

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICAL SCIENCE

0652/01

Paper 1 Multiple Choice

October/November 2004

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 16.

This document consists of **16** printed pages.




1 Which change of state is brought about by heating?


- A solid \rightarrow liquid
- B gas \rightarrow solid
- C gas \rightarrow liquid
- D liquid \rightarrow solid

2 Which diagram shows the process of diffusion?


A




B



C



D



key

○ } different atoms
● }

3 Fractional distillation can be used to separate the components in crude oil because the components have different

- A boiling points.
- B densities.
- C melting points.
- D volumes.

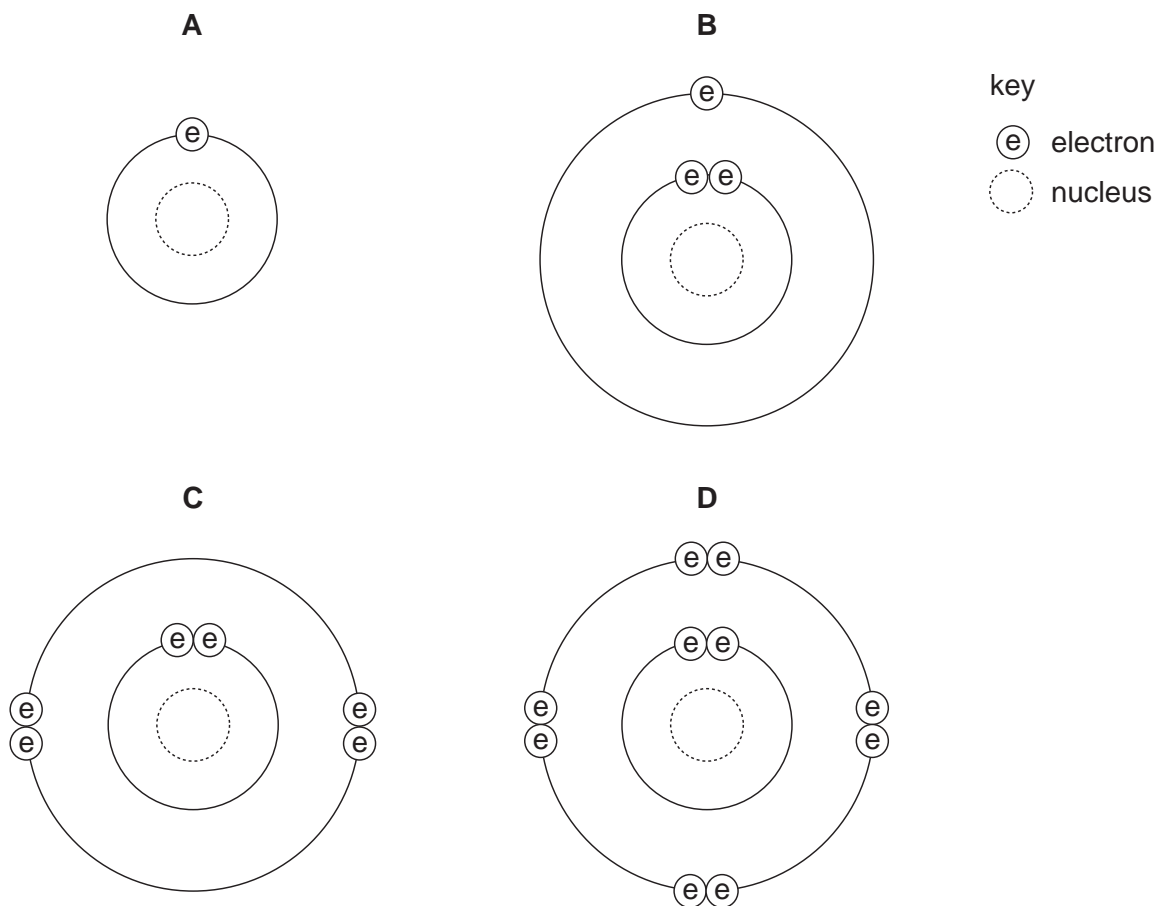
4 Propanone, a liquid covalent compound, is soluble in water.

Sodium chloride, a solid ionic compound, is also soluble in water.

Do these compounds conduct electricity when liquid and when in solution?

	propanone		sodium chloride	
	liquid	in solution	liquid	in solution
A	✓	x	x	✓
B	x	✓	x	✓
C	x	✓	✓	✓
D	x	x	✓	✓

5 Which diagram shows the electronic structure of a noble gas?



6 What are the charges on the calcium ion and the chloride ion in calcium chloride?

	calcium ion	chloride ion
A	+1	-1
B	+1	-2
C	+2	-1
D	-2	+1

7 The table shows the electronic structures of four atoms.

Which atom would form an ion with a negative charge?

	electronic structure
A	2, 8, 1
B	2, 8, 2
C	2, 8, 7
D	2, 8, 8

8 Which compound contains three different non-metallic elements?

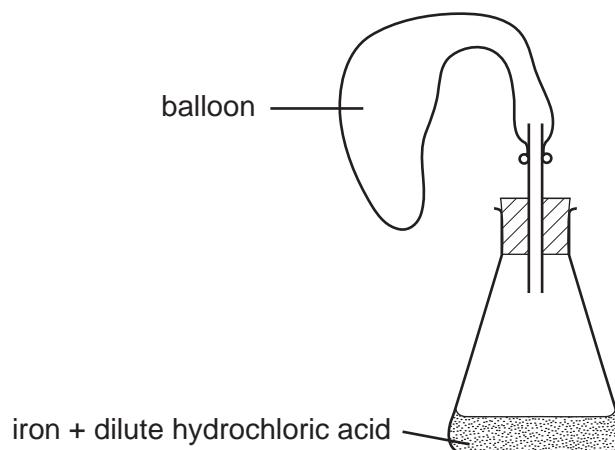
A C_2H_5Cl **B** $LiBH_4$ **C** SeO_2 **D** Si_2H_6

9 When drops of water are added to a sample of an anhydrous salt, a reaction occurs.

How can the reaction be reversed?

- A** cool the salt
- B** crystallise the salt
- C** filter the salt
- D** heat the salt

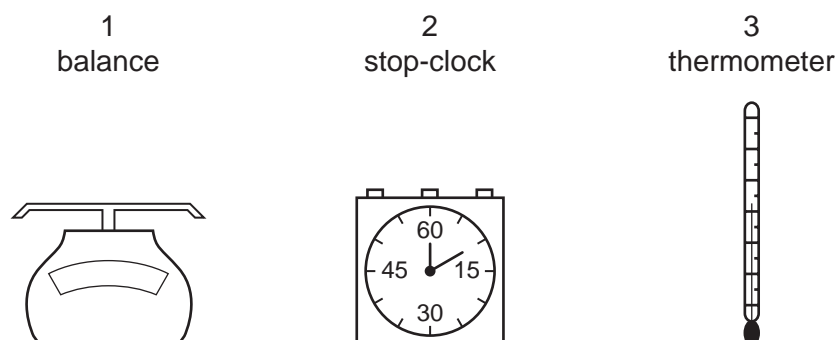
10 The diagram shows apparatus being used to fill a balloon with hydrogen.



Which form of iron makes the balloon fill most quickly?

- A a lump
- B pieces of wire
- C a powder
- D thin sheets

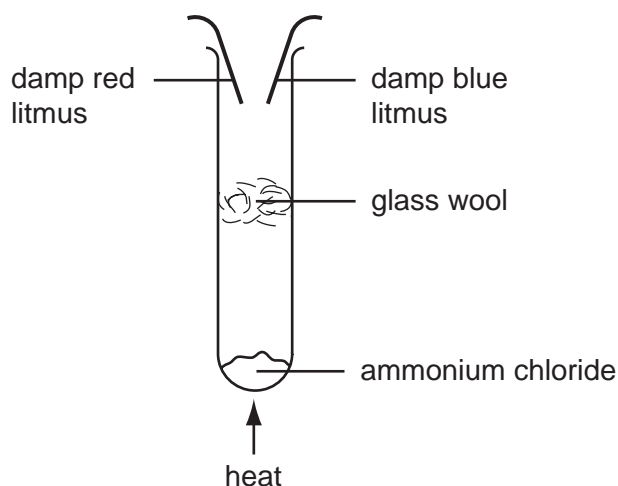
11 The diagrams show some pieces of laboratory equipment.



Which of these pieces of equipment are needed to find out whether dissolving salt in water is an endothermic process?

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

12 Ammonium chloride is heated as shown and two gases, **X** and **Y**, are formed.



Gas **X** turns the red litmus paper blue and then gas **Y** turns the blue litmus paper red.

What does this experiment show about gas **X**?

	X is	
A	ammonia	acidic
B	ammonia	basic
C	hydrogen chloride	acidic
D	hydrogen chloride	basic

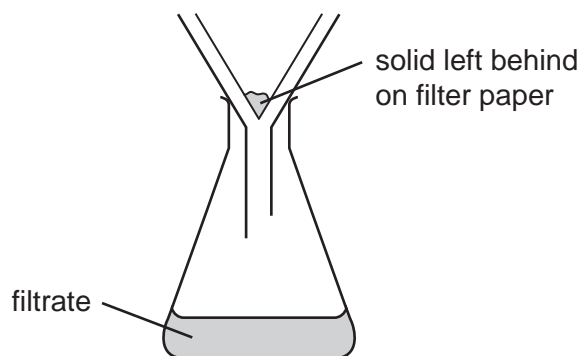
13 Samples of sodium oxide and sulphur dioxide are dissolved in water.

What could be the pH values of the solutions formed?

	sodium oxide	sulphur dioxide
A	5	5
B	5	10
C	10	5
D	10	10

- 14 An excess of powder **Y** is added to hot, dilute sulphuric acid.

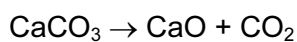
The excess of **Y** is then removed by filtering as shown.



The solid left behind on the filter paper and the filtrate are coloured.

What could **Y** be?

- A copper
 - B copper(II) oxide
 - C zinc
 - D zinc oxide
- 15 Limestone is used as the raw material in a lime kiln. The equation for the reaction occurring in the lime kiln is shown.



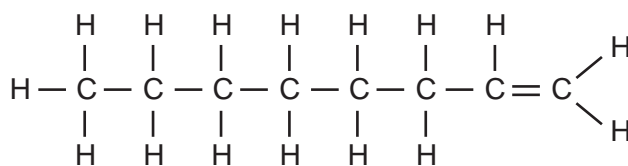
Which type of reaction is this?

- A decomposition
 - B neutralisation
 - C oxidation
 - D reduction
- 16 Two cooking pans, X and Y, are the same size and shape. X is made of aluminium and Y is made of iron.

Which pan, X or Y, is the heavier and which is more likely to rust?

	is heavier	more likely to rust
A	X	X
B	X	Y
C	Y	X
D	Y	Y

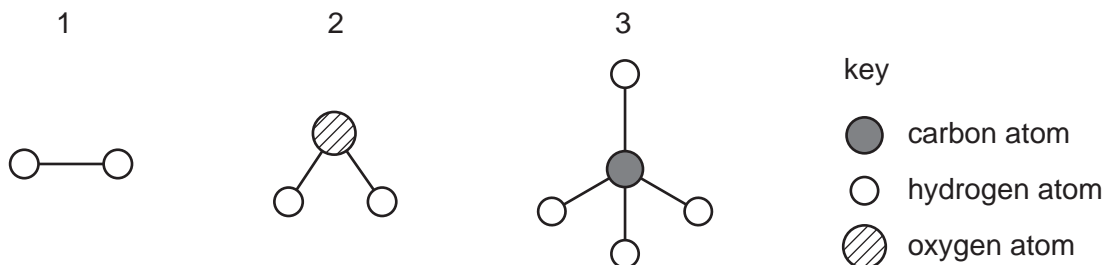
17 The structure of an organic compound is shown.



To which homologous series does this compound belong?

- A acids
- B alcohols
- C alkanes
- D alkenes

18 The diagrams show models of three molecules.



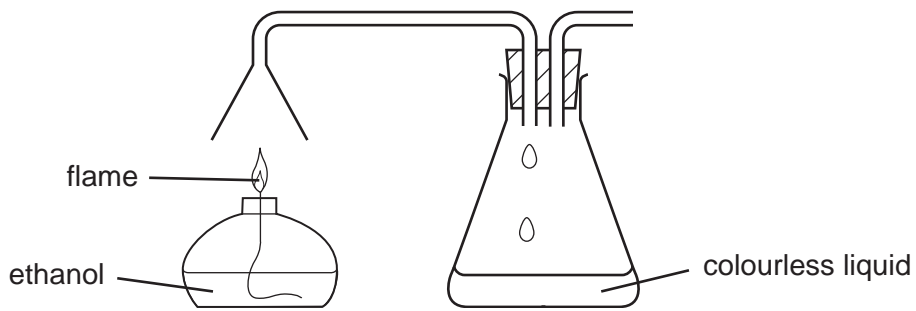
Which of these molecules is formed by the incomplete combustion of ethane?

	1	2	3
A	✓	✓	✓
B	✓	x	x
C	x	✓	x
D	x	x	✓

19 Which of acetylene, butane and charcoal are classified as hydrocarbon fuels?

	yes	no
A	acetylene, butane	charcoal
B	acetylene	butane, charcoal
C	butane, charcoal	acetylene
D	charcoal	acetylene, butane

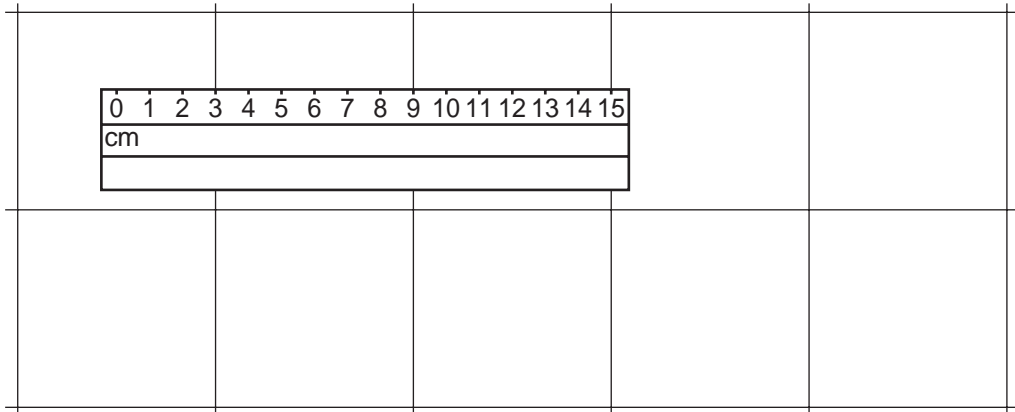
20 The combustion of ethanol can be investigated by using a simple burner.



What is the colourless liquid collected in the flask?

- A ethanoic acid
- B ethanol
- C ethene
- D water

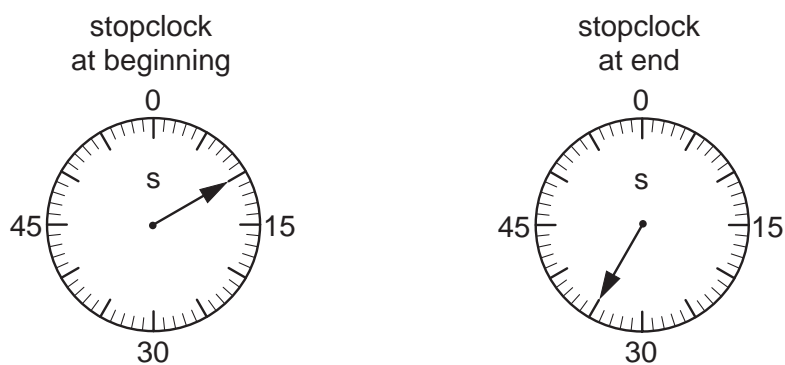
21 A floor is covered with square tiles. The diagram shows a ruler on the tiles.



How long is one tile?

- A 3 cm
- B 6 cm
- C 9 cm
- D 12 cm

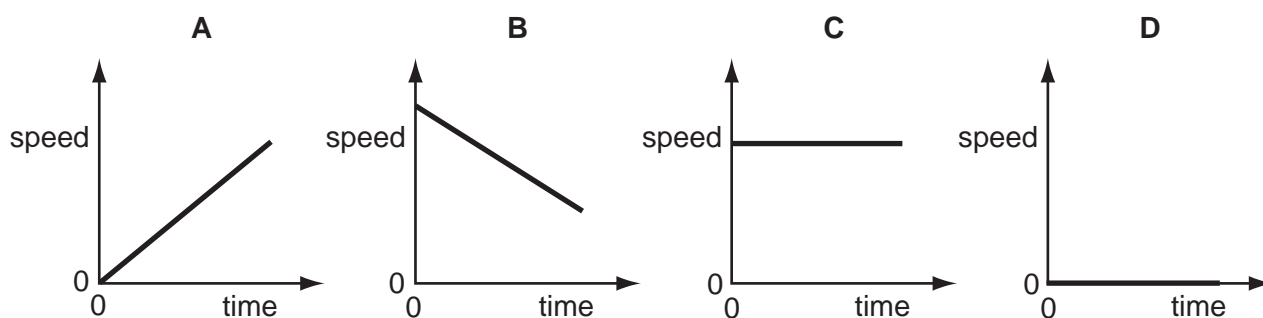
22 The diagrams show the times on a stopclock at the beginning and at the end of an experiment.



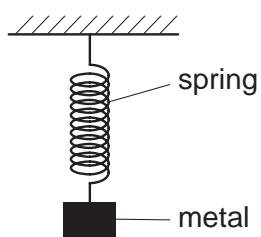
How long did the experiment take?

- A 10 s B 25 s C 35 s D 45 s

23 Which speed/time graph applies to an object at rest?



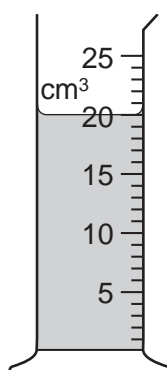
24 A spring is stretched by hanging a piece of metal from it.



What is the name given to the force that stretches the spring?

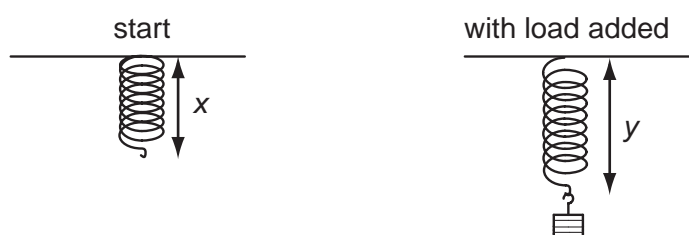
- A friction
B mass
C power
D weight

- 25 The diagram shows some liquid in a measuring cylinder. The mass of the liquid is 16g.



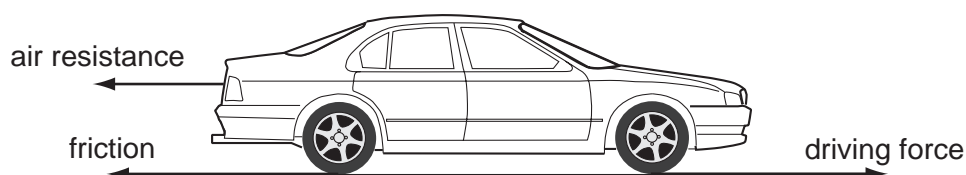
What is the density of the liquid?

- A 320g/cm³ B 36g/cm³ C 1.25g/cm³ D 0.8g/cm³
- 26 A student carries out an experiment to plot an extension / load graph for a spring. The diagrams show the apparatus at the start of the experiment and with a load added.



What is the extension caused by the load?

- A x B y C $y + x$ D $y - x$
- 27 Three horizontal forces act on a car that is moving along a straight, level road.



Which combination of forces would result in the car moving at constant speed?

	air resistance	friction	driving force
A	200 N	1000 N	800 N
B	800 N	1000 N	200 N
C	800 N	200 N	1000 N
D	1000 N	200 N	800 N

28 A child pushes a toy car along a level floor and then lets it go.

As the car slows down, what is the main energy change?

- A from chemical to heat
- B from chemical to kinetic
- C from kinetic to gravitational (potential)
- D from kinetic to heat

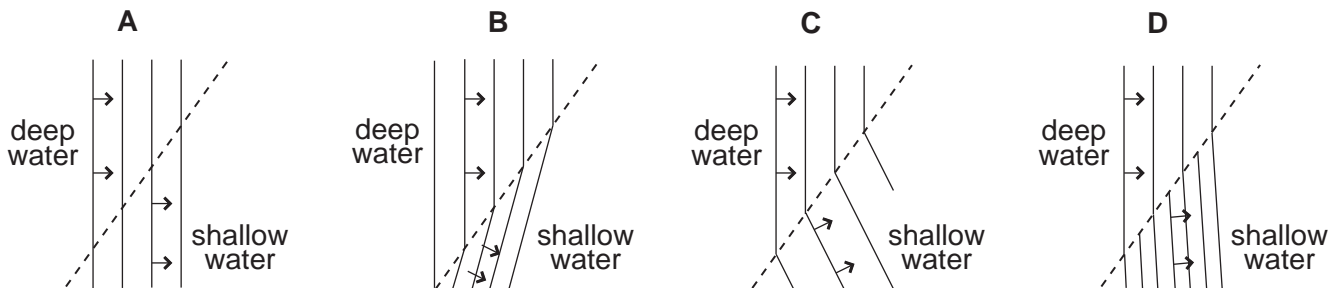
29 A beaker of water is heated at its base.

Why does the water at the base rise?

- A It contracts and becomes less dense.
- B It contracts and becomes more dense.
- C It expands and becomes less dense.
- D It expands and becomes more dense.

30 Waves move from deep water to shallow water where they are slower.

Which diagram shows what happens to the waves?



31 Which type of radiation lies between visible light and microwaves in the electromagnetic spectrum?

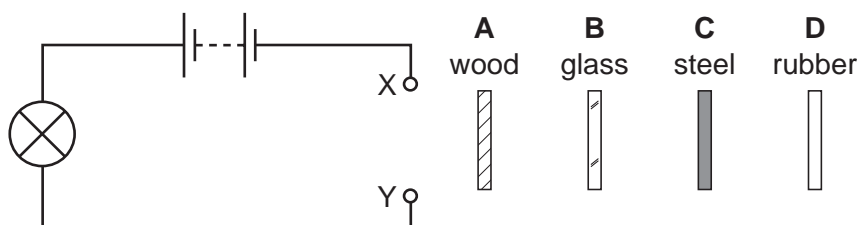
- A infra-red
- B radio waves
- C ultra-violet
- D X-rays

- 32 The diagram shows the image of a clockface in a plane mirror.



Which of these times is shown?

- A 02.25 B 02.35 C 09.25 D 09.35
- 33 What is the approximate range of audible frequencies for most humans?
- A 10 Hz to 10 000 Hz
 B 20 Hz to 20 000 Hz
 C 10 kHz to 10 000 kHz
 D 20 kHz to 20 000 kHz
- 34 A circuit is set up with a gap between two terminals X and Y. The four strips of material shown in the diagram are connected in turn across the gap.



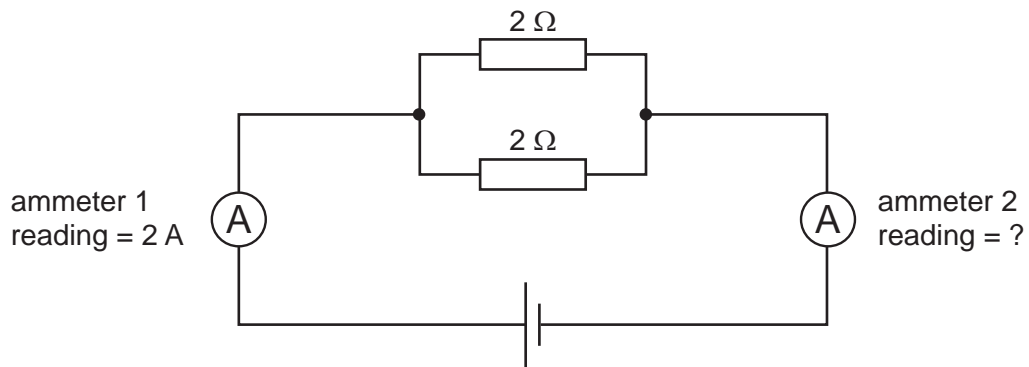
Which strip completes the circuit so that the lamp lights?

- 35 A pupil measures the potential difference across a device and the current in it.

Which calculation gives the resistance of the device?

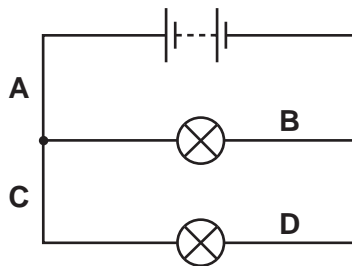
- A current + potential difference
 B current ÷ potential difference
 C potential difference ÷ current
 D potential difference x current

- 36 In the circuit shown, the reading on ammeter 1 is 2 A.



What is the reading on ammeter 2?

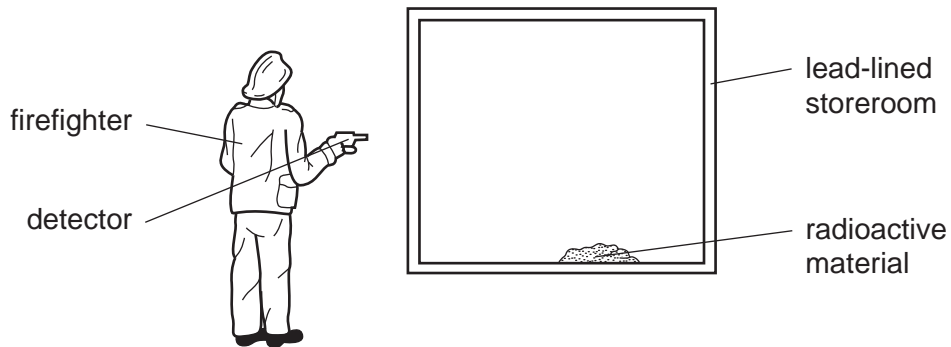
- A 0 A B 1 A C 2 A D 4 A
- 37 In which position in the circuit shown should a switch be placed so that both lamps can be switched on or off at the same time?



- 38 Which particles are emitted during thermionic emission?

- A electrons
 B ions
 C neutrons
 D protons

- 39 During a fire in a laboratory storeroom, some radioactive material was spilled. A firefighter detected radiation through the lead-lined walls of the storeroom. The radiation was emitted by the radioactive material.



Which type of radiation was being detected?

- A alpha-particles
 - B beta-particles
 - C gamma-rays
 - D X-rays
- 40 How many neutrons are in a nucleus of ${}^{14}_6\text{C}$?
- A 0 B 6 C 8 D 14

DATA SHEET
The Periodic Table of the Elements

		Group										
I	II	III	IV	V	VI	VII	0					
7 Li Lithium 3	9 Be Beryllium 4	1 H Hydrogen 1	11 B Boron 5	12 C Carbon 6	13 Al Aluminium 13	14 N Nitrogen 7	15 O Oxygen 8	16 F Fluorine 9	17 Ne Neon 10	18 Ar Argon 18	19 Cl Chlorine 17	20 He Helium 2
23 Na Sodium 11	24 Mg Magnesium 12	27 Fe Iron 26	28 Ni Nickel 28	29 Cu Copper 29	30 Zn Zinc 30	31 Ga Gallium 31	32 Ge Germanium 32	33 As Arsenic 33	34 Se Selenium 34	35 Br Bromine 35	36 Kr Krypton 36	37 Rb Rubidium 37
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
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Ru Ruthenium 44	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	190 Os Osmium 76	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83
226 Ra Radium 88	227 Ac Actinium 89	140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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
		232 Th Thorium 90	238 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100
		175 Lu Lutetium 71	173 Yb Ytterbium 70	173 Lu Lutetium 71	175 Lu Lutetium 71	175 Lu Lutetium 71	175 Lu Lutetium 71	175 Lu Lutetium 71	175 Lu Lutetium 71	175 Lu Lutetium 71	175 Lu Lutetium 71	175 Lu Lutetium 71
		103 Lr Lawrencium 103	102 No Nobelium 102	102 No Nobelium 102	103 Lr Lawrencium 103	103 Lr Lawrencium 103	103 Lr Lawrencium 103	103 Lr Lawrencium 103	103 Lr Lawrencium 103	103 Lr Lawrencium 103	103 Lr Lawrencium 103	103 Lr Lawrencium 103

*58-71 Lanthanoid series
90-103 Actinoid series

Key

a	X	a = relative atomic mass
b	X	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.).