UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/01**

Paper 1 Multiple Choice

October/November 2004

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 An animal has the following characteristics.

1	four limbs
2	external ears
3	gives birth to live young
4	constant body temperature

What characteristic feature will the body surface have?

A feathery

B hairy

C moist

D scaly

2 The table shows the changes in length of five potato cylinders that were placed in a concentrated salt solution.

potato cylinder	length at start of experiment / cm	length after 24 hours / cm
1	2.9	2.3
2	2.9	2.4
3	3.1	2.7
4	3.0	2.5
5	3.1	2.6

Why do these changes occur?

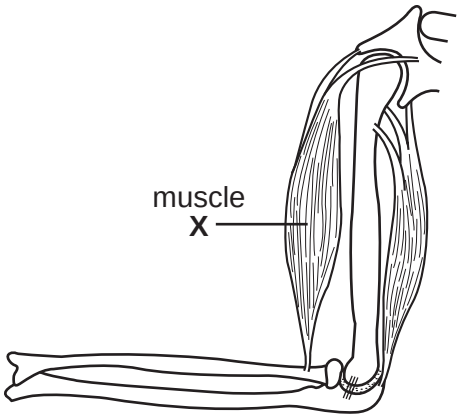
A Salt diffuses from the solution into the potato cells.

B The potato cells are killed by the high salt concentration.

C The solution inside the potato cells is more concentrated than the salt solution.

D Water is drawn from the potato cells into the salt solution.

3 The diagram shows some muscles and bones of the human arm.

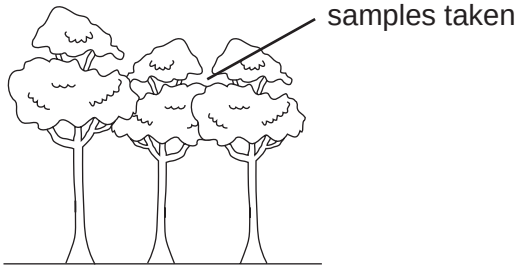


Muscle **X** causes the arm to move and it is attached to a bone in the forearm.

What describes the movement of the arm and states the bone to which the muscle is attached?

	movement of arm	bone
A	extends	radius
B	extends	ulna
C	flexes	radius
D	flexes	ulna

4 The diagram shows a group of trees and the place where two samples of air are taken. The levels of oxygen and carbon dioxide in the samples are measured.

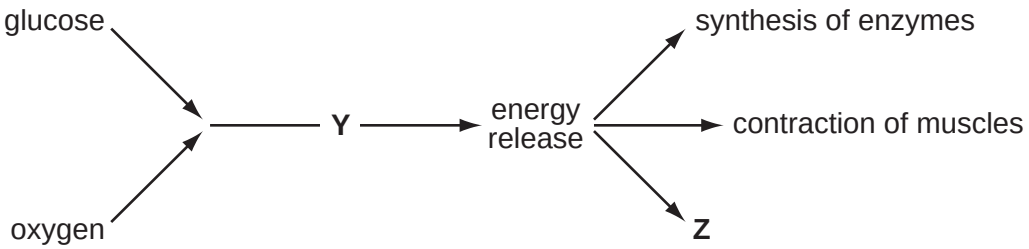


The first sample is taken on a sunny afternoon and the second sample is taken in the middle of the night.

Which shows the levels of the gases in the daytime sample compared with the sample taken at night?

	oxygen	carbon dioxide
A	less	more
B	more	less
C	more	the same
D	the same	more

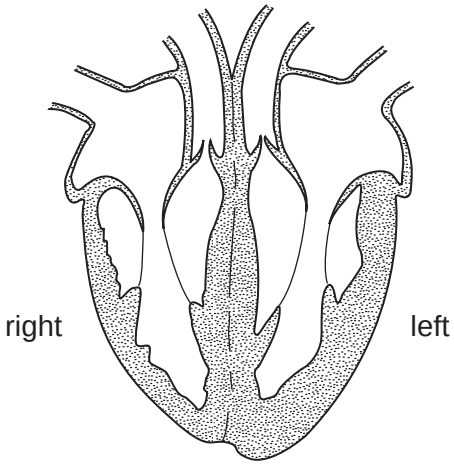
5 Glucose is a fuel needed for body processes to continue.



What are processes **Y** and **Z**?

	Y	Z
A	photosynthesis	growth
B	photosynthesis	respiration
C	respiration	growth
D	respiration	photosynthesis

6 The diagram shows a section through a human heart.



The left ventricle has a thicker, more muscular outer wall than the right ventricle.

This helps it to pump blood at a

A higher pressure.

B lower pressure.

C faster rate.

D slower rate.

7 What effect does smoking tobacco have on the lining of the bronchi?

A Cilia are paralysed.

B Cilia sweep mucus towards the lungs.

C Goblet cells stop making mucus.

D Mucus becomes less sticky.

8 Which is correct for anaerobic respiration?

A glucose + carbon dioxide → oxygen

B glucose → lactic acid

C glucose + oxygen → carbon dioxide + water

D glucose → lactic acid + carbon dioxide

9 Muscle wastage, lack of growth and the accumulation of fluid in tissues are conditions which result from the lack of nutrient **X** in the diet.

What is nutrient **X**?

A calcium

B carbohydrate

C fat

D protein

10 Where does undigested food move to after passing through the small intestine?

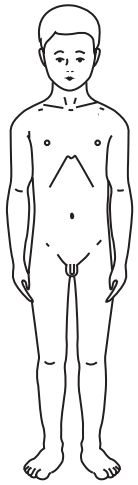
A blood

B large intestine

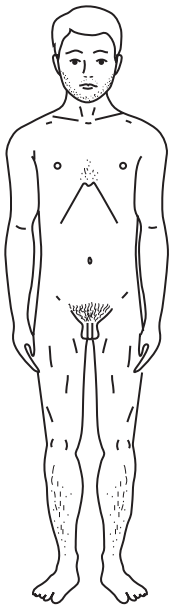
C pancreas

D stomach

11 The diagrams show a male at different ages.



aged 8 years



aged 20 years

Which hormone causes the changes shown?

A insulin

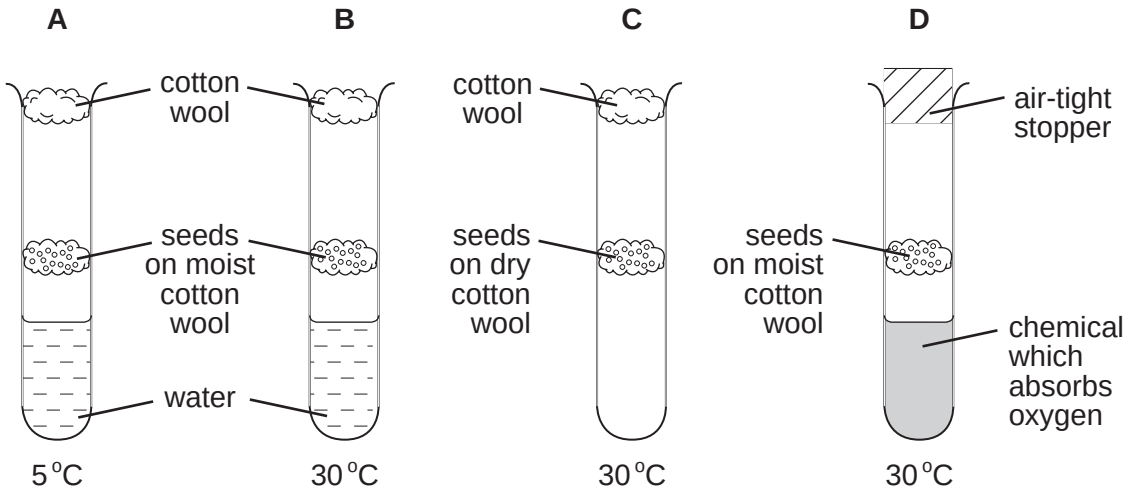
B oestrogen

C progesterone

D testosterone

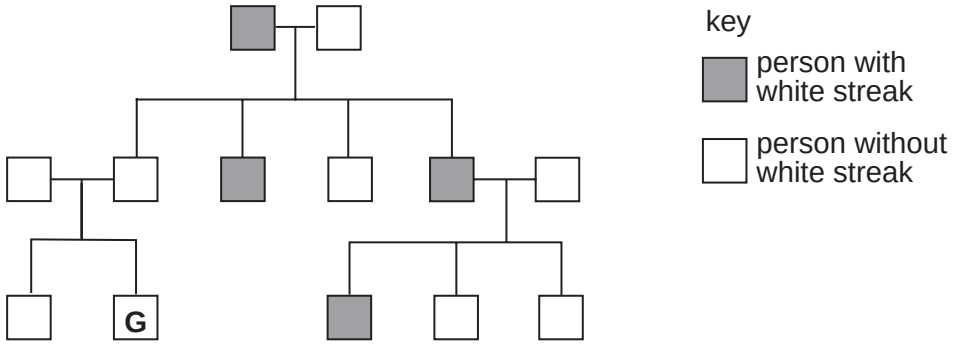
12 Four test-tubes with seeds are set up as shown.

In which test-tube does germination take place most rapidly?



13 A white streak in dark hair is caused by the presence of a dominant allele.

The diagram shows how this white streak was inherited in a family.



What was the chance that **G** would inherit the white streak?

A 0 % **B** 25 % **C** 75 % **D** 100 %

14 Which is the best description of the structure of glass?

	arrangement of atoms	structure
A	disordered	giant
B	disordered	molecular
C	ordered	giant
D	ordered	molecular

15 A laboratory report gives the following information about a solid element.

- It conducts electricity.
- It burns, forming a gas.
- The gas dissolves in water, forming an acidic solution.

What is the element?

A carbon

B copper

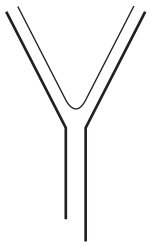
C iron

D sulphur

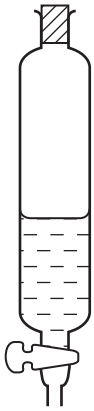
16 Hexane and octane are liquid hydrocarbons that mix together.

How can the mixture best be separated into the two liquids?

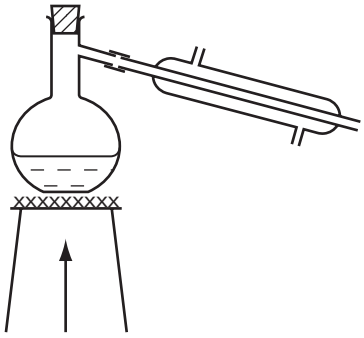
A



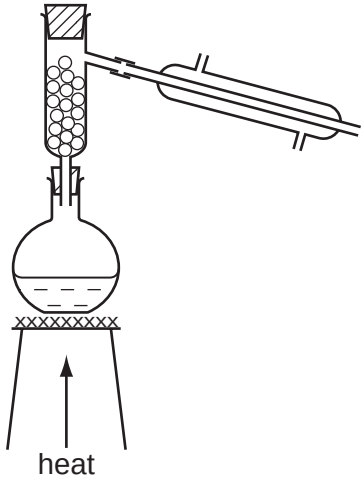
B



C



D



17 A silver ring contains the same amount of substance as a gold ring.

Are the mass and number of atoms in the rings the same?

	mass	number of atoms
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

18 Neon and nitrogen are gaseous non-metals.

Which of these elements can be oxidised?

	neon	nitrogen
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

19 The table shows information about some minerals in rocks.

name	chemical formula
bauxite	Al_2O_3
calcite	$CaCO_3$
haematite	Fe_2O_3
malachite	$CuCO_3.Cu(OH)_2$

From which two of these minerals can a transition metal be extracted?

A bauxite and calcite

B bauxite and haematite

C calcite and malachite

D haematite and malachite

20 In a house, there is

- a rusty spade, **P**
- a pan used for boiling vegetables, **Q**
- a shirt stained with oil, **R**

Which of these everyday objects is cleaned by using a non-aqueous solvent?

A **P** only

B **Q** only

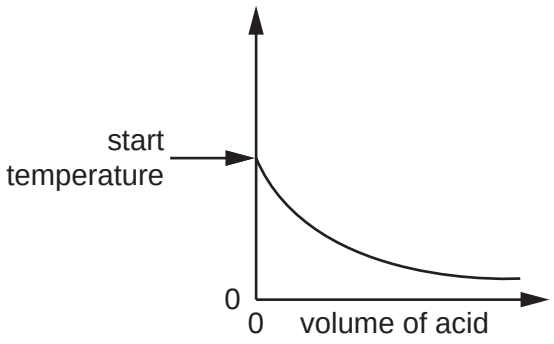
C **R** only

D **P**, **Q** and **R**

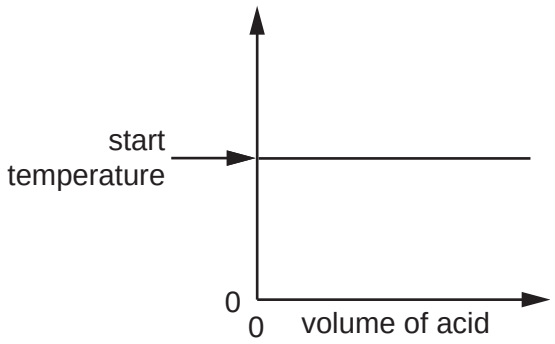
21 An acid is added to an alkali until the final solution is **just** neutral.

Which graph illustrates the change in temperature of the alkali as the acid is added?

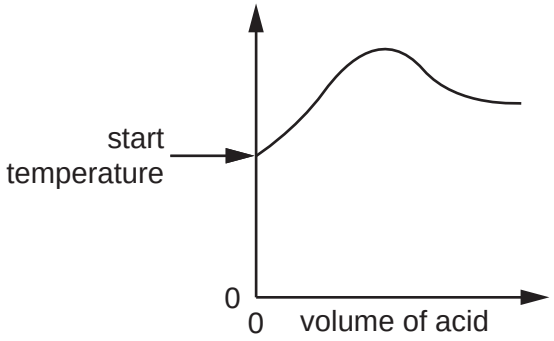
A



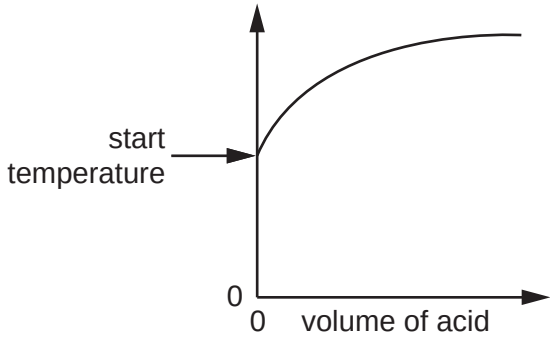
B



C



D



22 What is used to test for ammonia gas?

A a lighted splint

B aqueous sodium hydroxide

C damp red litmus paper

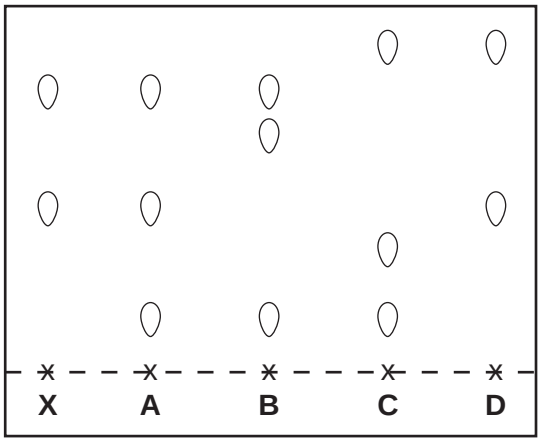
D limewater

23 A plant colour **X** is a mixture.

Chromatography is used to compare **X** with four other coloured mixtures, **A**, **B**, **C** and **D**.

The results are shown in the diagram.

Which other mixture contains **X**?



24 What are the products of burning a fossil fuel such as methane?

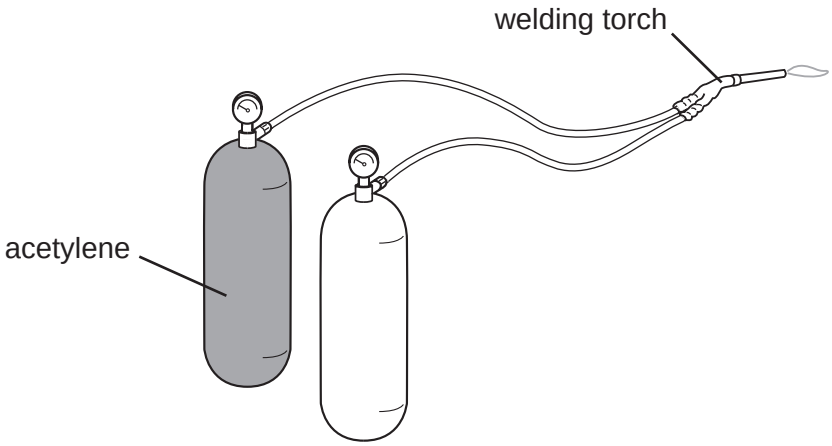
A carbon and hydrogen

B carbon dioxide and water

C carbon dioxide only

D water only

25 The diagram shows a torch used for welding materials. One cylinder contains acetyle



What is the gas in the other cylinder?

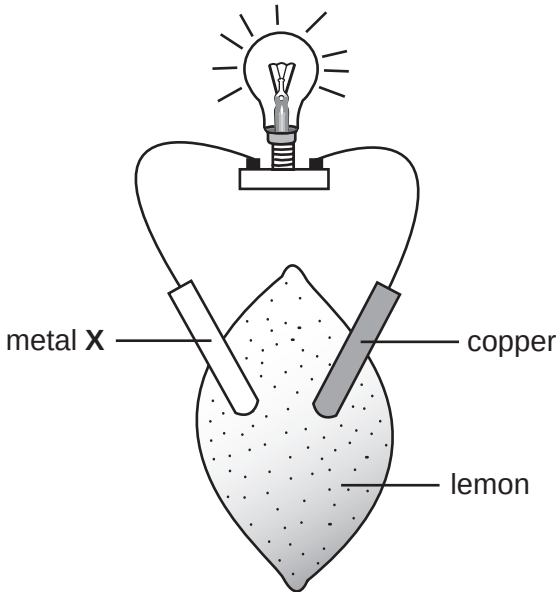
A hydrogen

B methane

C nitrogen

D oxygen

26 The diagram shows an experiment using a lemon.



Which statements are correct?

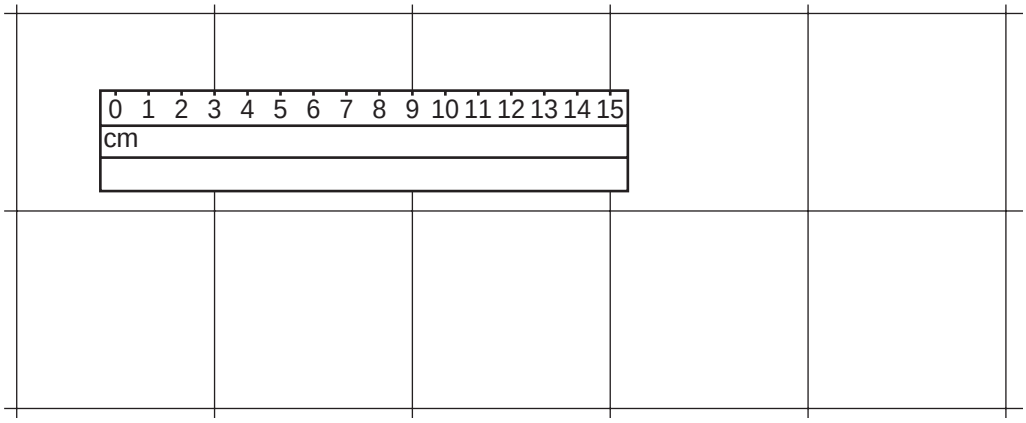
	lemon juice is an electrolyte	**X** could be copper	**X** could be zinc
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

27 A student at a firework display notices that the fireworks produce red and green sparks.

Which metal cations caused the coloured sparks?

	red	green
A	calcium	copper
B	sodium	calcium
C	potassium	copper
D	copper	sodium

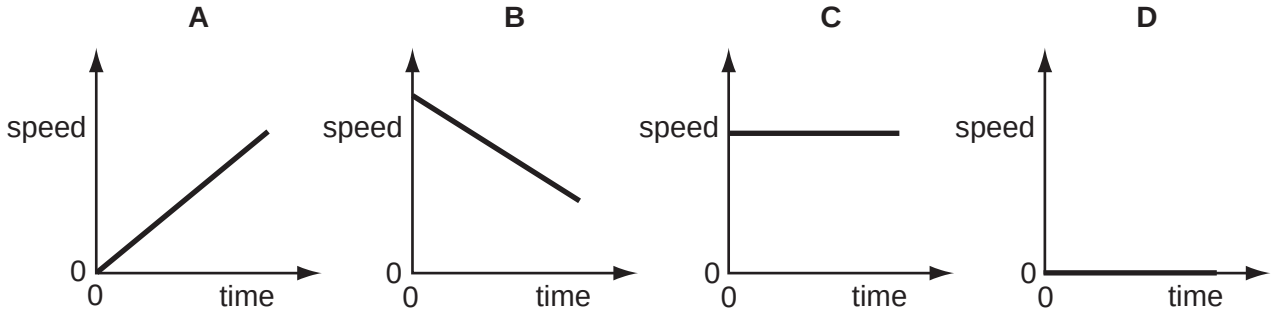
28 A floor is covered with square tiles. The diagram shows a ruler on the tiles.



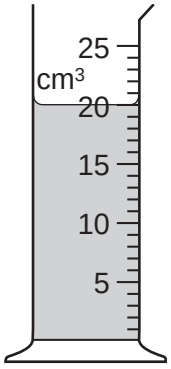
How long is one tile?

A 3 cm **B** 6 cm **C** 9 cm **D** 12 cm

29 Which speed / time graph applies to an object at rest?



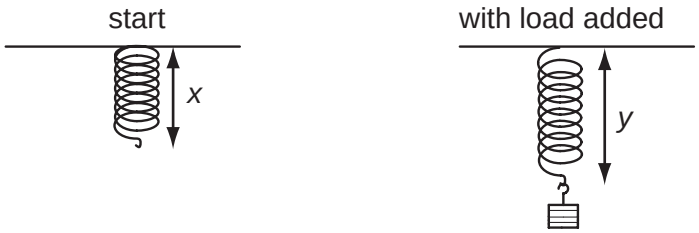
30 The diagram shows some liquid in a measuring cylinder. The mass of the liquid is 16 g.



What is the density of the liquid?

A 320 g / cm^3 **B** 36 g / cm^3 **C** 1.25 g / cm^3 **D** 0.8 g / cm^3

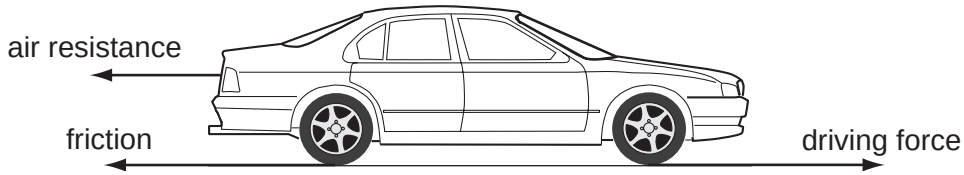
31 A student carries out an experiment to plot an extension / load graph for a spring. The diagrams show the apparatus at the start of the experiment and with a load added.



What is the extension caused by the load?

A x **B** y **C** $y + x$ **D** $y - x$

32 Three horizontal forces act on a car that is moving along a straight, level road.



Which combination of forces would result in the car moving at constant speed?

	air resistance	friction	driving force
A	200 N	1000 N	800 N
B	800 N	1000 N	200 N
C	800 N	200 N	1000 N
D	1000 N	200 N	800 N

33 A child pushes a toy car along a level floor and then lets it go.

As the car slows down, what is the main energy change?

A from chemical to heat

B from chemical to kinetic

C from kinetic to gravitational (potential)

D from kinetic to heat

34 A beaker of water is heated at its base.

Why does the water at the base rise?

A It contracts and becomes less dense.

B It contracts and becomes more dense.

C It expands and becomes less dense.

D It expands and becomes more dense.

35 Which type of radiation lies between visible light and microwaves in the electromagnetic spectrum?

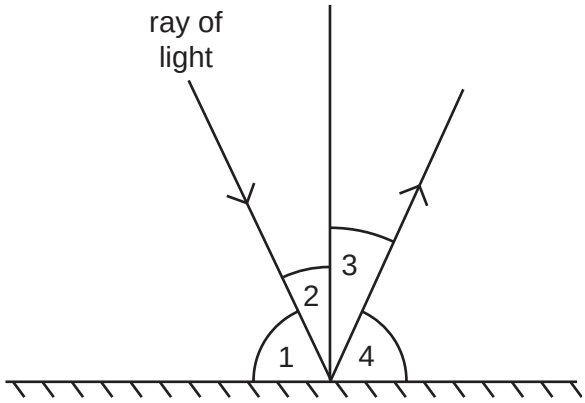
A infra-red

B radio waves

C ultra-violet

D X-rays

36 The diagram shows the path of a ray of light which has been reflected from a smooth surface.

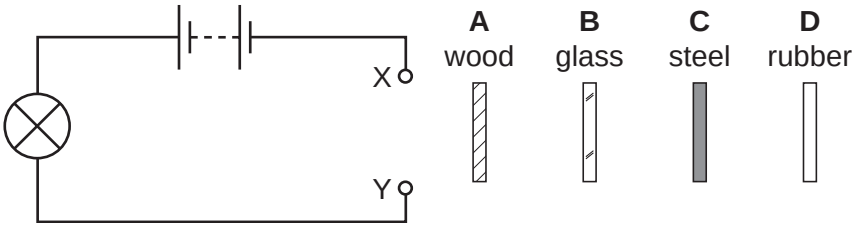


Which angles are the angles of incidence and reflection?

	angle of incidence	angle of reflection
A	1	4
B	2	3
C	3	2
D	4	1

37 A circuit is set up with a gap between two terminals X and Y. The four strips of mate… the diagram are connected in turn across the gap.

Which strip completes the circuit so that the lamp lights?



38 A pupil measures the voltage across a device and the current in it.

Which calculation gives the resistance of the device?

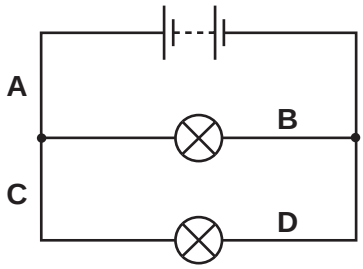
A current + voltage

B current ÷ voltage

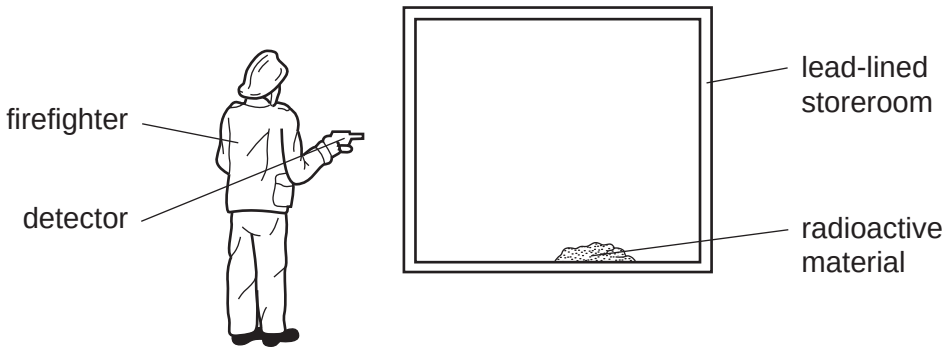
C voltage ÷ current

D voltage x current

39 In which position in the circuit shown should a switch be placed so that both lamps can be switched on or off at the same time?



40 During a fire in a laboratory storeroom, some radioactive material was spilled. [illegible] detected radiation through the lead-lined walls of the storeroom. The radiation was emit[illegible] radioactive material.



Which type of radiation was being detected?

A alpha-particles

B beta-particles

C gamma-rays

D X-rays

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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 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 Lawr 10

*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.).