

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.

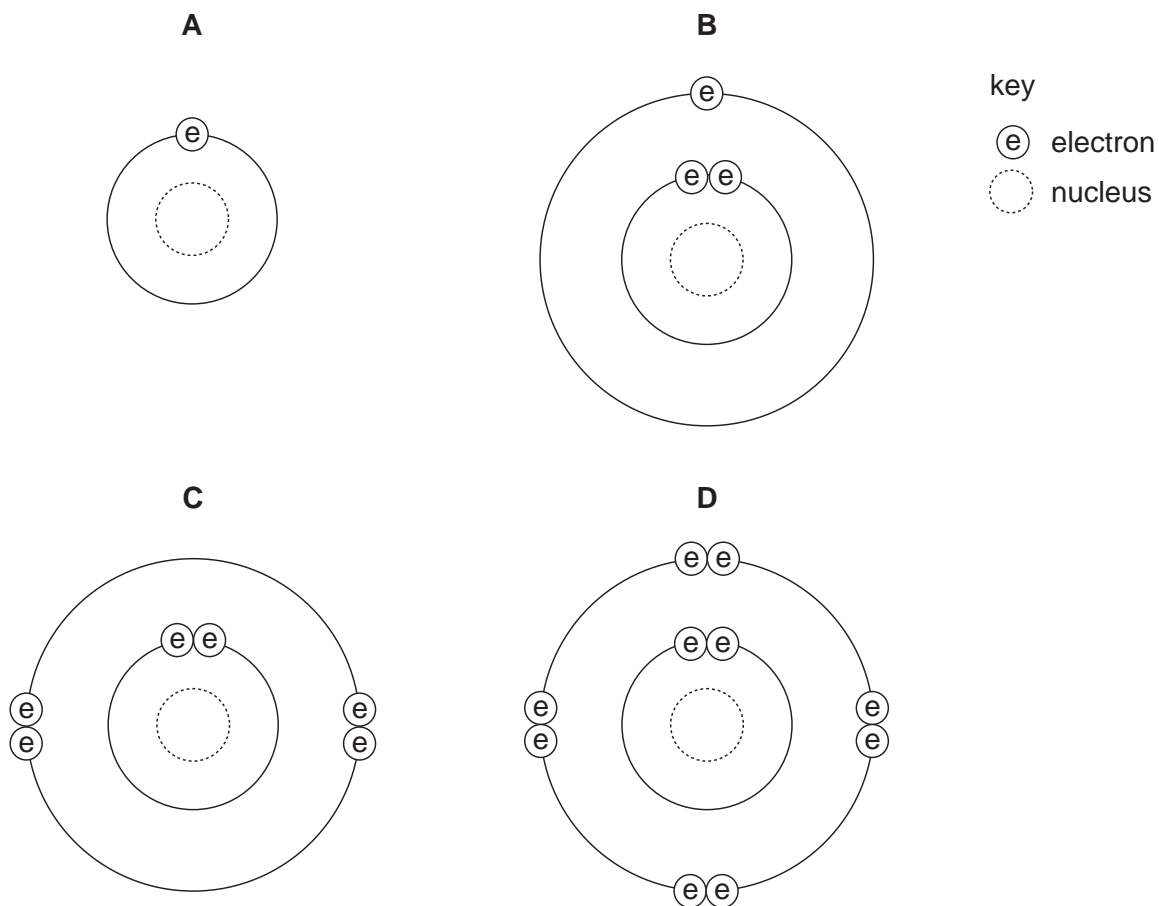
4 Propanone, a liquid covalent compound, is soluble in water.

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
<b>A</b>	✓	x	x	✓
<b>B</b>	x	✓	x	✓
<b>C</b>	x	✓	✓	✓
<b>D</b>	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
<b>A</b>	+1	-1
<b>B</b>	+1	-2
<b>C</b>	+2	-1
<b>D</b>	-2	+1

7 The table shows the electronic structures of four atoms.

Which atom would form an ion with a negative charge?

	electronic structure
<b>A</b>	2, 8, 1
<b>B</b>	2, 8, 2
<b>C</b>	2, 8, 7
<b>D</b>	2, 8, 8

8 Which compound contains three different non-metallic elements?

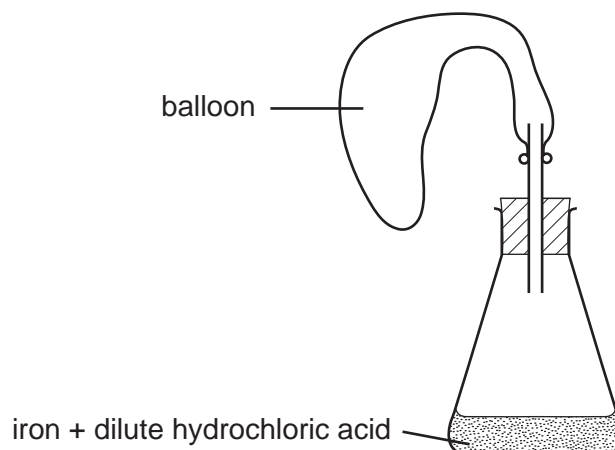
**A**  $C_2H_5Cl$       **B**  $LiBH_4$       **C**  $SeO_2$       **D**  $Si_2H_6$

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

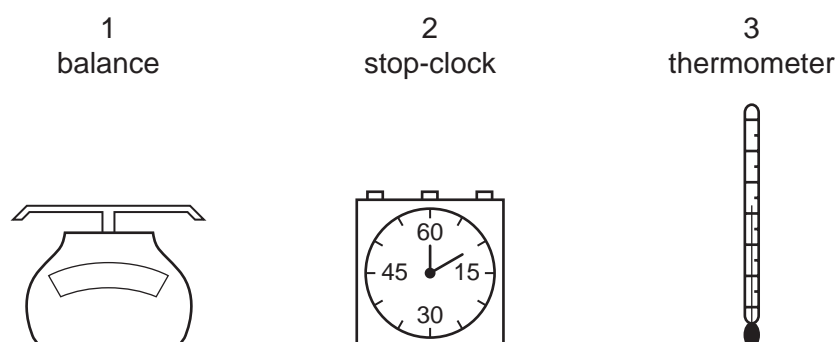
10 The diagram shows apparatus being used to fill a balloon with hydrogen.



Which form of iron makes the balloon fill most quickly?

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

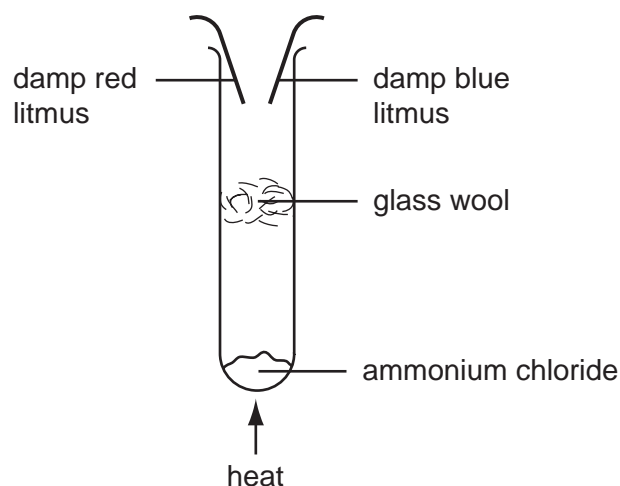
11 The diagrams show some pieces of laboratory equipment.



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**?

	<b>X</b> is	
<b>A</b>	ammonia	acidic
<b>B</b>	ammonia	basic
<b>C</b>	hydrogen chloride	acidic
<b>D</b>	hydrogen chloride	basic

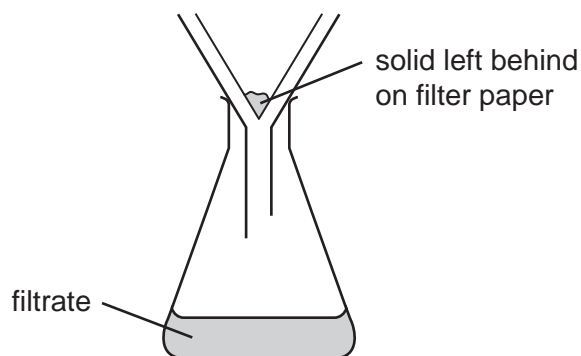
13 Samples of sodium oxide and sulphur dioxide are dissolved in water.

What could be the pH values of the solutions formed?

	sodium oxide	sulphur dioxide
<b>A</b>	5	5
<b>B</b>	5	10
<b>C</b>	10	5
<b>D</b>	10	10

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

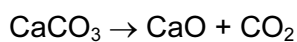
The excess of **Y** is then removed by filtering as shown.



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.



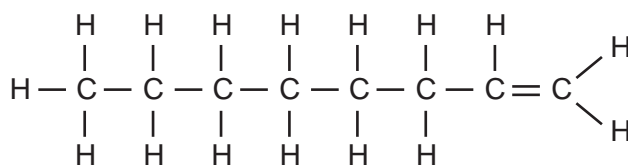
Which type of reaction is this?

- 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
<b>A</b>	X	X
<b>B</b>	X	Y
<b>C</b>	Y	X
<b>D</b>	Y	Y

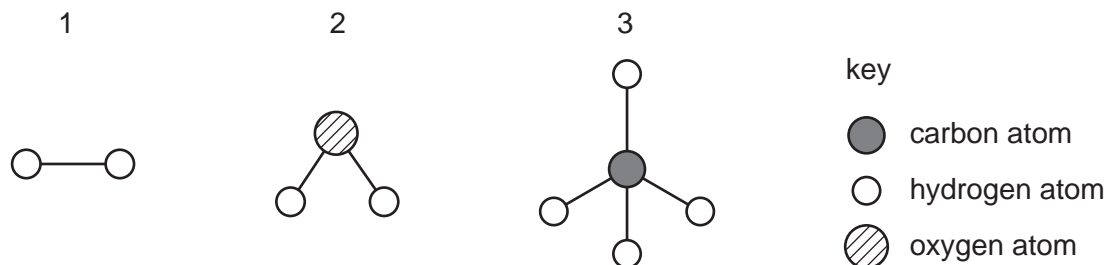
17 The structure of an organic compound is shown.



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?

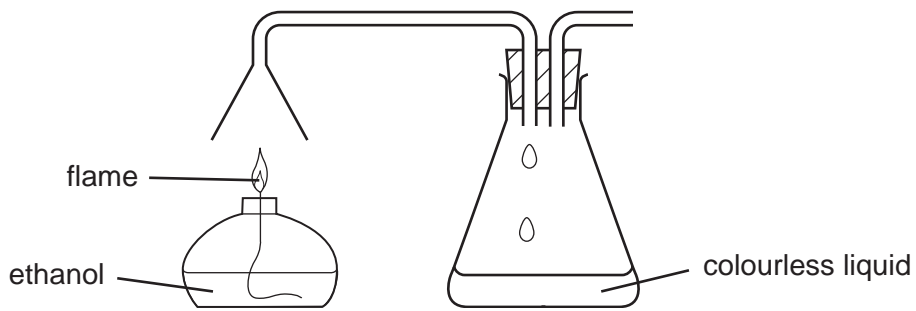
	1	2	3
<b>A</b>	✓	✓	✓
<b>B</b>	✓	x	x
<b>C</b>	x	✓	x
<b>D</b>	x	x	✓

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

	yes	no
<b>A</b>	acetylene, butane	charcoal
<b>B</b>	acetylene	butane, charcoal
<b>C</b>	butane, charcoal	acetylene
<b>D</b>	charcoal	acetylene, butane



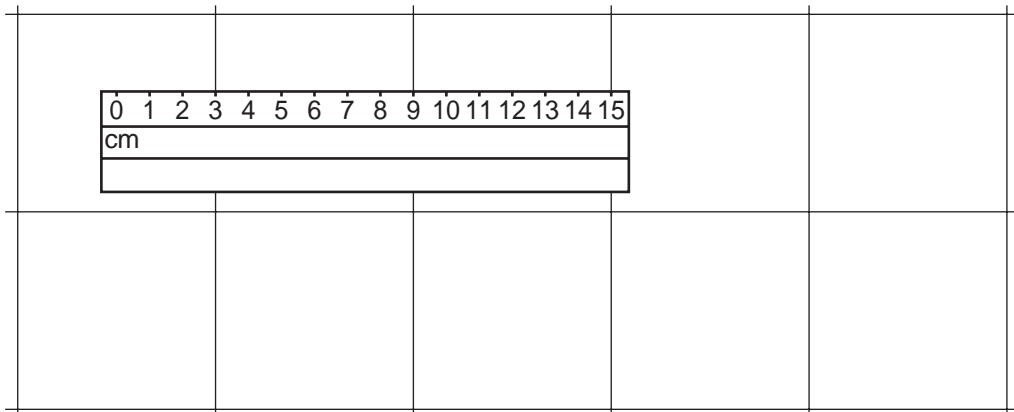
20 The combustion of ethanol can be investigated by using a simple burner.



What is the colourless liquid collected in the flask?

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

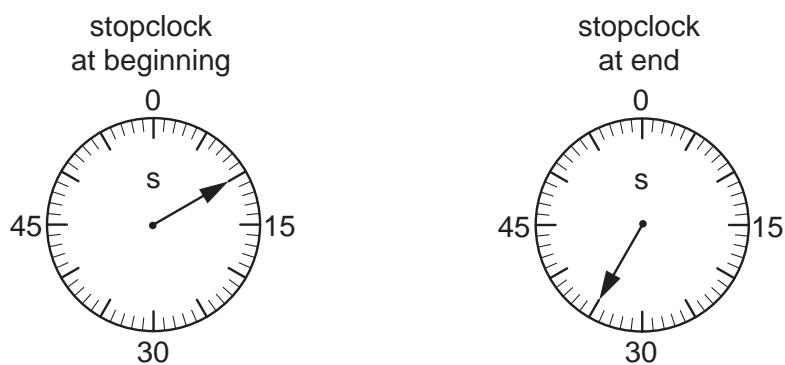
21 A floor is covered with square tiles. The diagram shows a ruler on the tiles.



How long is one tile?

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

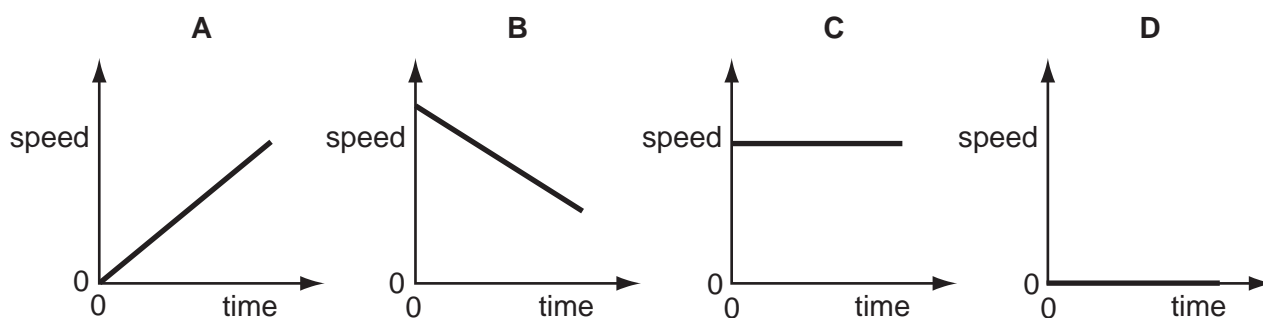
22 The diagrams show the times on a stopclock at the beginning and at the end of an experiment.



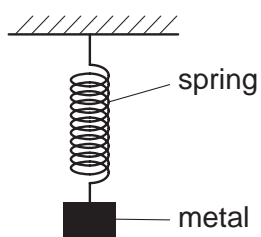
How long did the experiment take?

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

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



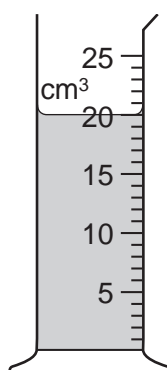
24 A spring is stretched by hanging a piece of metal from it.



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

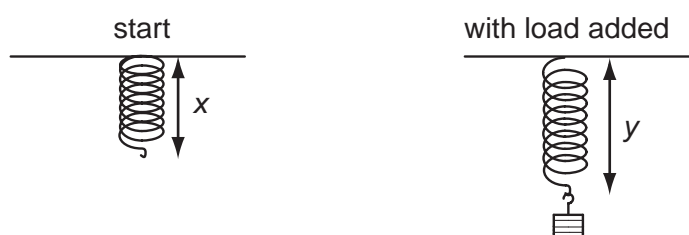
- A friction  
B mass  
C power  
D weight

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



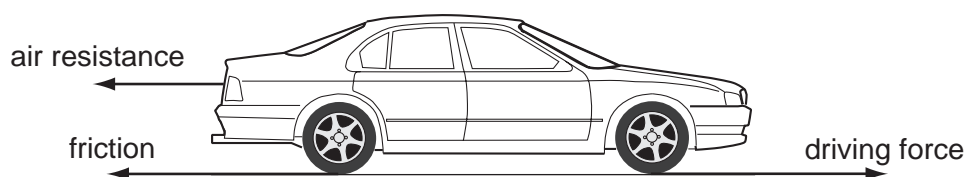
What is the density of the liquid?

- A 320g/cm<sup>3</sup>    B 36g/cm<sup>3</sup>    C 1.25g/cm<sup>3</sup>    D 0.8g/cm<sup>3</sup>
- 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
<b>A</b>	200 N	1000 N	800 N
<b>B</b>	800 N	1000 N	200 N
<b>C</b>	800 N	200 N	1000 N
<b>D</b>	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

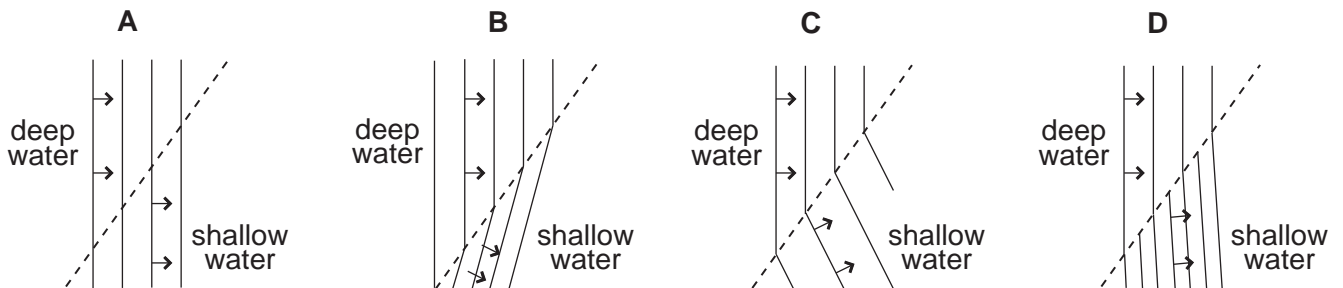
29 A beaker of water is heated at its base.

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?

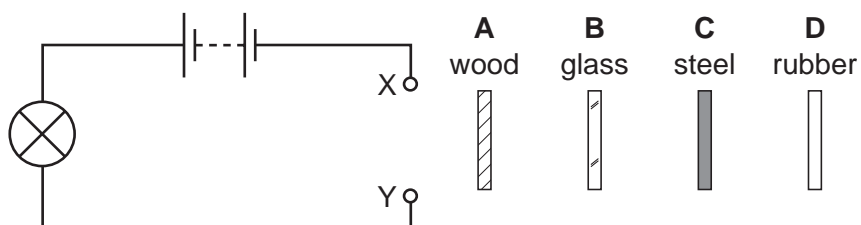
- A infra-red
- B radio waves
- C ultra-violet
- D X-rays

- 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.



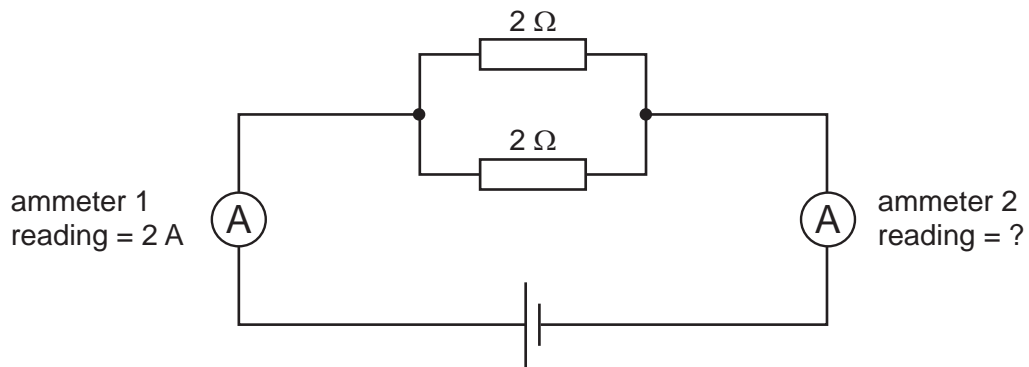
Which strip completes the circuit so that the lamp lights?

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

Which calculation gives the resistance of the device?

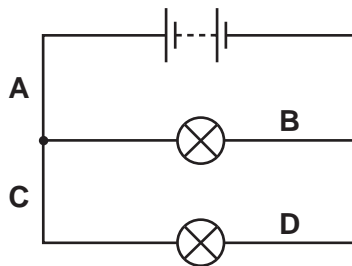
- A current + potential difference  
 B current ÷ potential difference  
 C potential difference ÷ current  
 D potential difference x current

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



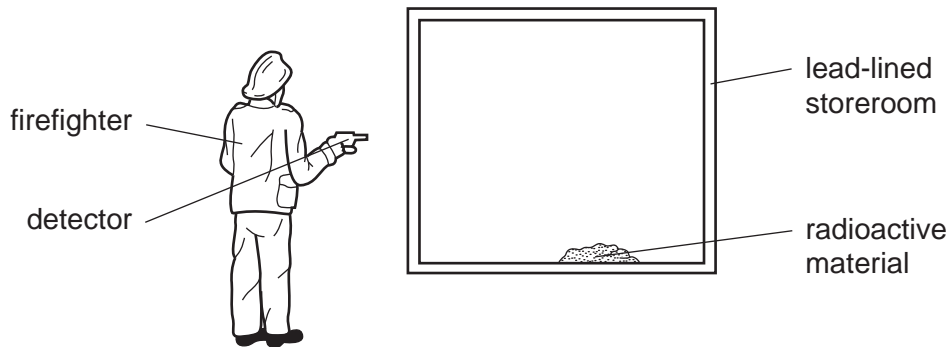
What is the reading on ammeter 2?

- 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	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII																																																											
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4	1 <b>H</b> Hydrogen 1	11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	13 <b>Al</b> Aluminium 13	14 <b>N</b> Nitrogen 7	15 <b>O</b> Oxygen 8	16 <b>F</b> Fluorine 9	17 <b>Ne</b> Neon 10	19 <b>Ar</b> Argon 18	20 <b>Kr</b> Krypton 36	21 <b>Xe</b> Xenon 54	22 <b>Rn</b> Radon 86	23 <b>Fr</b> Francium 87	24 <b>Ra</b> Radium 88	25 <b>Ac</b> Actinium 89	26 <b>Lu</b> Lutetium 71	27 <b>Lr</b> Lawrencium 103																																																										
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	29 <b>P</b> Phosphorus 15	30 <b>S</b> Sulphur 16	31 <b>Cl</b> Chlorine 17	32 <b>Ar</b> Argon 18	35 <b>K</b> Potassium 19	36 <b>Ca</b> Calcium 20	37 <b>Sc</b> Scandium 21	38 <b>Ti</b> Titanium 22	39 <b>V</b> Vanadium 23	40 <b>Cr</b> Chromium 24	41 <b>Mn</b> Manganese 25	42 <b>Fe</b> Iron 26	43 <b>Ni</b> Nickel 28	44 <b>Cu</b> Copper 29	45 <b>Zn</b> Zinc 30	46 <b>Ga</b> Gallium 31	47 <b>Ge</b> Germanium 32	48 <b>As</b> Arsenic 33	49 <b>Se</b> Selenium 34	50 <b>Br</b> Bromine 35	51 <b>Kr</b> Krypton 36	52 <b>Rb</b> Rubidium 37	53 <b>Sr</b> Strontium 38	54 <b>Y</b> Yttrium 39	55 <b>Zr</b> Zirconium 40	56 <b>Nb</b> Niobium 41	57 <b>Mo</b> Molybdenum 42	58 <b>Tc</b> Technetium 43	59 <b>Ru</b> Ruthenium 44	60 <b>Rh</b> Rhodium 45	61 <b>Pd</b> Palladium 46	62 <b>Ag</b> Silver 47	63 <b>Cd</b> Cadmium 48	64 <b>In</b> Indium 49	65 <b>Sn</b> Tin 50	66 <b>Sb</b> Antimony 51	67 <b>Te</b> Tellurium 52	68 <b>I</b> Iodine 53	69 <b>Xe</b> Xenon 54	70 <b>Cs</b> Caesium 55	71 <b>Ba</b> Barium 56	72 <b>La</b> Lanthanum 57	73 <b>Ce</b> Cerium 58	74 <b>Pr</b> Praseodymium 59	75 <b>Nd</b> Neodymium 60	76 <b>Pm</b> Promethium 61	77 <b>Sm</b> Samarium 62	78 <b>Eu</b> Europium 63	79 <b>Gd</b> Gadolinium 64	80 <b>Tb</b> Terbium 65	81 <b>Dy</b> Dysprosium 66	82 <b>Ho</b> Holmium 67	83 <b>Er</b> Erbium 68	84 <b>Tm</b> Thulium 69	85 <b>Yb</b> Ytterbium 70	86 <b>Lu</b> Lutetium 71	87 <b>Fr</b> Francium 87	88 <b>Ra</b> Radium 88	89 <b>Ac</b> Actinium 89	90 <b>Th</b> Thorium 90	91 <b>Pa</b> Protactinium 91	92 <b>U</b> Uranium 92	93 <b>Np</b> Neptunium 93	94 <b>Pu</b> Plutonium 94	95 <b>Am</b> Americium 95	96 <b>Cm</b> Curium 96	97 <b>Bk</b> Berkelium 97	98 <b>Cf</b> Californium 98	99 <b>Es</b> Einsteinium 99	100 <b>Fm</b> Fermium 100	101 <b>Md</b> Mendelevium 101	102 <b>No</b> Nobelium 102	103 <b>Lr</b> Lawrencium 103

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

a	<b>X</b>	b
a = relative atomic mass	X = atomic symbol	b = proton (atomic) number

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