

Centre Number	Candidate Number	Name
---------------	------------------	------

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICAL SCIENCE

0652/01

Paper 1 Multiple Choice

May/June 2003

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.

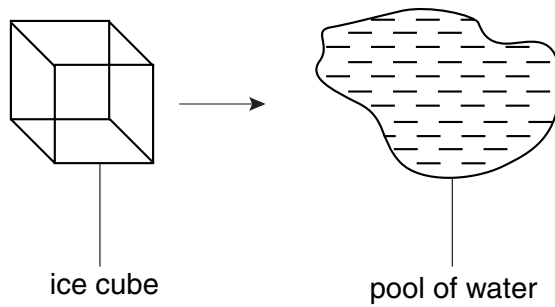
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 20.

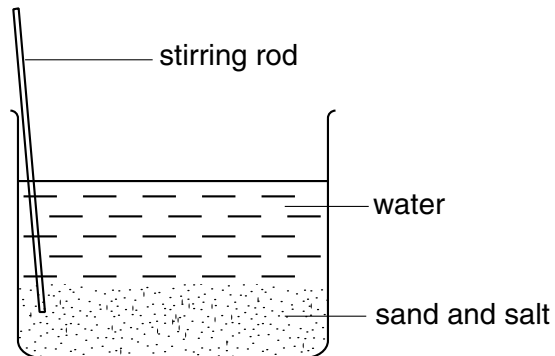
This document consists of **18** printed pages and **2** blank pages.

- 1 An ice cube is left on a warm table.



What happens to the molecules of water in the ice cube?

- A The molecules condense.
 - B The molecules dissolve.
 - C The molecules gain energy.
 - D The molecules lose energy.
- 2 The diagram shows the first step in separating sand from salt.



What is the next step?

- A evaporate the water
- B filter the mixture
- C freeze the mixture
- D make a chromatogram

- 3 The table shows what some students wrote about the electrical charges on the particles in an atom.

Which student was correct?

student	proton	electron	neutron
A	+1	0	-1
B	+1	-1	0
C	0	+1	-1
D	-1	+1	0

- 4 The table shows the nucleon numbers and proton numbers of the atoms of some elements.

nucleon number	35	37	40	39	40
proton number	17	17	18	19	19

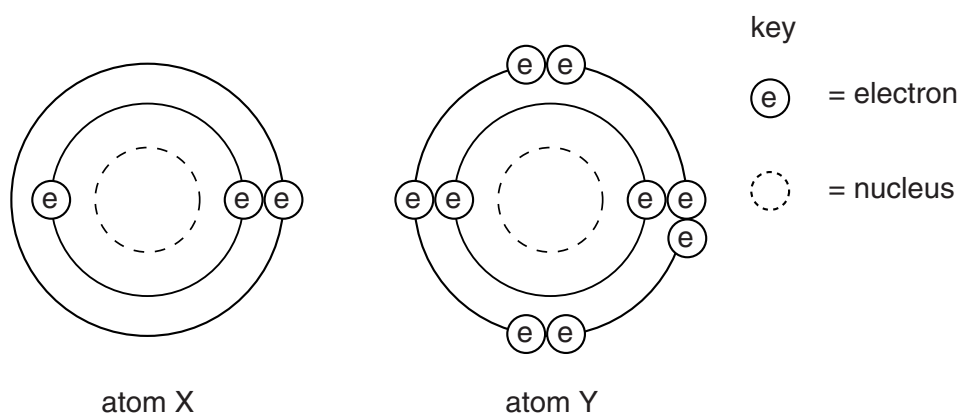
How many are atoms of non-metallic elements?

- A** 1 **B** 2 **C** 3 **D** 4

- 5 An ionic compound is likely to

- A** be a gas.
B be coloured.
C conduct electricity when molten.
D react vigorously with water.

6 The electronic structures of atoms X and Y are shown.

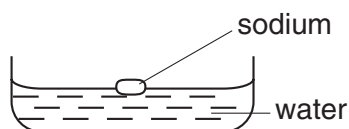


X and Y react to form an ionic compound.

What is the formula of the compound?

- A XY
- B XY_3
- C XY_7
- D X_7Y

7 When sodium reacts with water, a solution and a gas are produced.



The solution is tested with litmus paper and the gas is tested with a splint.

What happens to the litmus paper and to the splint?

	litmus paper	splint
A	blue to red	glowing splint relights
B	blue to red	lighted splint 'pops'
C	red to blue	glowing splint relights
D	red to blue	lighted splint 'pops'

8 Which of hydrogen and uranium form oxides when used as a source of energy?

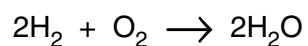
	hydrogen	uranium
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

9 A piece of zinc is placed in dilute sulphuric acid.

Which change slows down the speed of reaction?

- A** adding a catalyst
- B** adding water
- C** heating the acid
- D** powdering the zinc

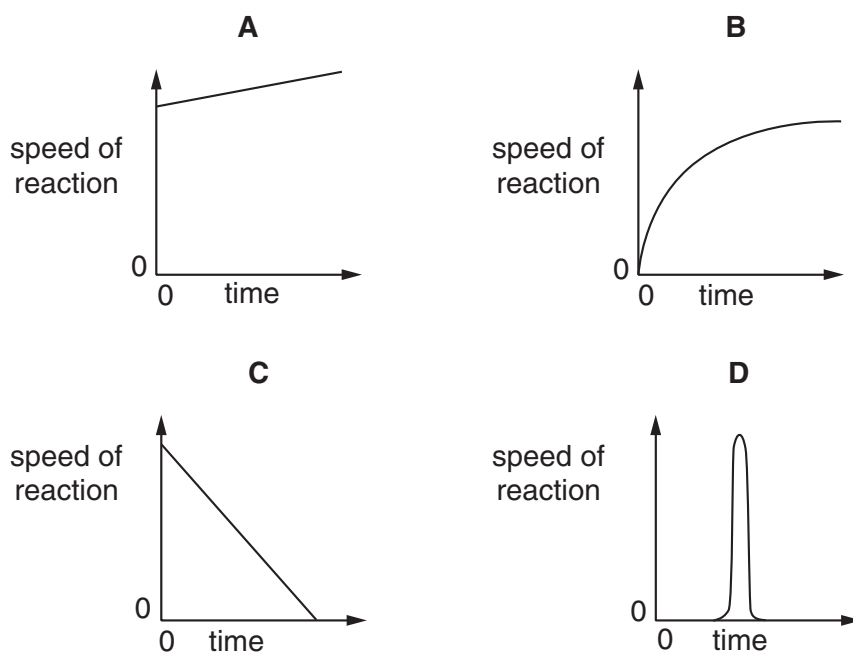
10 A spark can cause a mixture of hydrogen and air to explode.



Which two terms apply to this explosion of hydrogen?

	the reaction is	the hydrogen is
A	endothermic	oxidised
B	endothermic	reduced
C	exothermic	oxidised
D	exothermic	reduced

11 Which graph could represent the explosive combustion of methane?



12 Which of the following are properties of the oxides of most non-metals?

	property 1	property 2
A	acidic	covalent
B	acidic	ionic
C	basic	covalent
D	basic	ionic

13 Aqueous ammonia is added to solutions containing the ions of four metals.

aluminium copper(II) iron(III) zinc

Which of these ions give a coloured precipitate?

	aluminium	copper(II)	iron(III)	zinc
A	✓	✗	✗	✓
B	✓	✗	✓	✗
C	✗	✓	✗	✓
D	✗	✓	✓	✗

14 Which of the following is the pH value of an alkaline solution?

A 3

B 5

C 7

D 9

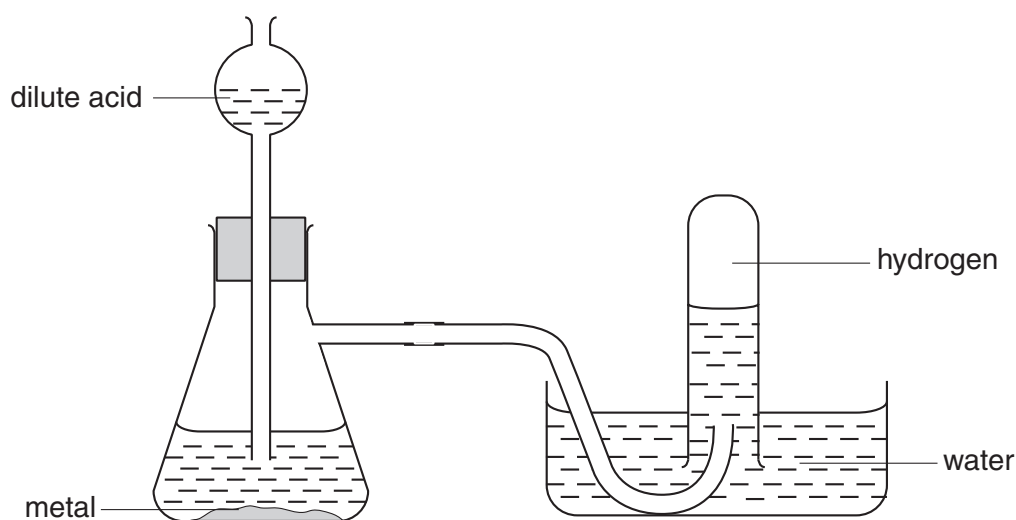
15 An element X has the two properties listed.

- 1 It acts as a catalyst.
- 2 It forms colourless ions.

Which of these properties suggest that X is a transition element?

	property 1	property 2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

16 The diagram shows a method of making hydrogen.



Which acid and metal would be suitable and safe for this method?

	metal	acid
A	copper	hydrochloric acid
B	copper	sulphuric acid
C	sodium	hydrochloric acid
D	zinc	sulphuric acid

17 Rust can be removed from pieces of iron by using hydrochloric acid.

This is possible because rust is

- A an alloy.
- B a metal oxide.
- C a red-brown solid.
- D soluble in water.

18 In an experiment, incomplete combustion of ethanol occurs.

Which gases may be present in the products?

- A carbon dioxide, carbon monoxide and hydrogen
- B carbon dioxide, carbon monoxide and water
- C carbon dioxide, hydrogen and water
- D carbon monoxide, hydrogen and water

19 Methanol and ethanol are both liquids.

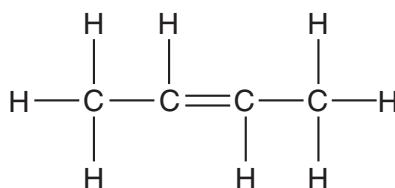
They both burn with a blue flame to produce carbon dioxide and water.

Both contain the functional group —O—H.

Which of the underlined words shows that methanol and ethanol are members of the same homologous series?

- A both burn
- B both liquids
- C both contain the functional group —O—H
- D produce carbon dioxide and water

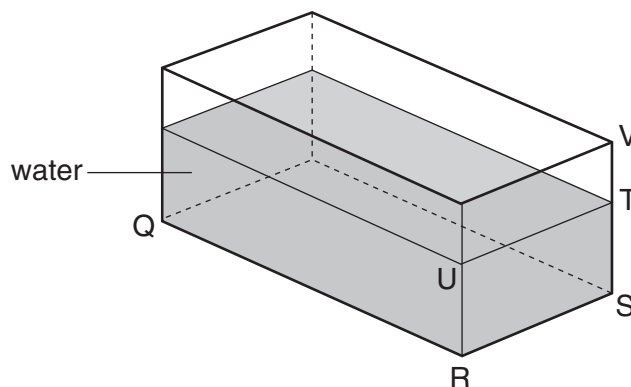
20 Compound X has the structure shown.



Which reactions does X show?

	addition of hydrogen	addition polymerisation
A	✓	✓
B	✓	x
C	x	✓
D	x	x

21 A glass tank contains some water.



The length QR and the width RS of the tank are known.

What other distance needs to be measured in order to be able to calculate the volume of the water?

A ST

B SV

C TU

D TV

22 A tunnel has a length of 50 km. A car takes 20 min to travel between the two ends of the tunnel.

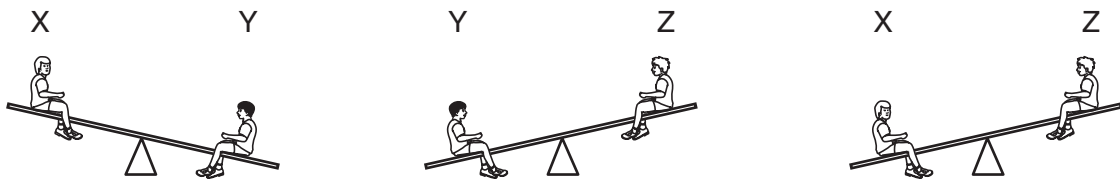
What is the average speed of the car?

- A 2.5 km/h
- B 16.6 km/h
- C 150 km/h
- D 1000 km/h

23 Which statement is correct?

- A Mass is a force, measured in kilograms.
- B Mass is a force, measured in newtons.
- C Weight is a force, measured in kilograms.
- D Weight is a force, measured in newtons.

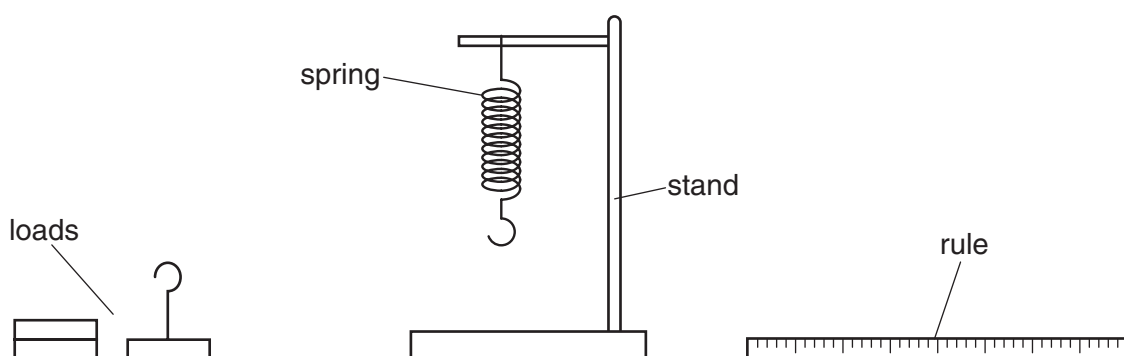
24 Three children, X, Y and Z, are using a see-saw to compare their weights.



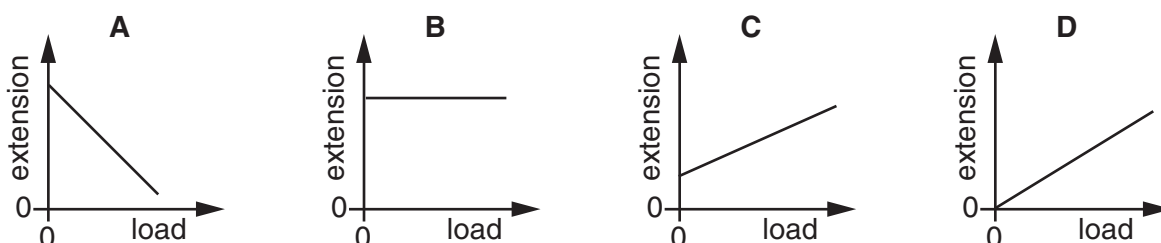
Which line in the table shows the correct order of the children's weights?

	heaviest	←————→	lightest
A	X	Y	Z
B	X	Z	Y
C	Y	X	Z
D	Y	Z	X

- 25 A spring is suspended from a stand. Loads are added and the extensions are measured.



Which graph shows the result of plotting extension against load?



- 26 What is the source of the energy converted by a hydro-electric power station?

- A hot rocks
- B falling water
- C oil
- D waves

- 27 A labourer on a building site lifts heavy concrete blocks onto a lorry. Lighter blocks are now lifted the same distance in the same time.

What happens to the work done in lifting each block and the power exerted by the labourer?

	work done in lifting each block	power exerted by labourer
A	decreases	decreases
B	decreases	remains the same
C	increases	increases
D	remains the same	increases

- 28 A person holds a glass beaker in one hand and fills it quickly with hot water. It takes several seconds before his hand starts to feel the heat.

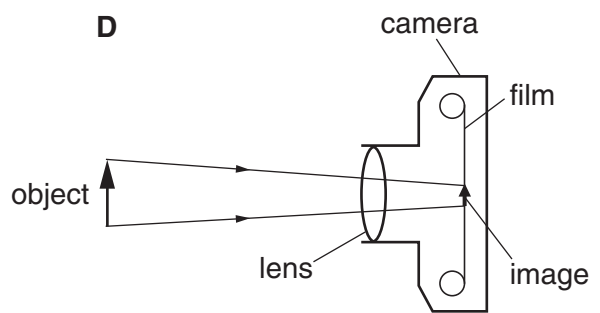
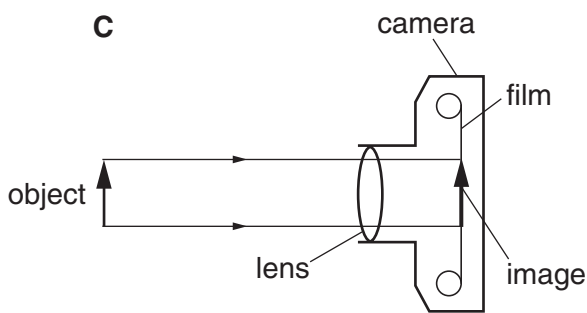
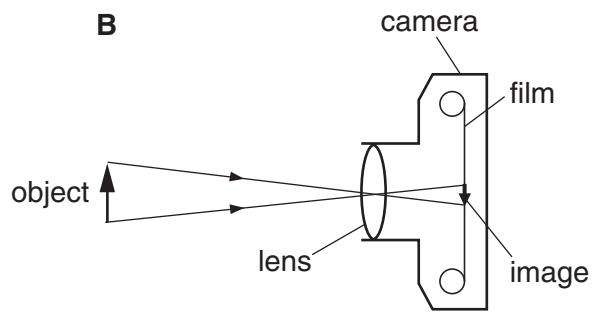
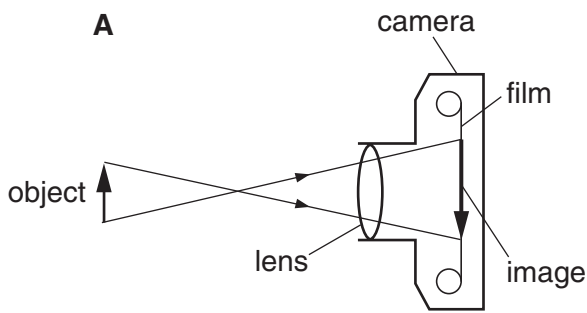
Why is there this delay?

- A Glass is a poor conductor of heat.
 - B Glass is a good conductor of heat.
 - C Water is a poor conductor of heat.
 - D Water is a good conductor of heat.
- 29 What causes refraction when light travels from air into glass?
- A The amplitude of the light waves changes.
 - B The colour of the light changes.
 - C The frequency of the light waves changes.
 - D The speed of the light changes.
- 30 A woman tunes her radio to a station broadcasting on 200 m.

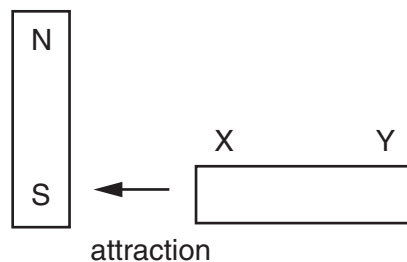
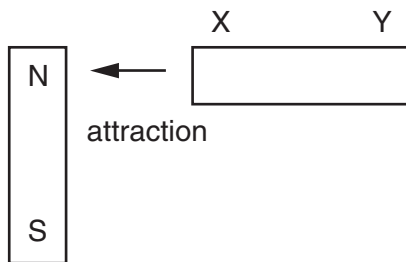
What does the 200 m tell her about the radio wave?

- A its amplitude
- B its frequency
- C its speed
- D its wavelength

31 Which diagram correctly shows rays passing through a camera lens?



32 A metal rod XY is placed near a magnet. End X is attracted when it is placed near to the north pole of the magnet, and also when it is placed near to the south pole.



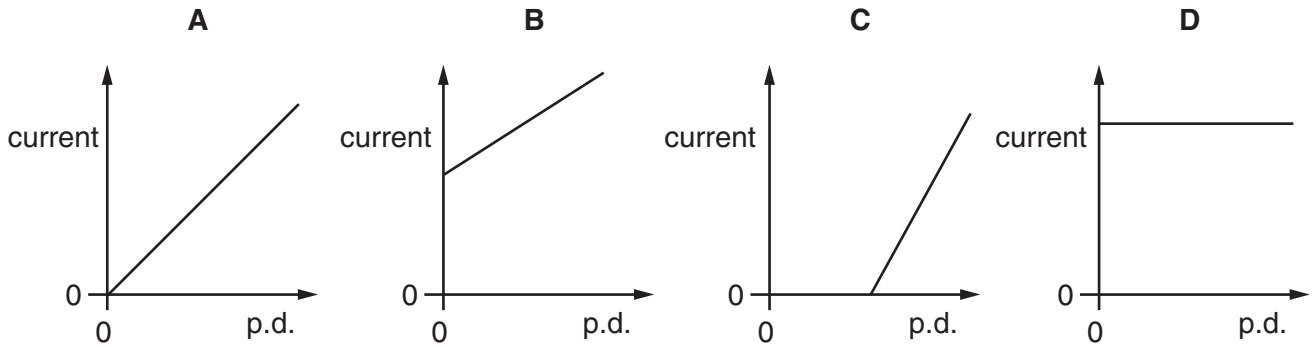
How does end Y behave when it is placed, in turn, near to the two poles of the magnet?

	Y near north pole	Y near south pole
A	attraction	attraction
B	attraction	repulsion
C	repulsion	attraction
D	repulsion	repulsion

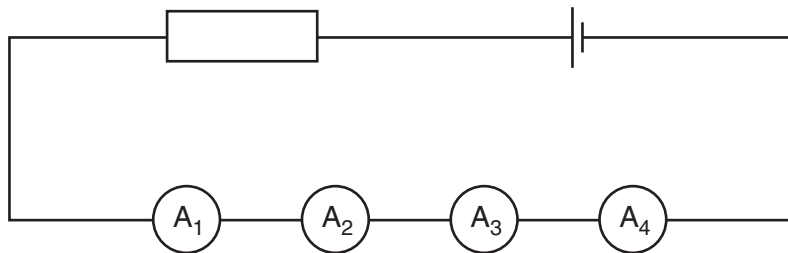
33 When the potential difference (p.d.) across a piece of resistance wire is changed, the current through the wire also changes.

The temperature of the wire is kept the same.

Which graph shows how the p.d. and current are related?



34 Two faulty ammeters and two perfect ammeters are connected in series in the circuit shown.



The readings on the ammeters are

A₁ 2.9 A

A₂ 3.1 A

A₃ 3.1 A

A₄ 3.3 A

Which two ammeters are faulty?

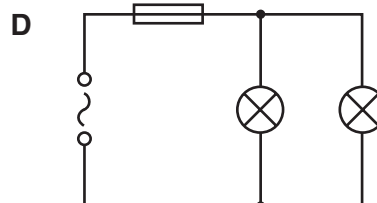
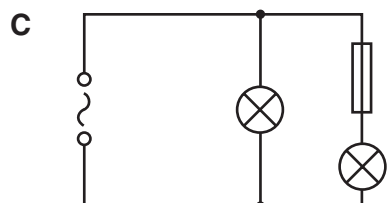
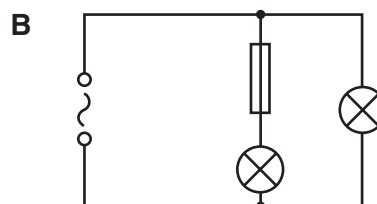
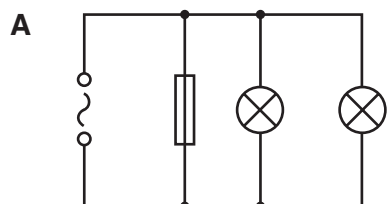
- A** A₁ and A₂ **B** A₁ and A₄ **C** A₂ and A₃ **D** A₃ and A₄

35 Which electrical component would not normally be found in a battery-operated torch (flashlight)?



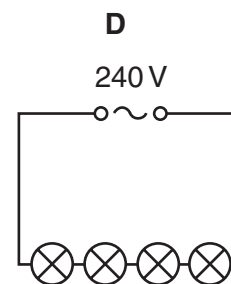
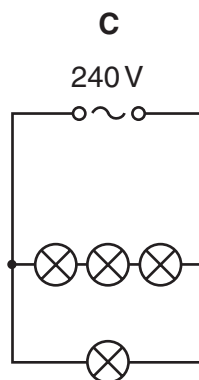
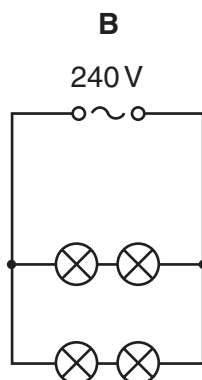
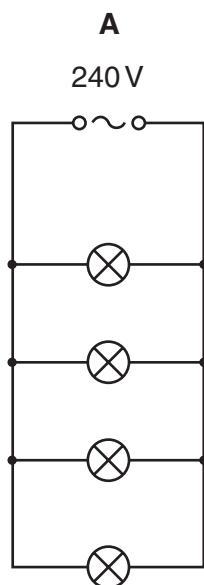
36 A student makes four circuits.

In which circuit are both lamps protected by the fuse?

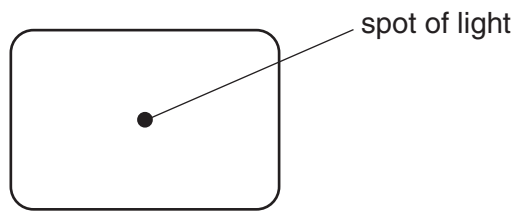


37 Four lamps are labelled '60 W 240 V'.

In which circuit are the lamps connected so that they all work at normal brightness?

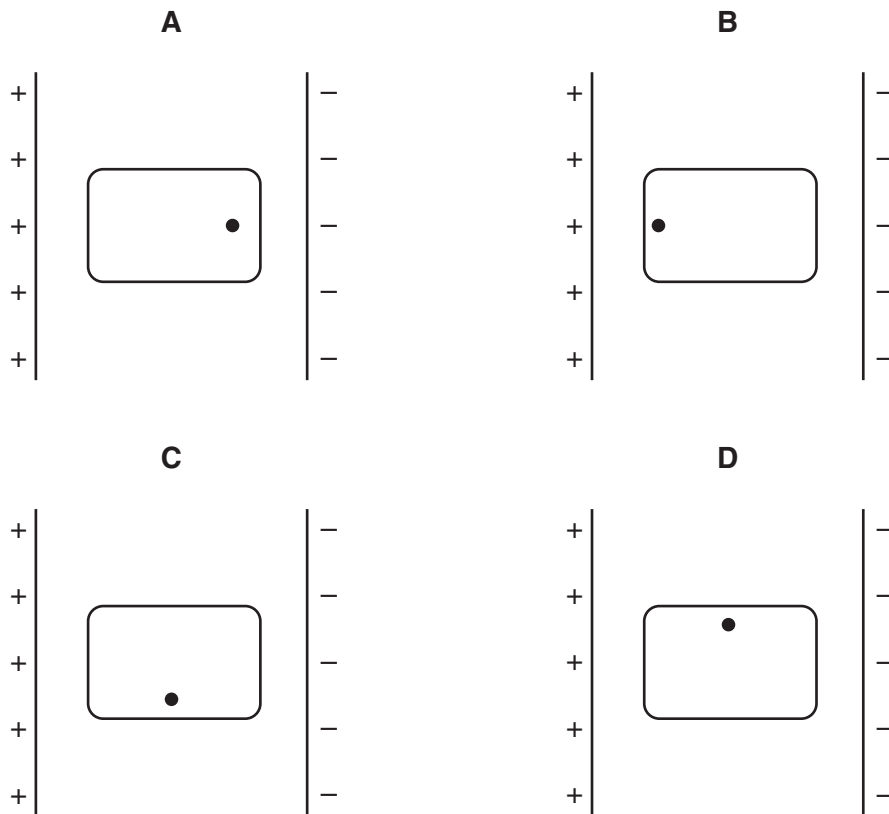


38 The diagram below shows the screen of a cathode-ray oscilloscope tube.



The tube is placed between a pair of charged plates.

Which diagram shows the new position of the spot?



39 Which type of radiation can be stopped by a sheet of paper?

- A α -particles
- B β -particles
- C γ -rays
- D X-rays

- 40 The half-life of a radioactive substance is 5 hours. A sample is tested and found to contain 0.48 g of the substance.

How much of the substance was present in the sample 20 hours before the sample was tested?

- A 0.03 g
- B 0.12 g
- C 1.92 g
- D 7.68 g

DATA SHEET
The Periodic Table of the Elements
Group

I	II	III	IV	V	VI	VII	O
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	59 Co Cobalt 27	64 Cu Copper 29	79 Se Selenium 34	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	103 Rh Rhodium 45	108 Ag Silver 47	128 Te Tellurium 52	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	192 Ir Iridium 77	197 Au Gold 79	209 Po Polonium 84	226 Ra Radium 88
227 Ac Actinium 89	227 Fr Francium 87	227 Fr Francium 87	227 Ac Actinium 89	227 Fr Francium 87	227 Ac Actinium 89	227 Fr Francium 87	227 Ac Actinium 89
		1 H Hydrogen 1					
		55 Mn Manganese 25					
		52 Cr Chromium 24					
		51 V Vanadium 23					
		48 Ti Titanium 22					
		93 Nb Niobium 41					
		96 Mo Molybdenum 42					
		101 Ru Ruthenium 44					
		106 Pd Palladium 46					
		112 Cd Cadmium 48					
		115 In Indium 49					
		119 Sn Tin 50					
		122 Sb Antimony 51					
		127 I Iodine 53					
		131 Xe Xenon 54					
		144 Nd Neodymium 60					
		141 Pr Praseodymium 59					
		140 Ce Cerium 58					
		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					
		238 U Uranium 92					
		91 Pa Protactinium 91					
		93 Np Neptunium 93					
		94 Pu Plutonium 94					
		95 Am Americium 95					
		96 Cm Curium 96					
		97 Bk Berkelium 97					
		98 Cf Californium 98					
		99 Es Einsteinium 99					
		100 Fm Fermium 100					
		101 Md Mendelevium 101					
		102 No Nobelium 102					
		103 Lr Lawrencium 103					

*58-71 Lanthanoid series
†90-103 Actinoid series

Key

a	X
b	b

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.).