UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/11**

Paper 1 Multiple Choice **May/June 2012**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

4386257424

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.

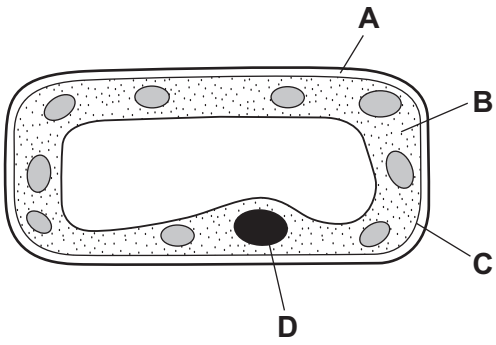
Read the instructions on the Answer Sheet very carefully.

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 The diagram shows a section through a cell from a leaf.

Which part is the cell membrane?



2 What happens in photosynthesis?

A Carbon dioxide is made.

B Oxygen is used.

C Starch is absorbed.

D Water is used.

3 Which word equation represents aerobic respiration?

A carbon dioxide + oxygen → glucose + water

B carbon dioxide + water → glucose + oxygen

C glucose + oxygen → carbon dioxide + water

D glucose + oxygen → lactic acid

4 Some cancer treatments cause a reduction in the number of a person's white blood cells.

Why might this be a problem?

A Blood takes longer to clot.

B Infections are more likely to cause illness.

C Insufficient oxygen reaches the brain.

D Less carbon dioxide is carried to the lungs.

5 Why is calcium needed in the diet?

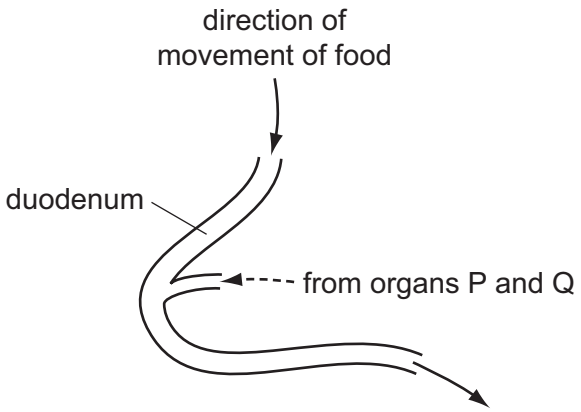
A to make carbohydrates

B to make teeth

C to make enzymes

D to make muscles hard

6 The diagram shows part of the alimentary canal.



Which organs are represented by P and Q?

A kidneys and pancreas

B liver and pancreas

C liver and stomach

D pancreas and stomach

7 A person touches a hot object which triggers a reflex action.

In which order does the signal travel in the reflex arc?

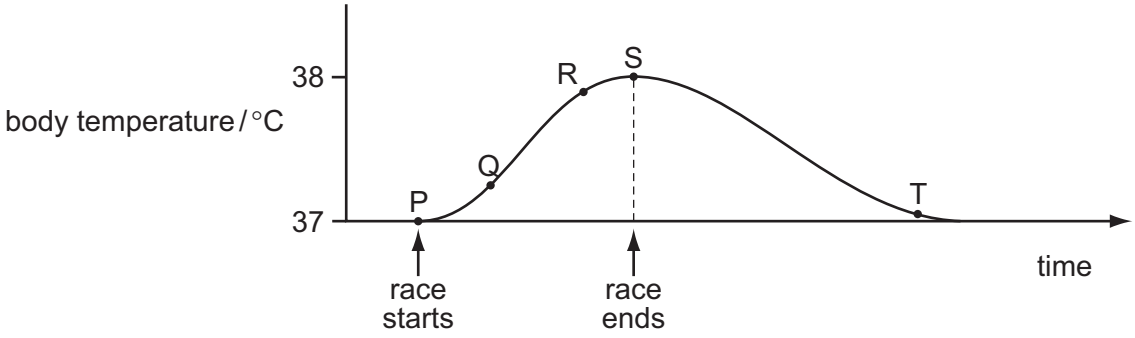
A relay neurone → spinal cord → sensory neurone

B sensory neurone → spinal cord → motor neurone

C spinal cord → sensory neurone → stimulus

D stimulus → motor neurone → spinal cord

8 The graph shows body temperature before, during and after running a race on a hot day.



Which change in body temperature occurs as a result of homeostasis?

A P to Q **B** Q to R **C** R to S **D** S to T

9 Which structure contracts to expel the baby during birth?

A cervix

B oviduct

C uterus wall

D vagina

10 In a flowering plant, which structure contains the female gamete?

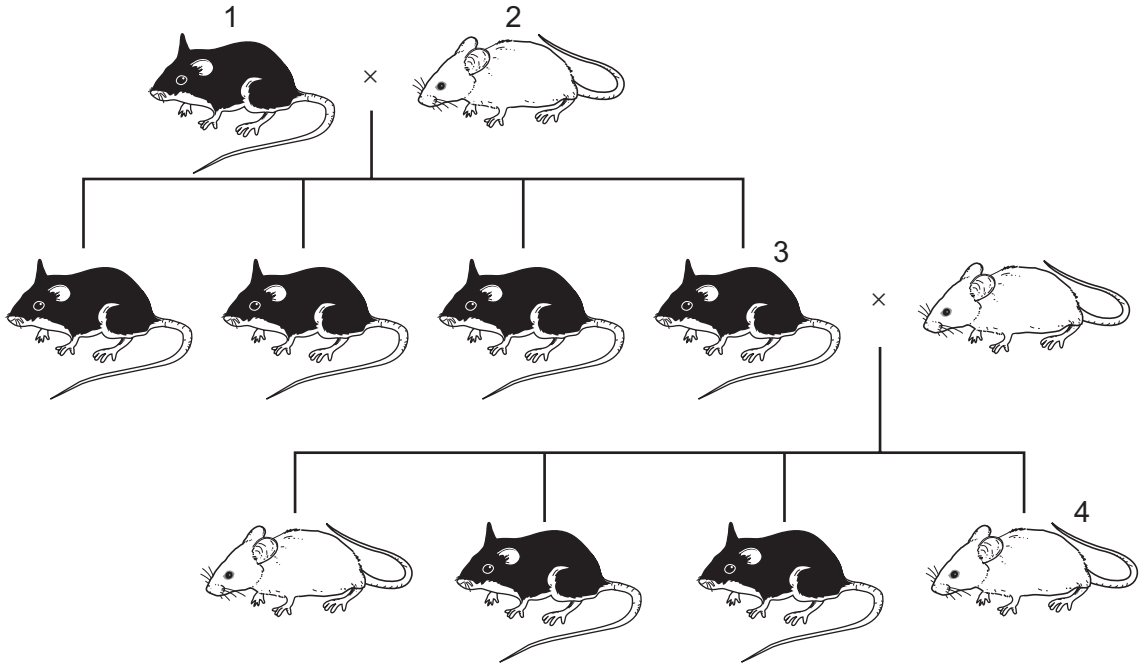
A anther

B ovule

C pollen grain

D stigma

11 The diagram shows the results of a breeding experiment using black and white mice.



Which statement is correct?

A Mouse 1 has a dominant allele for fur colour.

B Mouse 2 is heterozygous for fur colour.

C Mouse 3 is homozygous for fur colour.

D Mouse 4 is heterozygous for fur colour.

12 The diagram shows a food chain.

Which organisms pass the greatest amount of energy along the food chain?

A		**B**		**C**		**D**
shrubs	→	insects	→	birds	→	mammals

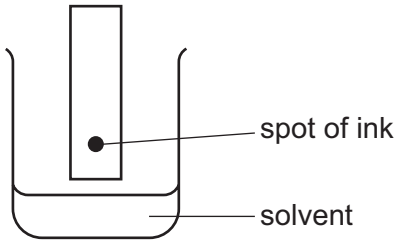
13 What can lead to global warming?

	deforestation	burning of fossil fuels
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

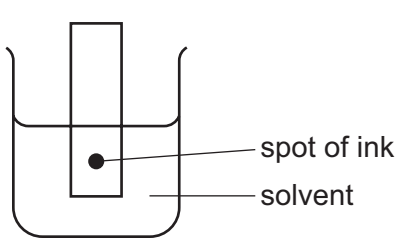
14 The colours in an ink can be separated by chromatography.

Which diagram shows the correct way to set up the apparatus?

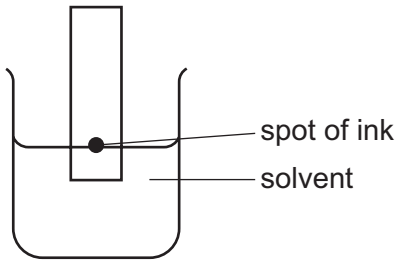
A



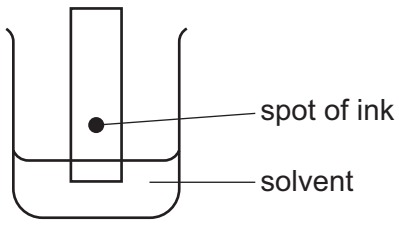
B



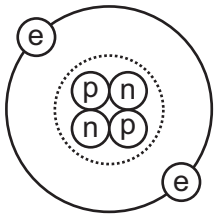
C



D



15 The diagram shows a helium atom.



Which particles in the helium atom have approximately the same mass?

A electron and proton only

B electron and neutron only

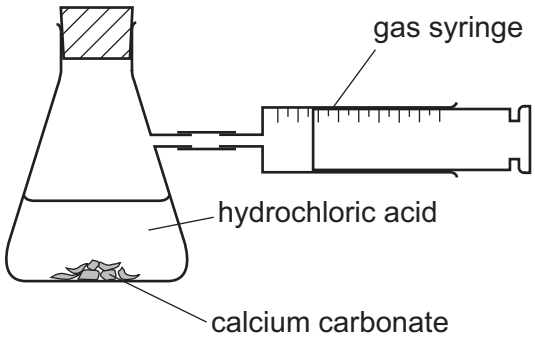
C proton and neutron only

D electron, proton and neutron

16 How many atoms of metals and of non-metals are shown in the formula Na_2SO_4?

	atoms of metals	atoms of non-metals
A	1	1
B	1	2
C	2	4
D	2	5

17 The apparatus shown is used to investigate the speed of reaction between hydrochloric acid and calcium carbonate.



The time to collect 50 cm^3 of gas is measured.

Using concentrated acid and lumps of calcium carbonate, the time is 150 s.

In a second experiment, the time is 90 s.

Which change was made in the second experiment?

A larger lumps of calcium carbonate

B less concentrated acid

C lower temperature

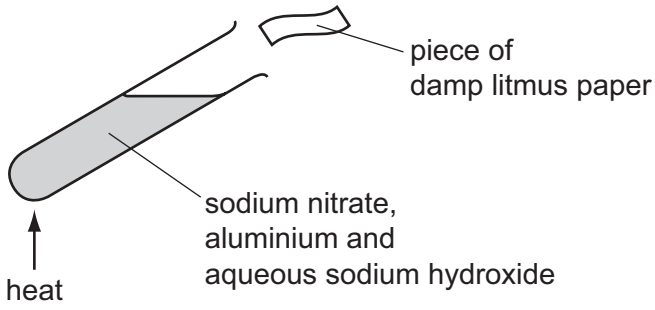
D powdered calcium carbonate

18 Hydrogen and oxygen react explosively to form water.

Which terms describe this reaction?

	combustion	oxidation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

19 The diagram shows litmus paper testing the gas that is given off from the contents of the test tube.



The damp litmus paper

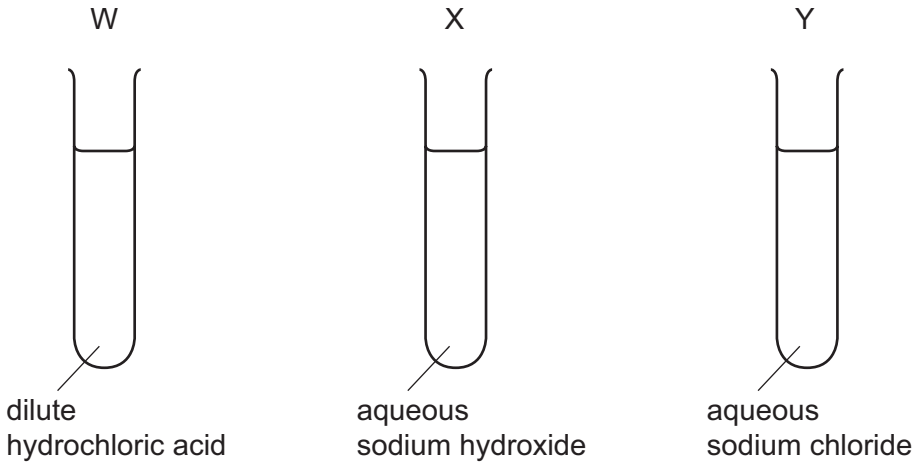
A turns blue.

B turns colourless.

C turns red.

D turns red then colourless.

20 Universal Indicator solution is added to test-tubes W, X and Y.



What are the colours of the Universal Indicator?

	in W	in X	in Y
A	green	red	purple
B	purple	green	red
C	red	green	purple
D	red	purple	green

21 The table shows physical properties of some substances.

Which substance is a metal?

	malleability	density	electrical conductivity
A	brittle	high density	high
B	brittle	low density	low
C	malleable	high density	high
D	malleable	low density	low

22 Which statement about lithium, sodium and potassium is **not** correct?

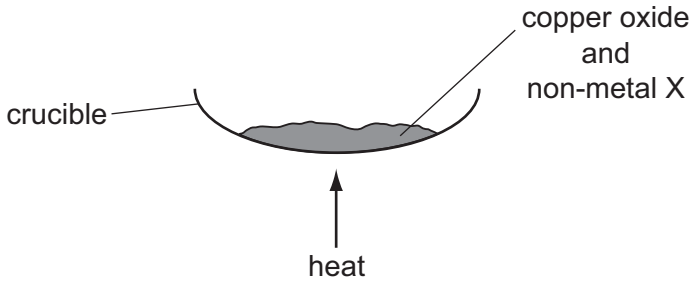
A They are in the same group of the Periodic Table.

B They are in the same period of the Periodic Table.

C They float on water.

D They react with water to give a flammable gas.

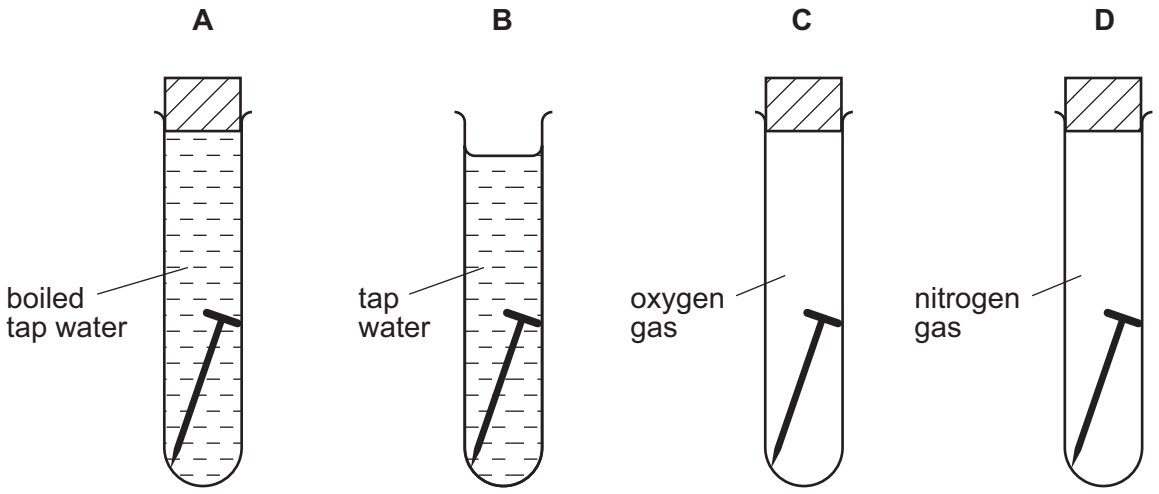
23 Copper is obtained from copper oxide by heating with non-metal X.



Which shows the identity of non-metal X and the type of reaction non-metal X undergoes?

	identity of X	type of reaction
A	carbon	oxidation
B	carbon	reduction
C	oxygen	oxidation
D	oxygen	reduction

24 In which tube does the iron nail rust in the shortest time?



25 Fertilisers are used to supply the essential elements needed for plant growth.

Which compound supplies two of these essential elements?

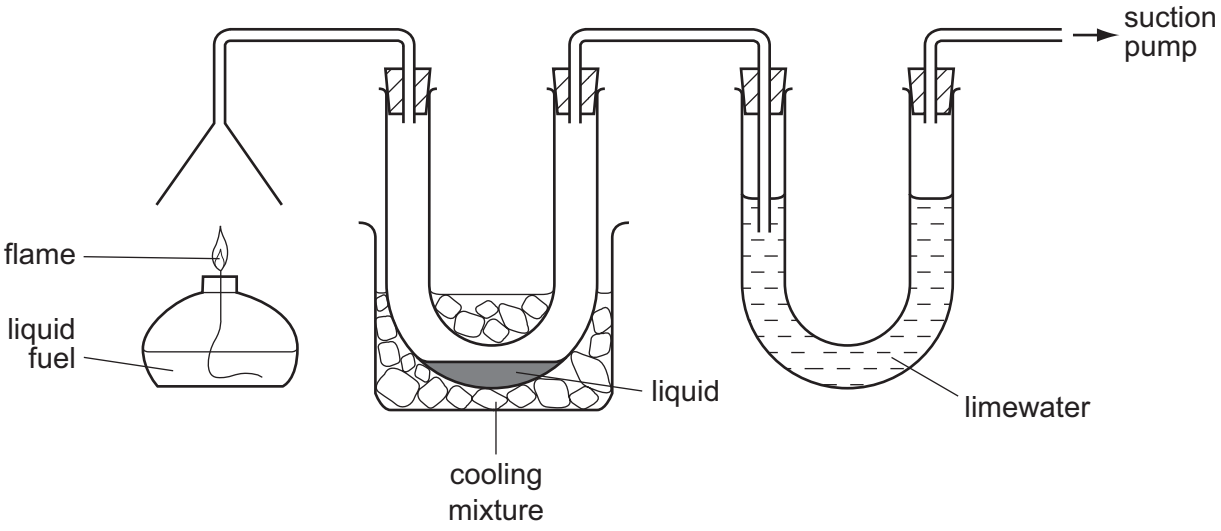
A $Ca(H_2PO_4)_2$

B $Ca(NO_3)_2$

C KNO_3

D $(NH_4)_2SO_4$

26 The burning of a fuel is investigated using the apparatus shown.



Which substances is the apparatus testing for?

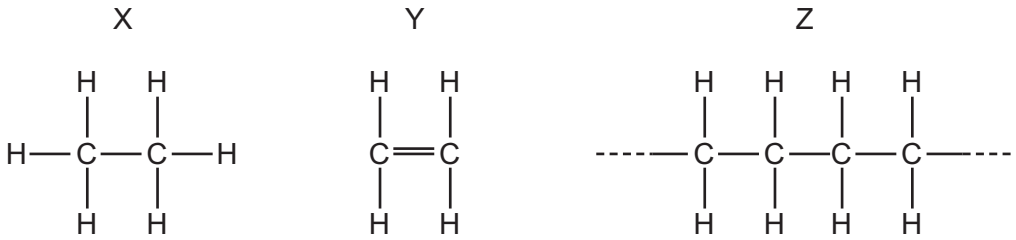
A carbon monoxide and carbon dioxide

B carbon monoxide and water

C carbon dioxide and water

D carbon dioxide and sulfur dioxide

27 The diagram shows three molecules.



Which molecule is a monomer and which is a polymer?

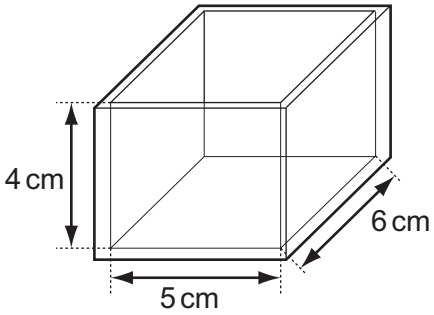
	monomer	polymer
A	X	Z
B	Y	Z
C	Y	X
D	Z	Y

28 A motorist starts out on a 210 km journey at 8 am. At 10 am he stops for a 30 minute break after covering 180 km. The motorist completes the journey at 11 am.

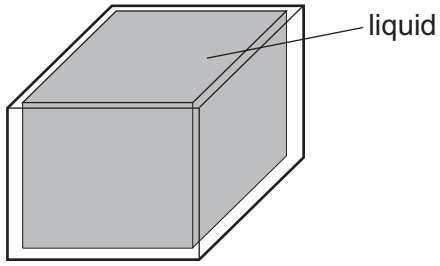
What is his average speed in covering the 210 km?

A 60 km / h **B** 70 km / h **C** 84 km / h **D** 90 km / h

29 The diagrams show a glass tank with inside measurements of 5 cm × 6 cm × 4 cm.



mass = 40 g



total mass = 220 g

The tank has a mass of 40 g when empty. When the tank is filled with a liquid, the tank and liquid have a total mass of 220 g.

What is the density of the liquid?

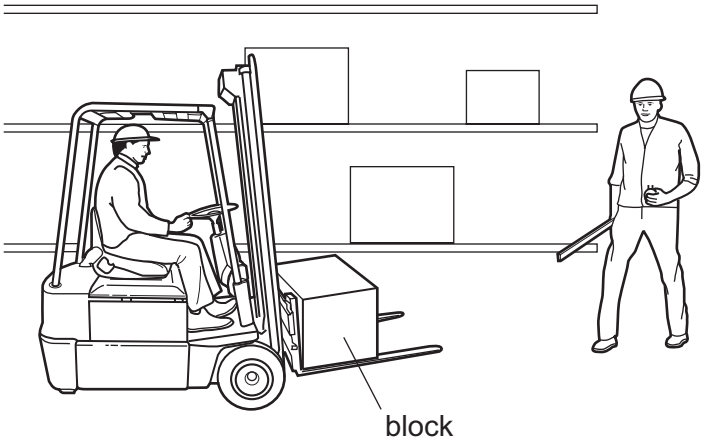
A $\frac{220}{(5 \times 6 \times 4)}\ \text{g/cm}^3$

B $\frac{(220 - 40)}{(5 \times 6 \times 4)}\ \text{g/cm}^3$

C $\frac{(5 \times 6 \times 4)}{220}\ \text{g/cm}^3$

D $\frac{(5 \times 6 \times 4)}{(220 - 40)}\ \text{g/cm}^3$

30 A workman lifts a cubic block from ground level to a high shelf using a fork lift truck. A second workman has a metre rule and a stopwatch.



Which quantity will the second workman be able to determine, using **only** the metre rule and the stopwatch?

A the average speed of the block as it moves up

B the density of the material of the block

C the pressure exerted by the block on the shelf

D the work done on the block when it is lifted

31 On a warm day, a driver checks the air pressure in a car tyre. Overnight the temperature drops and the air pressure in the tyre falls. There are no air leaks in the tyre.

Why does the pressure fall?

A The air molecules in the tyre move more slowly.

B The air molecules in the tyre stop moving.

C The volume of the air in the tyre decreases.

D The volume of the air in the tyre increases.

32 How is heat transferred in a vacuum?

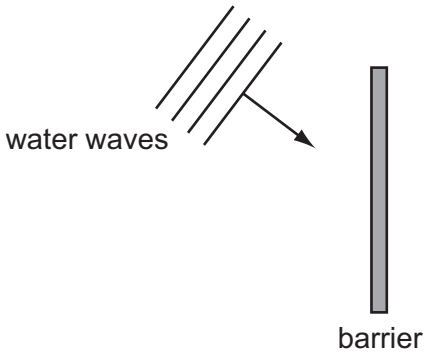
A by conduction and convection

B by convection and radiation

C by convection only

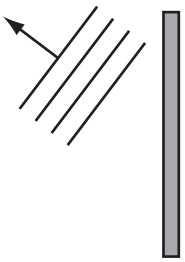
D by radiation only

33 The diagram shows water waves travelling towards a barrier.

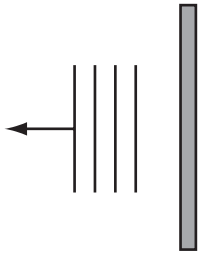


Which diagram shows the direction of the waves after being reflected by the barrier?

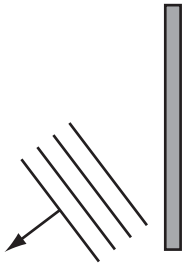
A



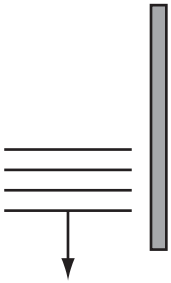
B



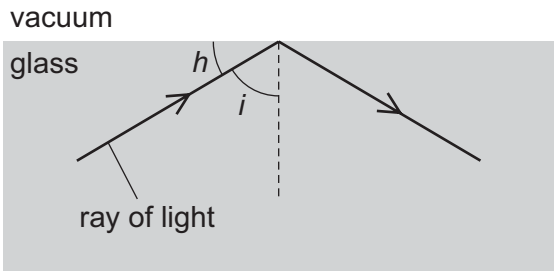
C



D



34 A glass block is surrounded by a vacuum. A ray of light strikes the inside of the glass block, and is totally reflected back into the block.



Why does this happen?

A Angle *h* is greater than the critical angle.

B Angle *i* is greater than the critical angle.

C Light cannot travel through a vacuum.

D The ray is travelling along the normal.

35 The Sun emits infra-red radiation, ultraviolet radiation and visible light.

Which statement about the time it takes these radiations to reach Earth's atmosphere is correct?

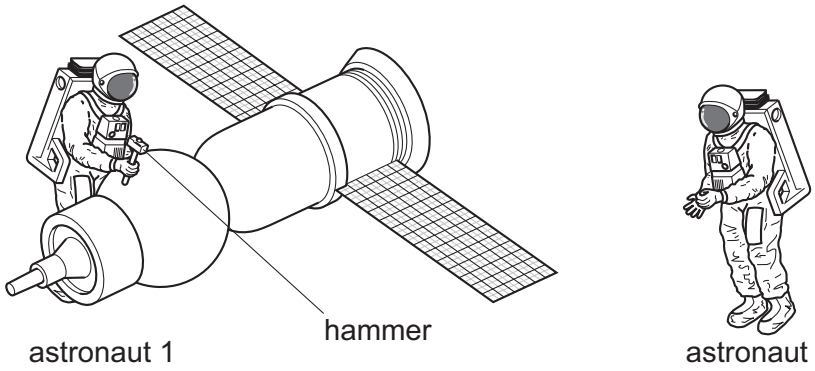
A Infra-red radiation arrives first.

B Ultraviolet radiation arrives first.

C Visible light arrives first.

D They all arrive at the same time.

36 Astronaut 1 uses a hammer to mend a satellite in space. Astronaut 2 is nearby. There is no air in space.



Compared with the sound heard if they were working on Earth, what does astronaut 2 hear?

A a louder sound

B a quieter sound

C a sound of the same loudness

D no sound at all

37 The instructions for a household lamp state that the plug should be fitted with a 3 A fuse.

What could happen if, by mistake, a 13 A fuse is fitted?

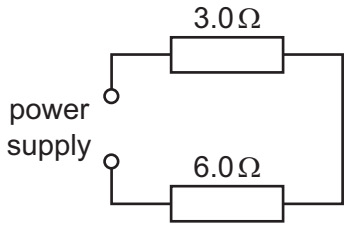
A The fuse might melt too easily.

B The lamp might explode if a fault develops.

C The wires connecting the lamp to the plug might overheat if a fault developed.

D Too much voltage might be supplied to the lamp.

38 A 3.0 Ω resistor and a 6.0 Ω resistor are connected to a power supply as shown.



What is the total resistance of the circuit?

A 2.0 Ω **B** 3.0 Ω **C** 9.0 Ω **D** 18 Ω

39 In the lighting circuit in a house, how are lamps usually connected, and what is one reason for this?

	usual connection	reason
A	parallel	to allow every lamp to have the full supply voltage
B	parallel	to share out the voltage equally between the lamps
C	series	to allow every lamp to have the full supply voltage
D	series	to share out the voltage equally between the lamps

40 What are carbon-12 and carbon-14?

A atoms of different elements with different nuclear masses

B atoms of different elements with the same nuclear mass

C atoms of the same element with different nuclear masses

D atoms of the same element with the same nuclear mass

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II									III	IV	V	VI	VII	0
															4 He Helium 2
					1 H Hydrogen 1										
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 Sulfur 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 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.).