UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/11**

Paper 1 Multiple Choice **October/November 2010**

45 minutes

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

* 6 9 6 0 1 7 9 8 9 5 *

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.

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1 Which part of a plant cell contains starch grains?

A cell wall

B chloroplasts

C nucleus

D vacuole

2 When a plant cell is placed in a dilute solution of red dye, the contents of the cell do not become red.

What prevents the dye molecules from entering the cell?

A cell surface membrane

B chloroplasts

C cytoplasm

D vacuole

3 Which is correct for all enzymes?

	made of proteins	made inside cells
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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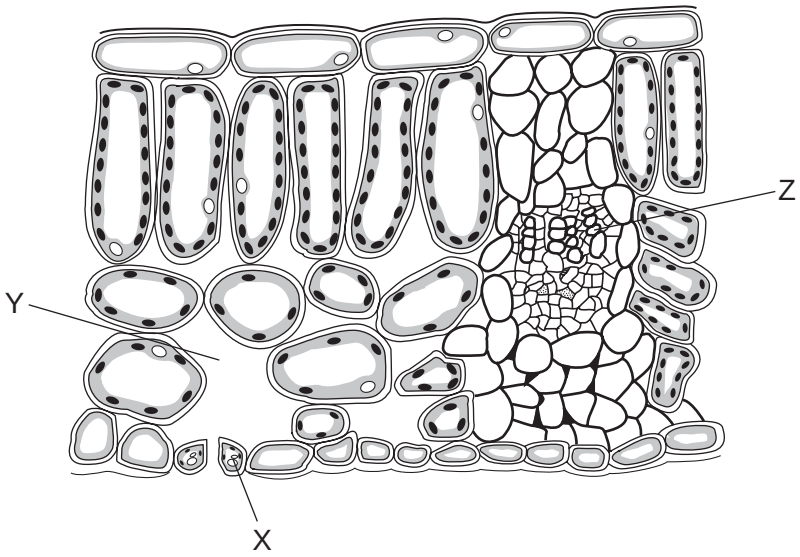
4 The diagram shows a section through a leaf.



What are X, Y and Z?

	X	Y	Z
A	epidermis cell	air space	phloem
B	epidermis cell	stoma	xylem
C	guard cell	air space	xylem
D	guard cell	stoma	phloem

5 Which nutrient, when deficient in the diet, causes a lack of haemoglobin in red blood cells?

A calcium

B iron

C vitamin C

D vitamin D

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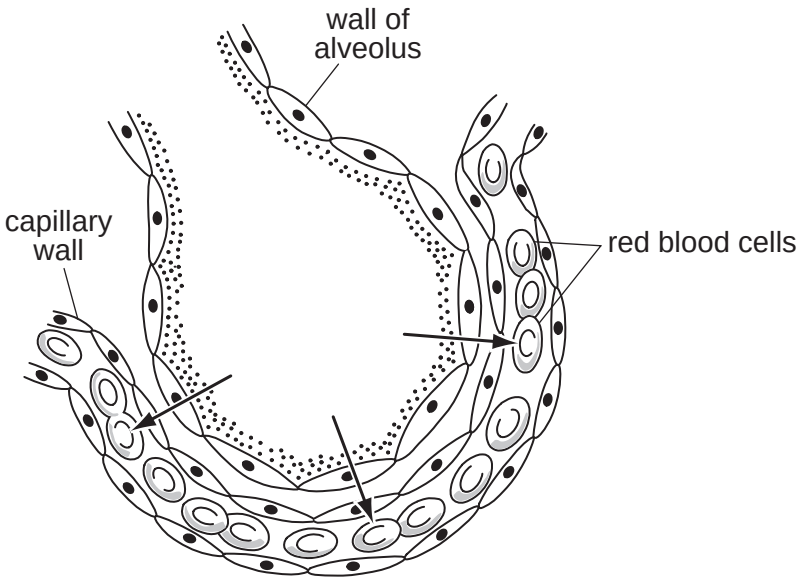
6 The diagram shows an alveolus and one of its capillaries.



What moves in the direction shown by the arrows?

A carbon dioxide

B hydrogen

C oxygen

D water

7 Which blood vessel carries oxygenated blood away from the heart?

A aorta

B pulmonary artery

C pulmonary vein

D vena cava

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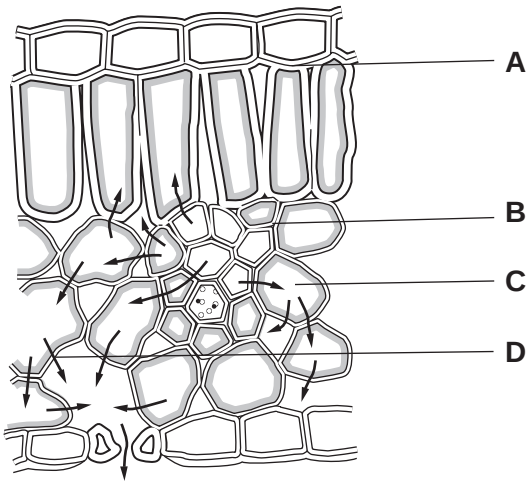
8 The diagram shows a section through a leaf. The arrows show water movement.

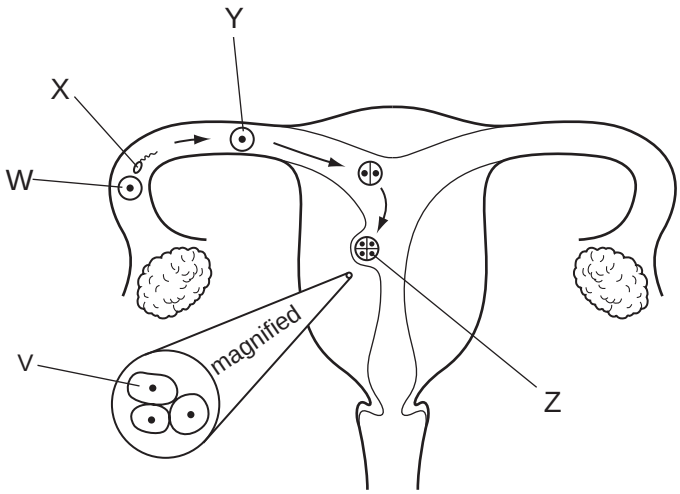
Where does the water evaporate?



9 What is the stimulus for insulin secretion and what is the effect of insulin on the liver?

	stimulus for secretion	effect on the liver
A	high blood glucose	decreased glucose uptake
B	high blood glucose	increased glucose uptake
C	low blood glucose	decreased glucose uptake
D	low blood glucose	increased glucose uptake

10 The diagram shows the uterus and stages in the formation and implantation of a human embryo.



Which cells are genetically identical?

A W and Z **B** X and V **C** X and Y **D** Y and Z

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11 The table shows the names of plant reproductive structures.

Which does **not** link a structure with what it contains?

	structure	what it contains
A	anther	pollen grain
B	fruit	seed
C	seed	embryo
D	style	ovule

12 Which variation amongst humans is **not** affected by diet?

A blood group

B bone strength

C height

D speed of wound healing

13 What will increase soil erosion?

A deforestation

B maintaining natural plant cover

C reducing grazing by livestock

D terracing of the land

14 Three students make statements about the differences between elements, compounds and mixtures.

Student 1 All elements exist only as atoms and not molecules.

Student 2 Compounds contain at least two elements.

Student 3 Mixtures consist only of compounds.

Which students are correct?

A 1 only **B** 2 only **C** 3 only **D** 1, 2 and 3

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15 The table shows information about four different compounds.

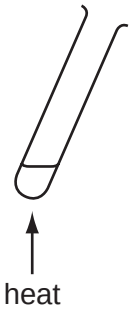
Which compound contains ionic bonds?

	formula of compound	elements present in compound
A	CO_2	carbon, oxygen
B	HCl	hydrogen, chlorine
C	NH_3	nitrogen, hydrogen
D	Na_2O	sodium, oxygen

16 Aqueous copper(II) sulfate consists of copper(II) sulfate dissolved in water.

Which apparatus could **not** be used to remove water from this solution?

A



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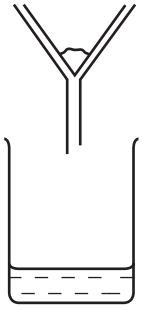

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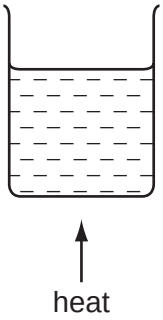
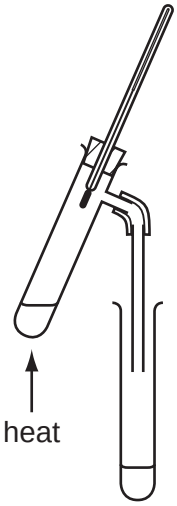


D



17 Which three elements are all transition elements?

A chlorine, bromine and iodine

B helium, neon and argon

C iron, cobalt and nickel

D lithium, sodium and potassium

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18 The equation represents the reaction of aluminium with sulfuric acid.

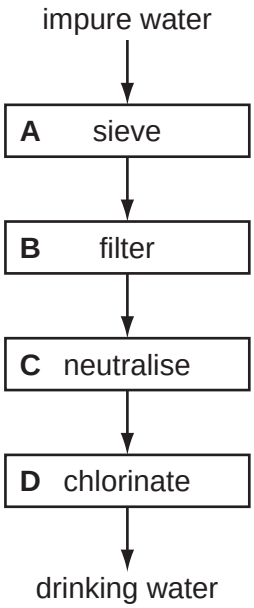
$$x\,Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + y\,H_2$$

What are the correct values of *x* and *y*?

	x	*y*
A	2	3
B	2	6
C	3	3
D	3	6

19 The chart shows four stages in the purification of drinking water.

Which stage sterilises the water?



20 Aluminium occurs as aluminium oxide in the ore bauxite.

Which terms apply to the extraction of aluminium from aluminium oxide?

	electrolysis	reduction
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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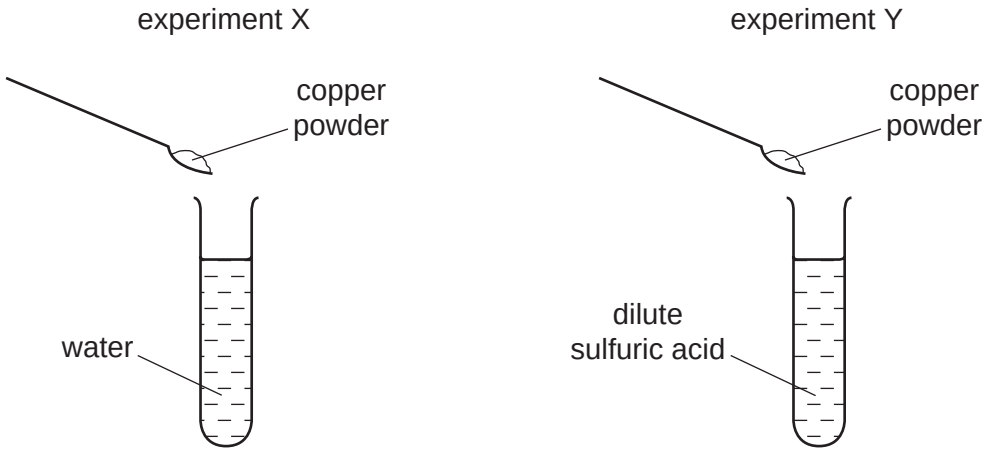
21 Aqueous copper(II) ions, $Cu^{2+}(aq)$, are blue.

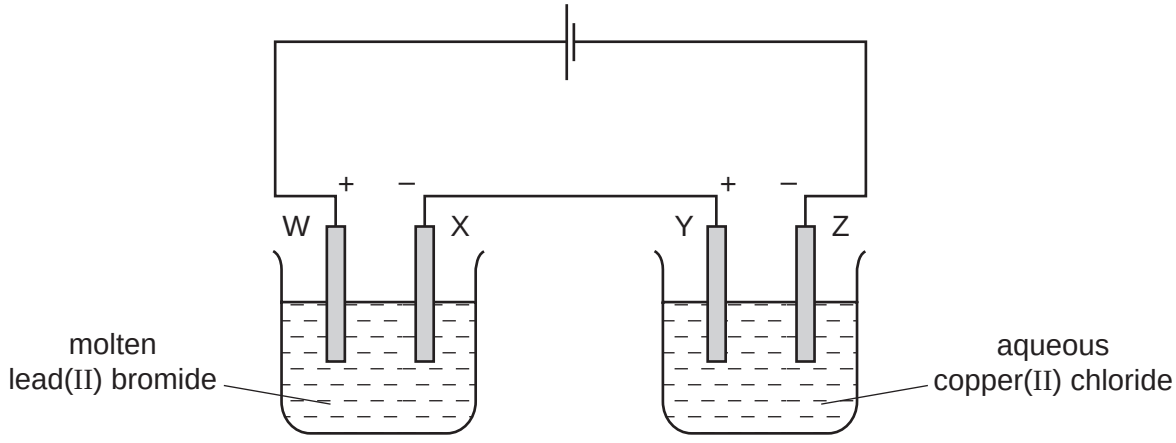
In separate experiments, X and Y, copper powder is added to a test-tube of liquid and the mixture stirred. At the end of each experiment some copper powder remains at the bottom of each tube.



What are the final colours of the liquids above the copper powder?

	experiment X	experiment Y
A	blue	blue
B	blue	colourless
C	colourless	blue
D	colourless	colourless

22 An electrolysis circuit is set up using carbon electrodes as shown.



At which two electrodes would a Group VII element be formed?

A W and Y **B** W and Z **C** X and Y **D** X and Z

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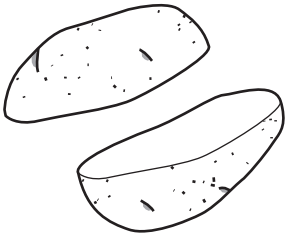
23 A 250 g portion of potatoes is to be cooked in boiling water.

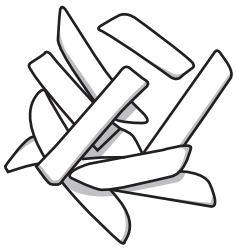
Which form of the potatoes will require the shortest cooking time?

A



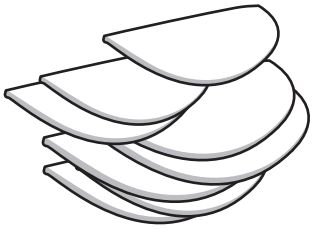
potato halves

B



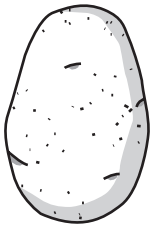
thick potato sticks

C



thin slices of potato

D



whole potato

24 The equations for two reactions are shown.

X $PbCO_3 \rightarrow PbO + CO_2$

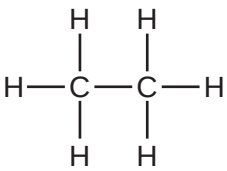
Y $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

Which types of reaction are X and Y?

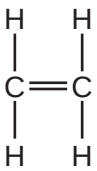
	X	Y
A	combustion	neutralisation
B	combustion	thermal decomposition
C	thermal decomposition	combustion
D	thermal decomposition	neutralisation

25 Which structure shows a polymer that is also a hydrocarbon?

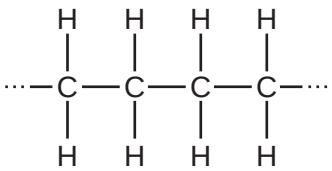
A



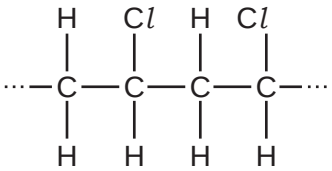
B



C



D



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26 Two products, X and Y, are formed in the complete combustion of methane.

What are X and Y?

A carbon and hydrogen

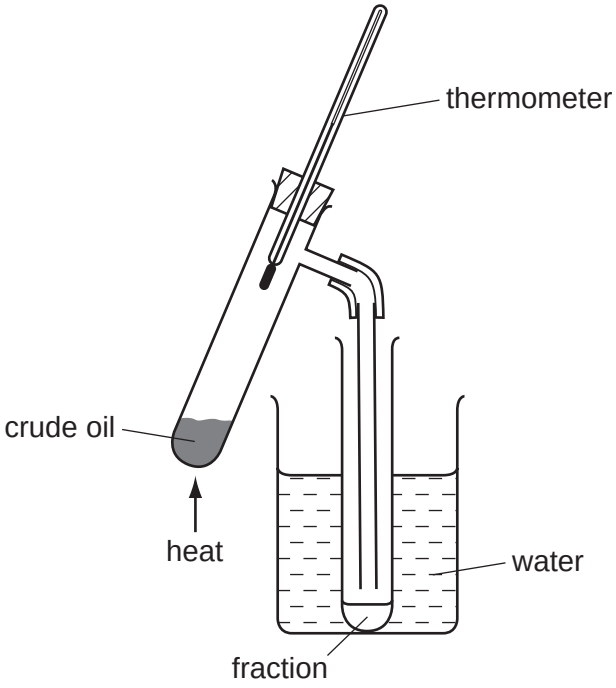
B carbon and water

C carbon dioxide and hydrogen

D carbon dioxide and water

27 Crude oil (petroleum) is heated, using the apparatus shown.

Four fractions, with different boiling point ranges, are collected.



Which term best describes crude oil?

A a compound

B an element

C a mixture

D a plastic

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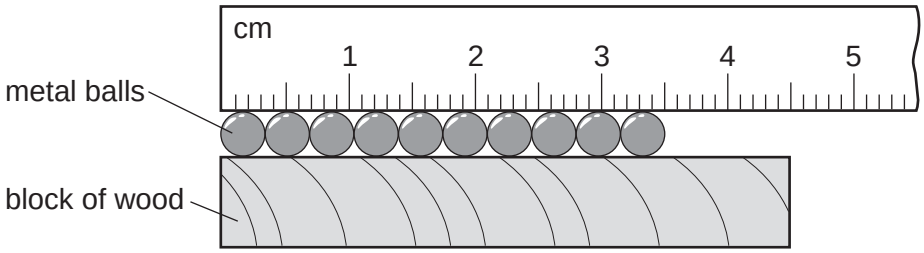
28 A ruler and a block of wood are used to find the diameter of some identical metal balls.



What is the diameter of a single ball?

A 3.5 mm **B** 4.5 mm **C** 3.5 cm **D** 4.5 cm

29 Which statement is correct?

A The mass of a bottle of water at the North Pole is different from its mass at the Equator.

B The mass of a bottle of water is measured in newtons.

C The weight of a bottle of water and its mass are both measured in kilograms.

D The weight of a bottle of water is one of the forces acting on the bottle.

30 Which substance in the table has the lowest density?

	substance	mass / g	volume / cm^3
A	nylon	1.2	1.0
B	cotton	1.5	1.0
C	olive oil	1.8	2.0
D	water	2.0	2.0

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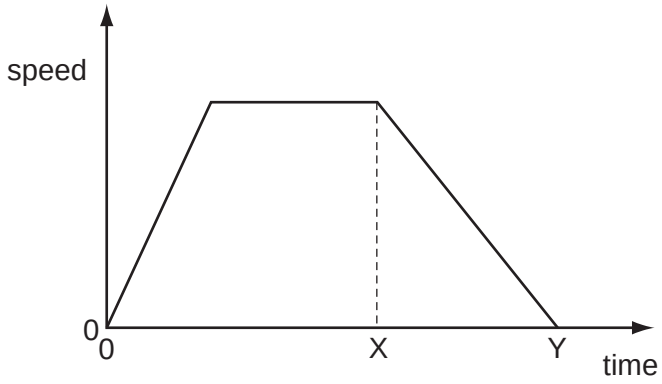
31 The graph shows how the speed of an object changes over an interval of time.



Which statement describes the acceleration of the object between time X and time Y?

A It is constant.

B It is decreasing.

C It is increasing.

D It is zero.

32 In a hydroelectric power station, one form of energy is stored in a reservoir. This energy is then transferred in stages to another form, which is the output.

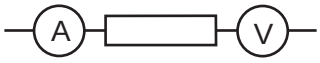
Which row gives the names for the stored energy and the output energy?

	stored energy	output energy
A	electrical	heat
B	electrical	kinetic
C	kinetic	electrical
D	potential	electrical

33 The diagrams show part of an electric circuit containing an ammeter and a voltmeter.

Which arrangement should be used to measure the potential difference (p.d.) across the resistor and the current through it?

A



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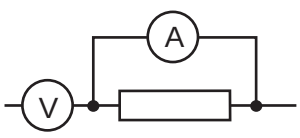

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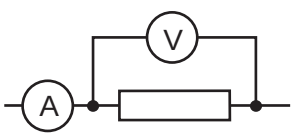

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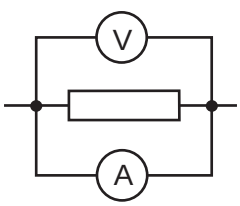

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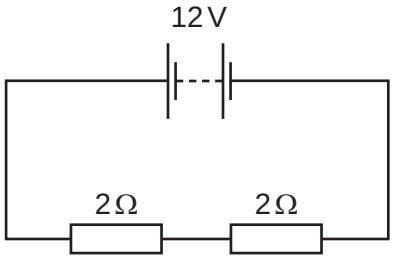
34 The diagram shows an electrical circuit.

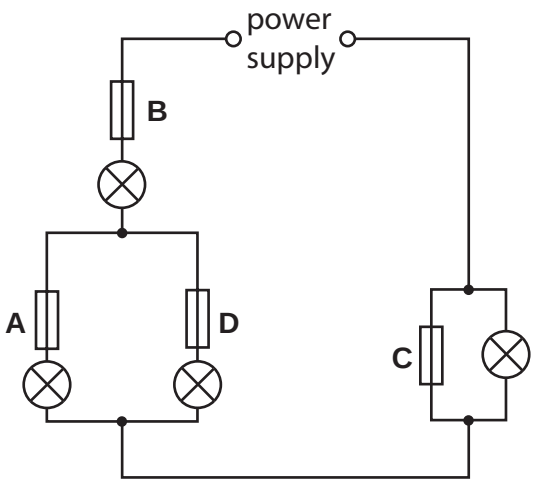


What is the current through the circuit?

A 3 A **B** 4 A **C** 12 A **D** 24 A

35 In the circuit shown, only one of the fuses has blown, but none of the lamps is lit.

Which fuse has blown?



36 A camper sits beside a fire and quickly begins to feel warm. He pushes the end of a metal rod into the fire and after a while his hand feels the rod getting warm.

Which heat transfers are taking place?

	heat transfer from fire through the air	heat transfer from fire through the rod
A	conduction	convection
B	conduction	radiation
C	radiation	conduction
D	radiation	convection

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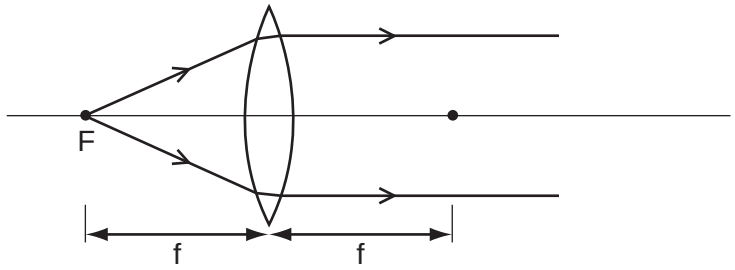
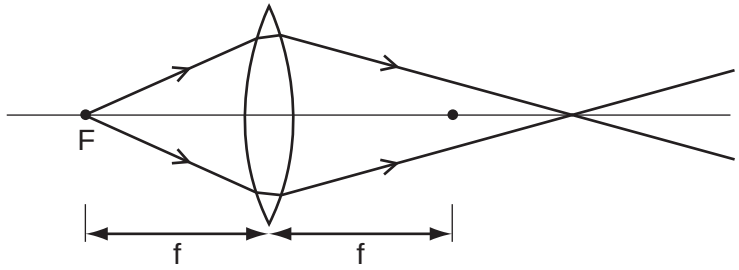
37 A source of light is placed at the focus F of a converging lens. The focal length of the lens is f.

Which diagram shows the path of the rays of light that pass through the lens?

A



B



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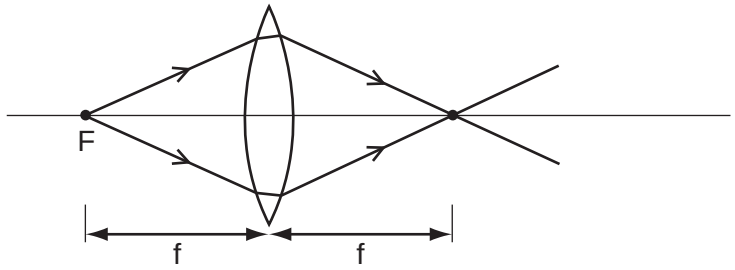

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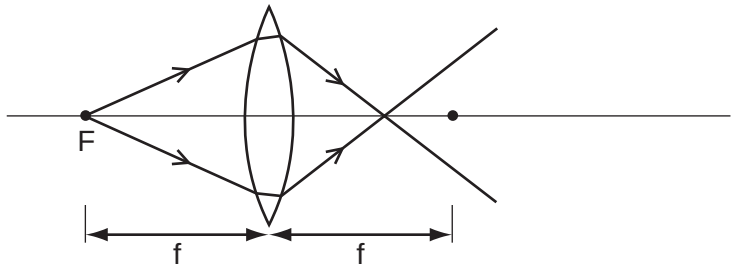

38 The Sun heats the Earth by electromagnetic radiation.

Which region of the electromagnetic spectrum is responsible for most of this heating?

A microwave

B infra-red

C ultraviolet

D X-ray

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39 A police car with its siren sounding is stationary in heavy traffic. A pedestrian notices that, although the loudness of the sound produced does not change, the pitch varies.

Which row in the table describes the amplitude and the frequency of the sound?

	amplitude	frequency
A	constant	constant
B	constant	varying
C	varying	constant
D	varying	varying

40 Which row in the table describes alpha-particles?

	electric charge	penetrates 1 cm of aluminium?
A	negative	yes
B	negative	no
C	positive	yes
D	positive	no

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DATA SHEET
The Periodic Table of the Elements

																		4 **He** Helium 2
												11 **B** Boron 5	12 **C** Carbon 6	14 **N** Nitrogen 7	16 **O** Oxygen 8	19 **F** Fluorine 9	20 **Ne** Neon 10
												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
										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
										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
										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

1 **H** Hydrogen 1																		
7 **Li** Lithium 3	9 **Be** Beryllium 4																	
23 **Na** Sodium 11	24 **Mg** Magnesium 12																	
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								
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								
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								
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	a = relative atomic mass
X	X = atomic symbol
b	b = proton (atomic) number

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

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