



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/12

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)



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.

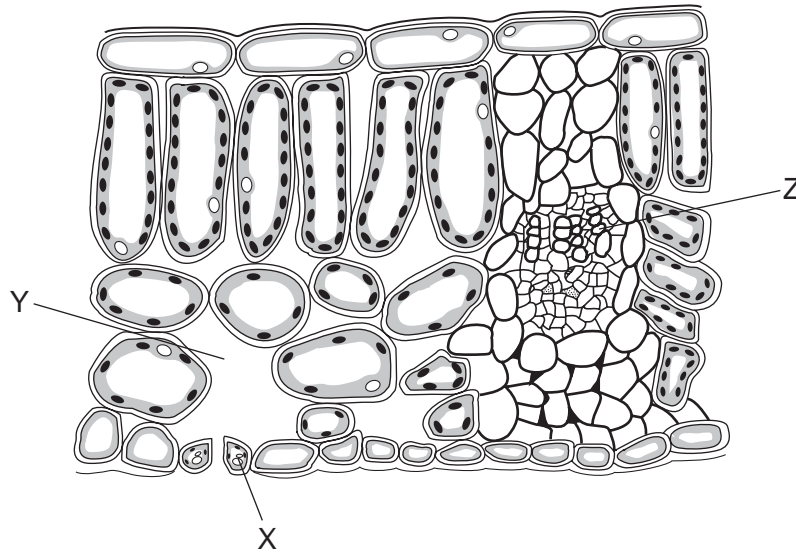
Any rough working should be done in this booklet.

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 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

- 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 part of a plant cell contains starch grains?
- A** cell wall
 - B** chloroplasts
 - C** nucleus
 - D** vacuole

4 Which is correct for all enzymes?

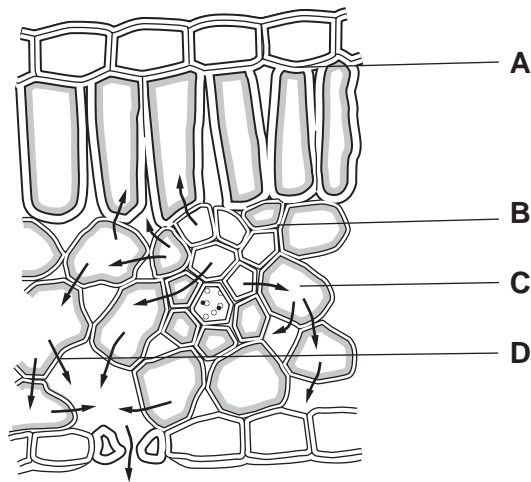
	made of proteins	made inside cells
A	✓	✓
B	✓	x
C	x	✓
D	x	x

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

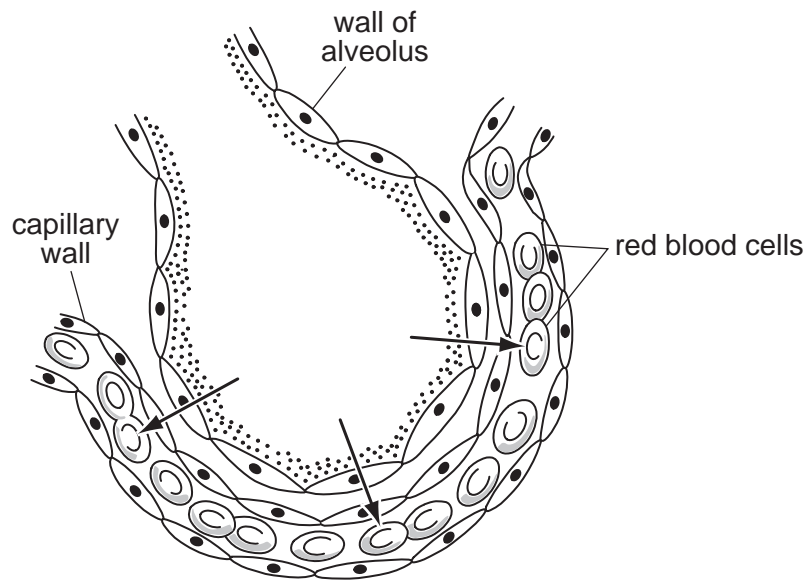
- A** calcium
- B** iron
- C** vitamin C
- D** vitamin D

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

Where does the water evaporate?



7 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

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

- A aorta
- B pulmonary artery
- C pulmonary vein
- D vena cava

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

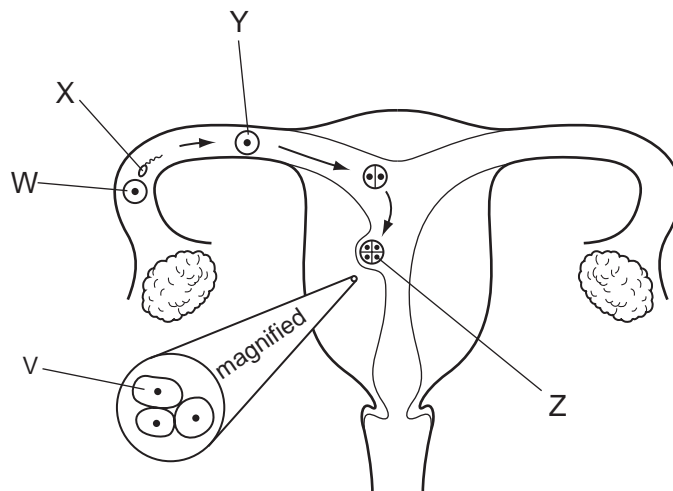
- A blood group
- B bone strength
- C height
- D speed of wound healing

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



Which cells are genetically identical?

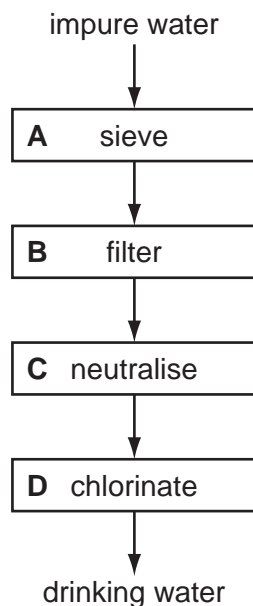
- A W and Z
- B X and V
- C X and Y
- D Y and Z

13 What will increase soil erosion?

- A deforestation
- B maintaining natural plant cover
- C reducing grazing by livestock
- D terracing of the land

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

Which stage sterilises the water?



15 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

16 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.

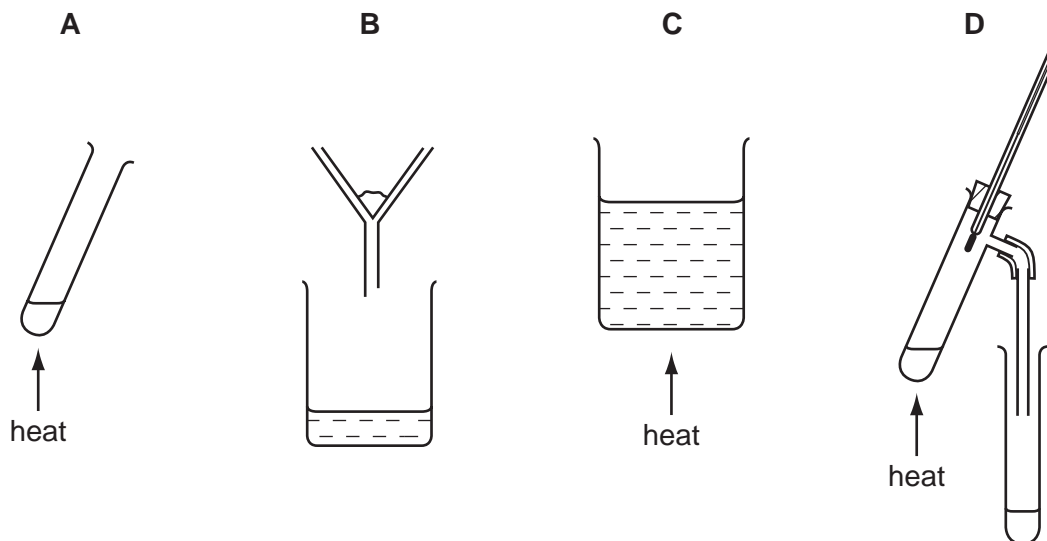
Student 3 Mixtures consist only of compounds.

Which students are correct?

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

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

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

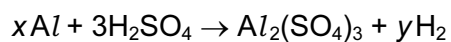


18 The table shows information about four different compounds.

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 ₂ O	sodium, oxygen

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

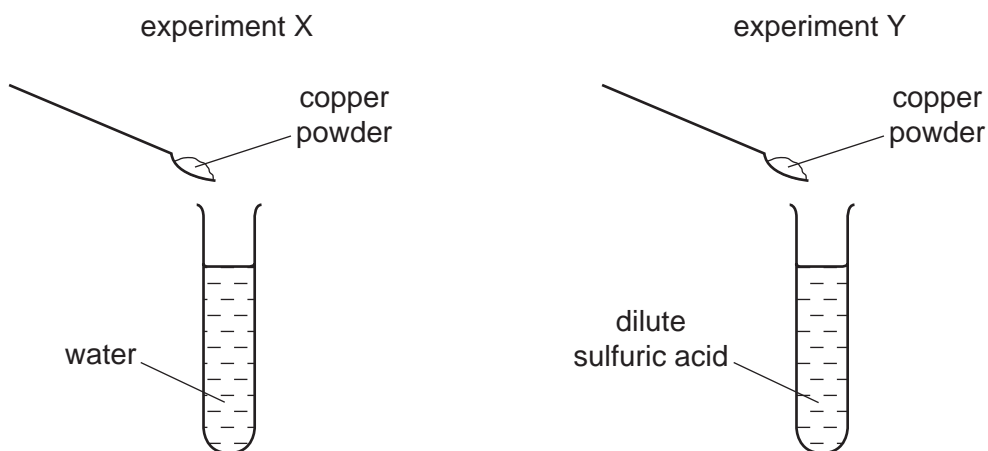


What are the correct values of x and y ?

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

20 Aqueous copper(II) ions, $\text{Cu}^{2+}(\text{aq})$, 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?

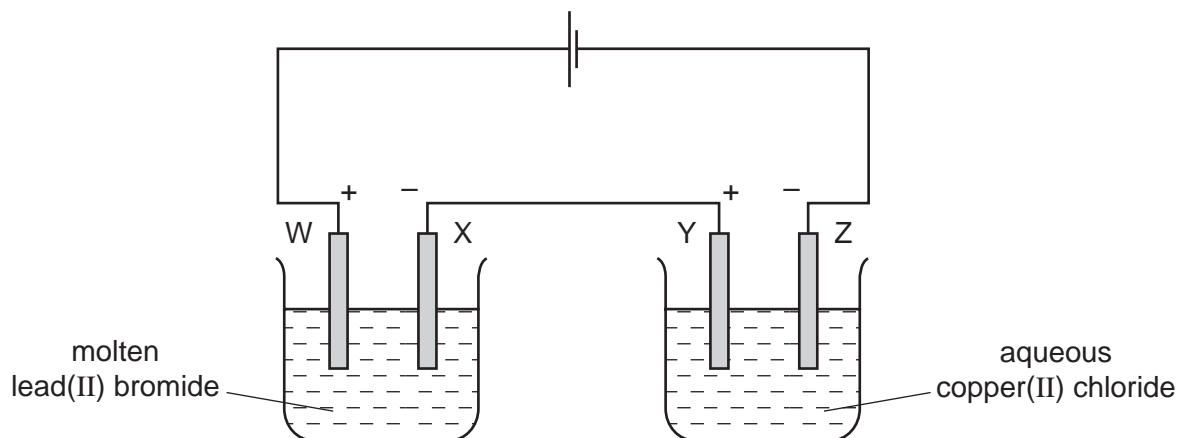
	experiment X	experiment Y
A	blue	blue
B	blue	colourless
C	colourless	blue
D	colourless	colourless

21 Aluminium occurs as aluminium oxide in the ore bauxite.

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

	electrolysis	reduction
A	✓	✓
B	✓	x
C	x	✓
D	x	x

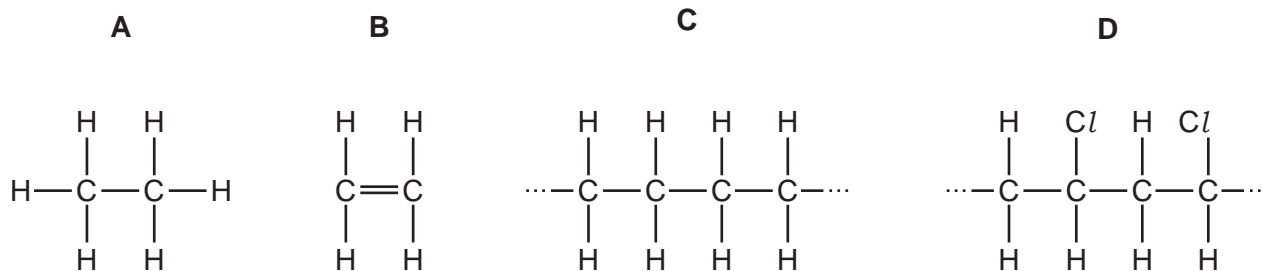
22 An electrolysis circuit is set up using carbon electrodes as shown.



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

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



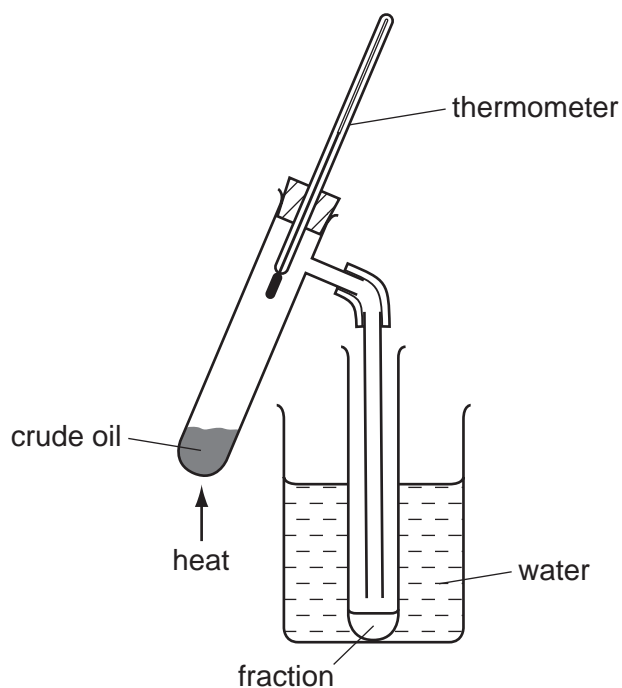
24 Two products, X and Y, are formed in the complete combustion of methane.

What are X and Y?

- A** carbon and hydrogen
B carbon and water
C carbon dioxide and hydrogen
D carbon dioxide and water

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

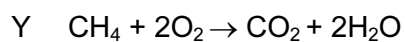
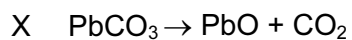
Four fractions, with different boiling point ranges, are collected.



Which term best describes crude oil?

- A a compound
- B an element
- C a mixture
- D a plastic

26 The equations for two reactions are shown.

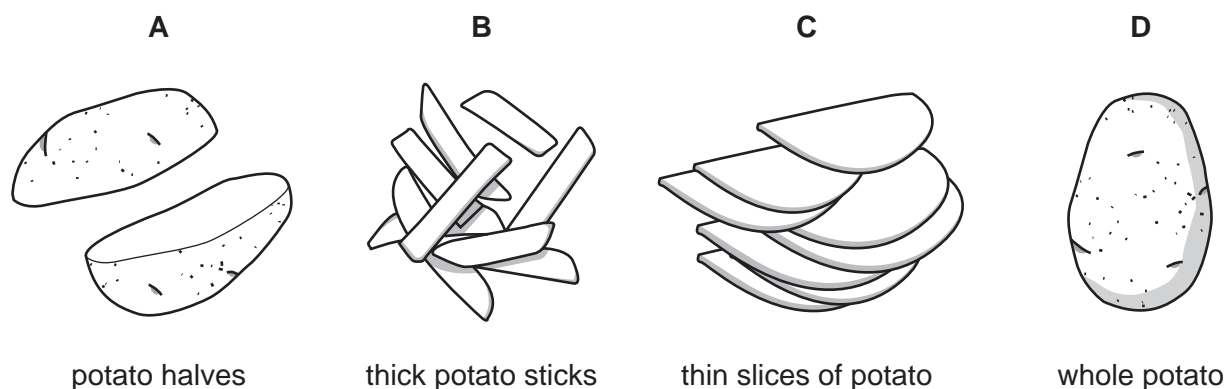


Which types of reaction are X and Y?

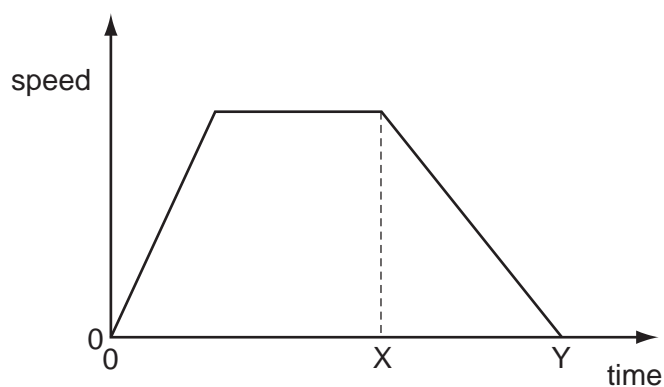
	X	Y
A	combustion	neutralisation
B	combustion	thermal decomposition
C	thermal decomposition	combustion
D	thermal decomposition	neutralisation

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

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



28 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.

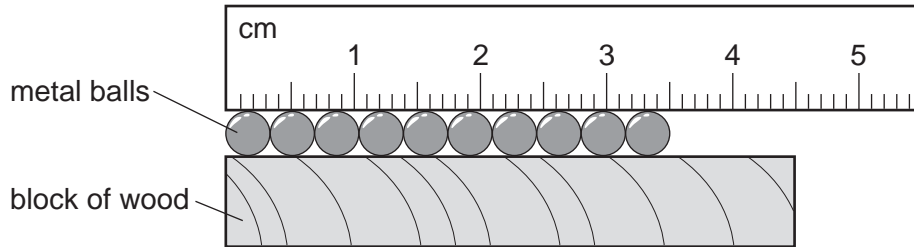
29 Which substance in the table has the lowest density?

	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

30 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.

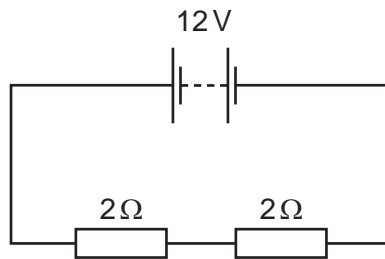
31 A ruler and a block of wood are used to find the diameter of some identical metal balls.



What is the diameter of a single ball?

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

32 The diagram shows an electrical circuit.

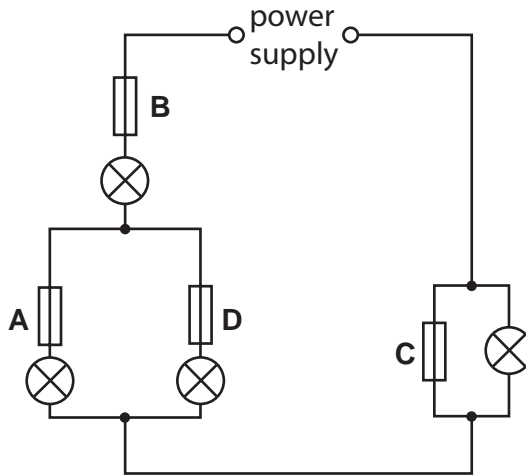


What is the current through the circuit?

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

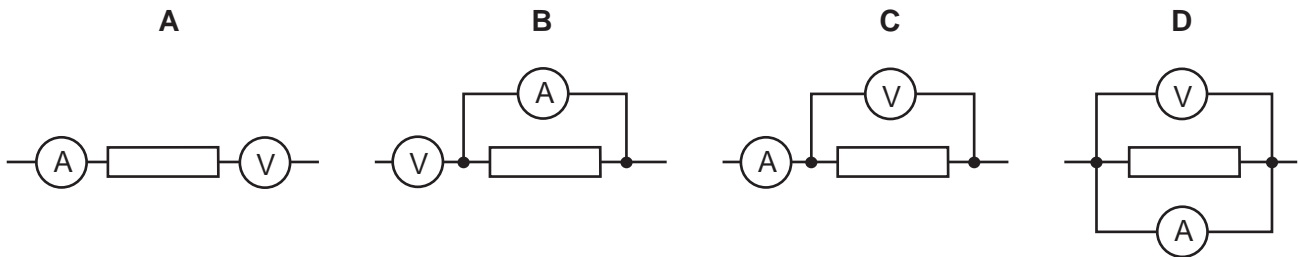
33 In the circuit shown, only one of the fuses has blown, but none of the lamps is lit.

Which fuse has blown?



34 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?



35 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

- 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

- 37 The Sun heats the Earth by electromagnetic radiation.

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

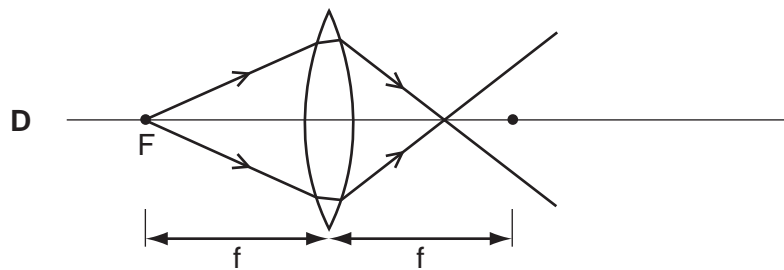
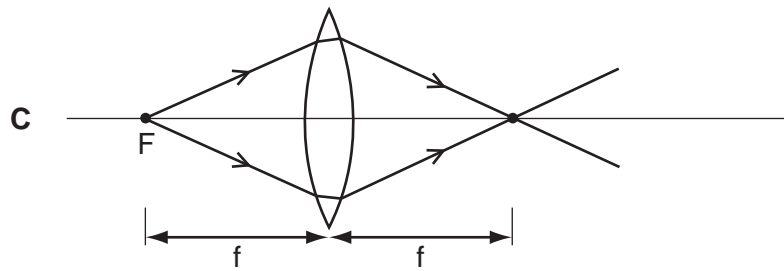
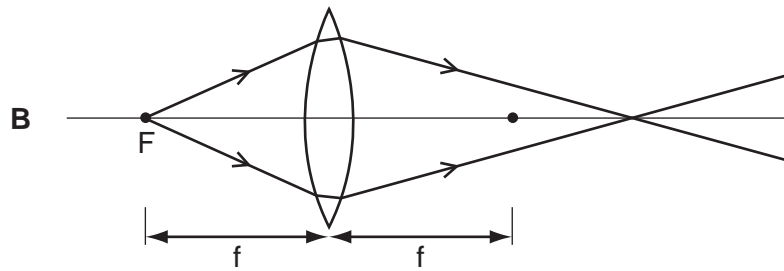
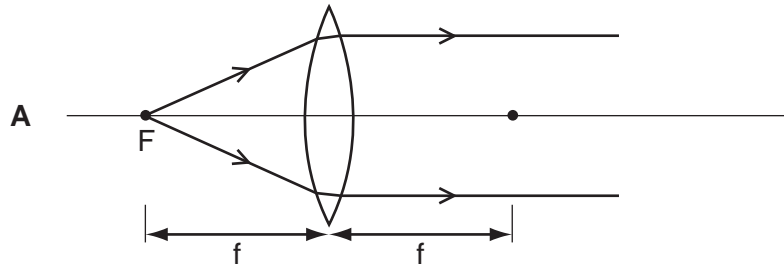
- A** microwave
 - B** infra-red
 - C** ultraviolet
 - D** X-ray
- 38 A police car with its siren sounding is stationary in heavy traffic. A pedestrian notices that, although the loudness of the sound produced does not change, the pitch varies.

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

39 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?



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

DATA SHEET
The Periodic Table of the Elements

		Group										
I	II	III	IV	V	VI	VII	O					
1 H Hydrogen 1							4 He Helium 2					
7 Li Lithium 3	9 Be Beryllium 4	5 B Boron 5	6 C Carbon 6	7 N Nitrogen 7	8 O Oxygen 8	9 F Fluorine 9	10 Ne Neon 10					
11 Na Sodium 11	12 Mg Magnesium 12	13 Al Aluminium 13	14 Si Silicon 14	15 P Phosphorus 15	16 S Sulfur 16	17 Cl Chlorine 17	18 Ar Argon 18					
19 K Potassium 19	20 Ca Calcium 20	21 Sc Scandium 21	22 Ti Titanium 22	23 V Vanadium 23	24 Cr Chromium 24	25 Mn Manganese 25	26 Fe Iron 26					
37 Rb Rubidium 37	38 Sr Strontium 38	39 Y Yttrium 39	40 Zr Zirconium 40	41 Nb Niobium 41	42 Mo Molybdenum 42	43 Tc Technetium 43	44 Ru Ruthenium 44					
55 Cs Caesium 55	56 Ba Barium 56	57 La Lanthanum 57	72 Hf Hafnium 72	73 Ta Tantalum 73	74 W Tungsten 74	75 Re Rhenium 75	76 Os Osmium 76					
87 Fr Francium 87	88 Ra Radium 88	89 Ac Actinium 89 †										
			29 Cu Copper 29	28 Ni Nickel 28	27 Co Cobalt 27	29 Zn Zinc 30	30 Ga Gallium 31					
			47 Ag Silver 47	46 Pd Palladium 46	45 Rh Rhodium 45	48 Cd Cadmium 48	49 In Indium 49					
			79 Au Gold 79	78 Pt Platinum 78	77 Ir Iridium 77	80 Hg Mercury 80	81 Tl Thallium 81					
			82 Pb Lead 82	83 Bi Bismuth 83	84 Po Polonium 84	85 At Astatine 85	86 Rn Radon 86					
			64 Gd Gadolinium 64	63 Eu Europium 63	62 Sm Samarium 62	65 Tb Terbium 65	66 Dy Dysprosium 66					
			96 Cm Curium 96	95 Am Americium 95	94 Pu Plutonium 94	97 Bk Berkelium 97	98 Cf Californium 98					
			141 Pr Praseodymium 59	60 Nd Neodymium 60	61 Pm Promethium 61	62 Sm Samarium 62	63 Eu Europium 63					
			91 Pa Protactinium 91	92 U Uranium 92	93 Np Neptunium 93	94 Pu Plutonium 94	95 Am Americium 95					
			140 Ce Cerium 58	141 Pr Praseodymium 59	142 Nd Neodymium 60	143 Pm Promethium 61	144 Sm Samarium 62					
			232 Th Thorium 90	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95					
			169 Tm Thulium 69	68 Er Erbium 68	67 Ho Holmium 67	70 Yb Ytterbium 70	71 Lu Lutetium 71					
			101 Md Mendelevium 101	100 Fm Fermium 100	99 Es Einsteinium 99	102 No Nobelium 102	103 Lr Lawrencium 103					
			127 I Iodine 53	51 Sb Antimony 51	52 Te Tellurium 52	54 Xe Xenon 54	131 Xe Xenon 54					
			128 Te Tellurium 52	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54					
			207 Pb Lead 82	209 Bi Bismuth 83	207 Pb Lead 82	169 Tm Thulium 69	175 Lu Lutetium 71					
			204 Tl Thallium 81	204 Tl Thallium 81	204 Tl Thallium 81	169 Tm Thulium 69	175 Lu Lutetium 71					

* 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 dm³ at room temperature and pressure (r.t.p.).

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