelled point should a switch be placed so that lamp 1 remains on all the time and lamp 2 can be switched on and off?

40 A radioactive source emits radiation which can pass through a sheet of paper but not through thick aluminium.



What does this show about the radiation?

A It is alpha-particles.

B It is beta-particles.

C It is gamma-rays.

D It is a mixture of alpha-particles and gamma-rays.

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 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	55 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.).