UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE **0653/13**

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 Which part of a plant cell contains starch grains?

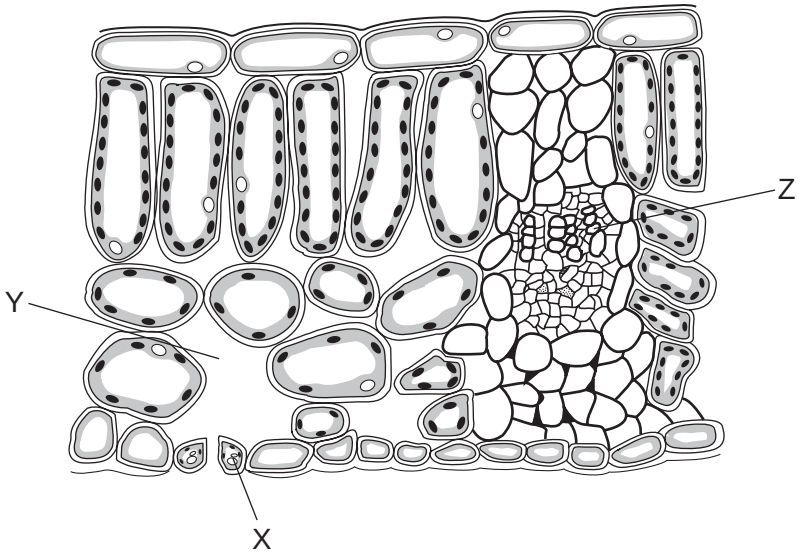
A cell wall

B chloroplasts

C nucleus

D vacuole

2 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

3 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

4 Which is correct for all enzymes?

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

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

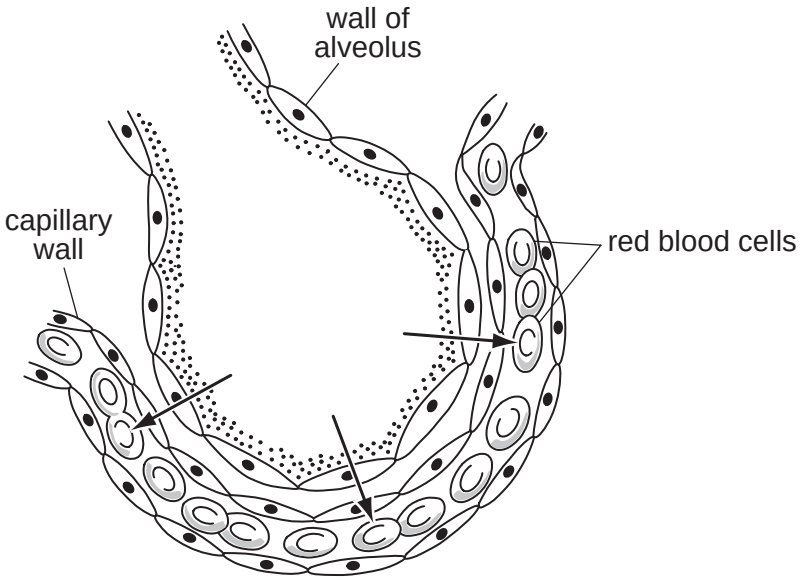
A aorta

B pulmonary artery

C pulmonary vein

D vena cava

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



What moves in the direction shown by the arrows?

A carbon dioxide

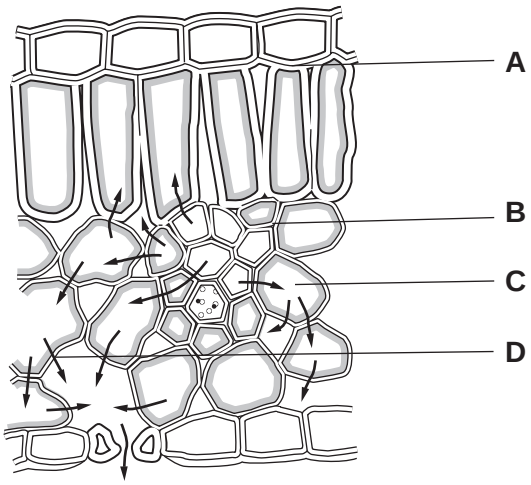
B hydrogen

C oxygen

D water

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

Where does the water evaporate?



8 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

9 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

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

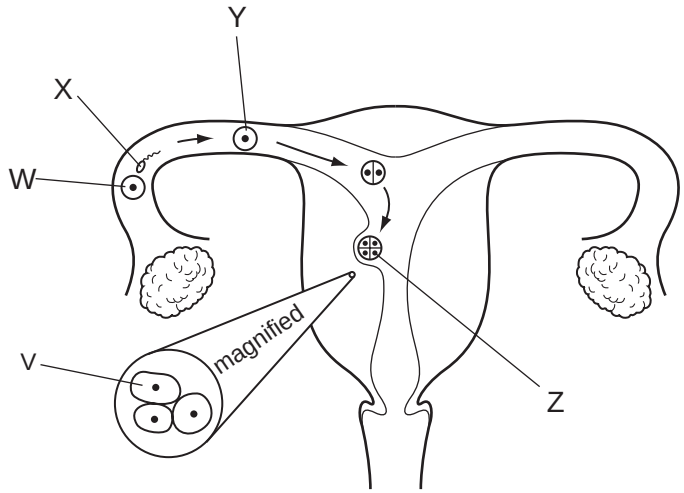
A blood group

B bone strength

C height

D speed of wound healing

11 The 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

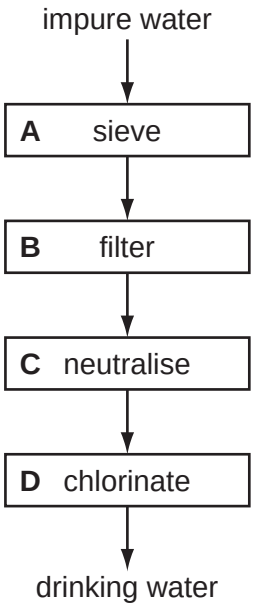
12 The table shows the names of plant reproductive structures.

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

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

Which stage sterilises the water?



14 What will increase soil erosion?

A deforestation

B maintaining natural plant cover

C reducing grazing by livestock

D terracing of the land

15 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

16 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

17 The table shows information about four different compounds.

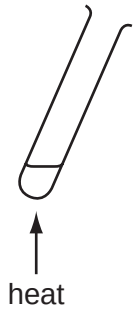
Which compound contains ionic bonds?

	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

18 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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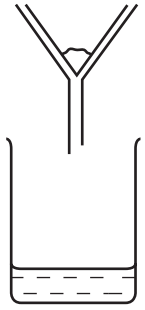
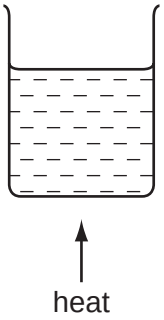
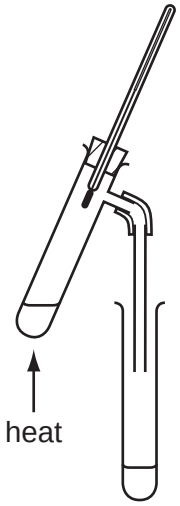


C



D



19 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	✗	✗

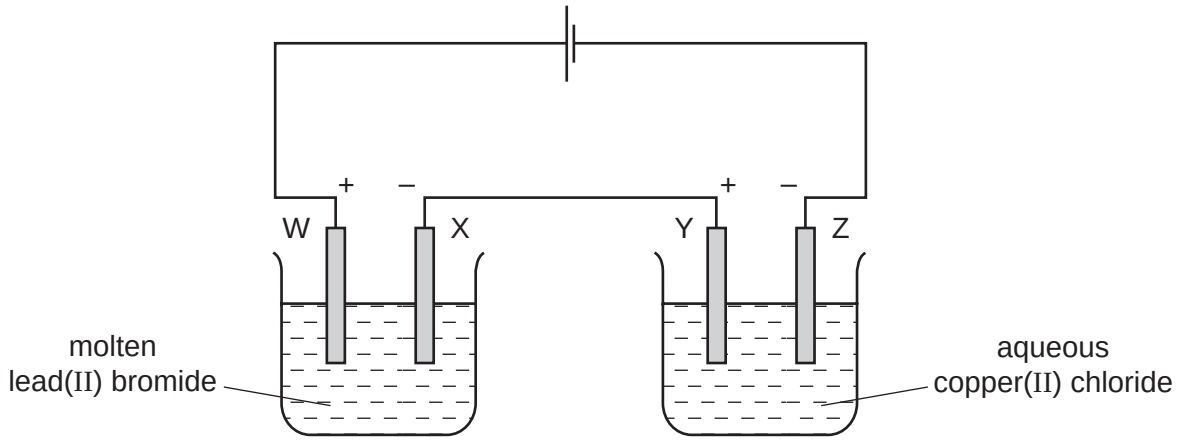
20 The equation represents the reaction of aluminium with sulfuric acid.

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

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

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

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

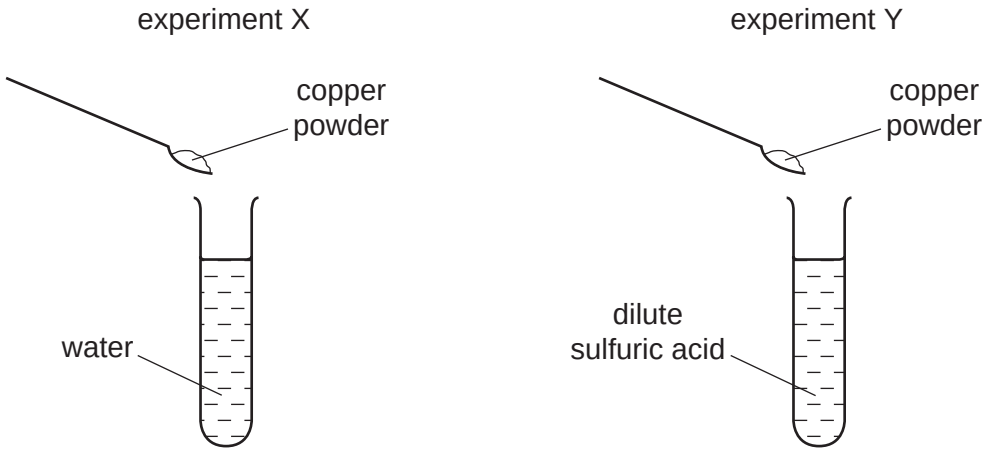


At which two electrodes would a Group VII element be formed?

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

22 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.



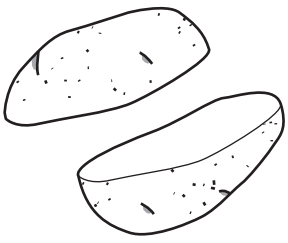
What are the final colours of the liquids above the copper powder?

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

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

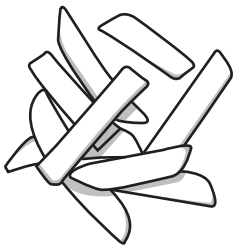
Which form of the potatoes will require the shortest cooking time?

A



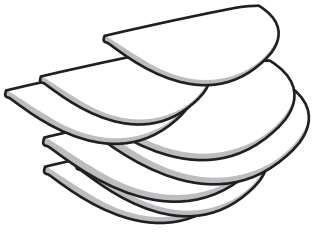
potato halves

B



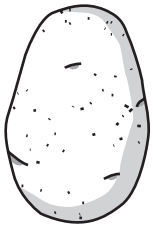
thick potato sticks

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

What are X and Y?

A carbon and hydrogen

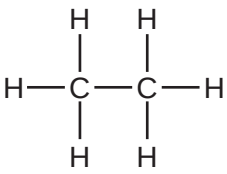
B carbon and water

C carbon dioxide and hydrogen

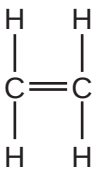
D carbon dioxide and water

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

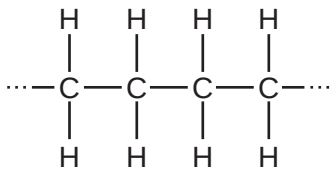
A



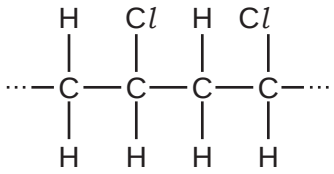
B



C

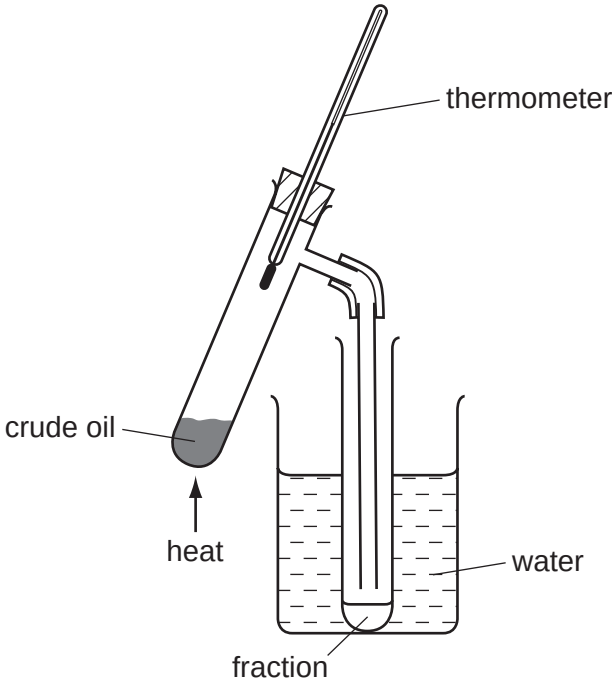


D



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

28 Which statement is correct?

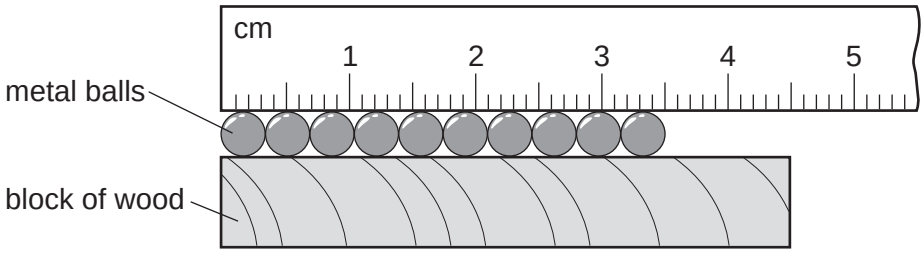
A The mass of a bottle of water at the North Pole is different from its mass at the Equator.

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.

29 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

30 Which substance in the table has the lowest density?

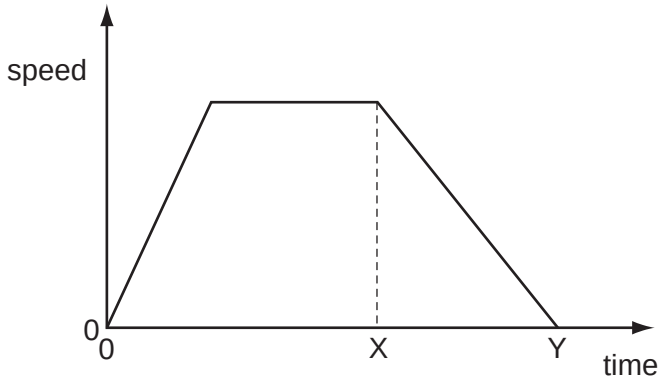
	substance	mass / g	volume / cm^3
A	nylon	1.2	1.0
B	cotton	1.5	1.0
C	olive oil	1.8	2.0
D	water	2.0	2.0

31 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

32 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.

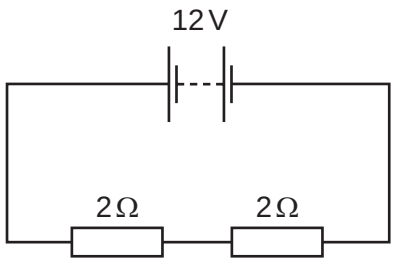
D It is zero.

33 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

34 The diagram shows an electrical circuit.



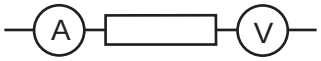
What is the current through the circuit?

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

35 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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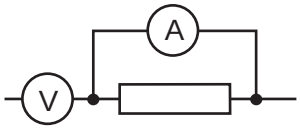
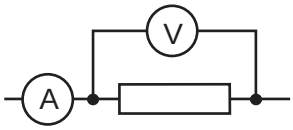
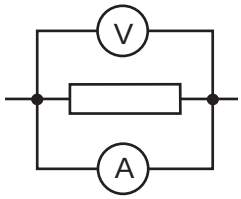


C

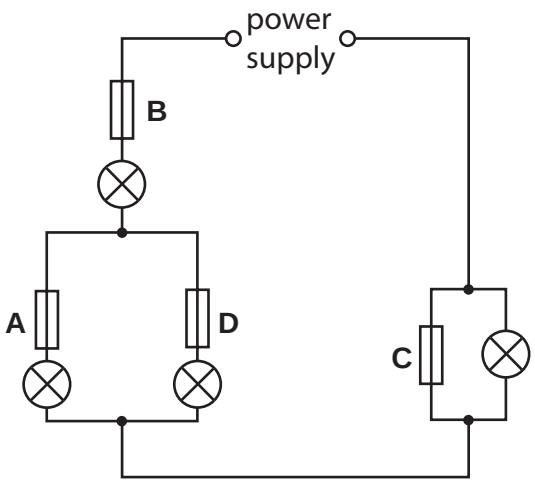


D



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

Which fuse has blown?



37 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

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

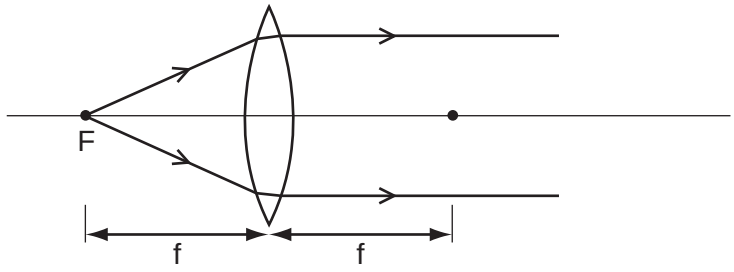
C ultraviolet

D X-ray

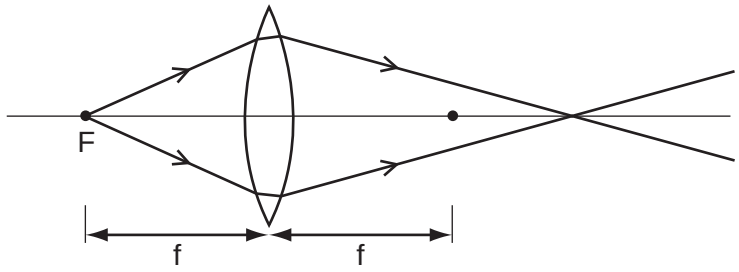
39 A source of light is placed at the focus F of a converging lens. The focal length of the lens is f.

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

A



B



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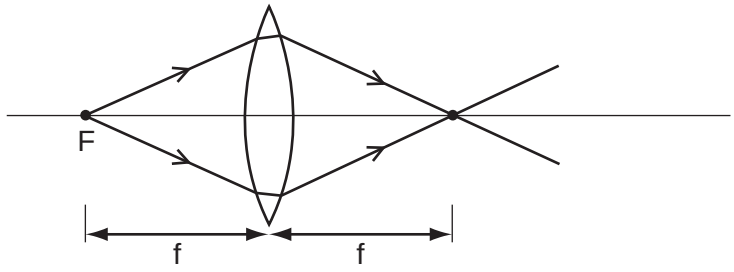

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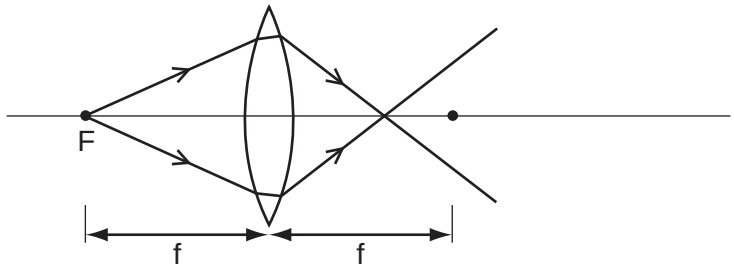

40 Which row in the table describes alpha-particles?

	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

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.).