

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.

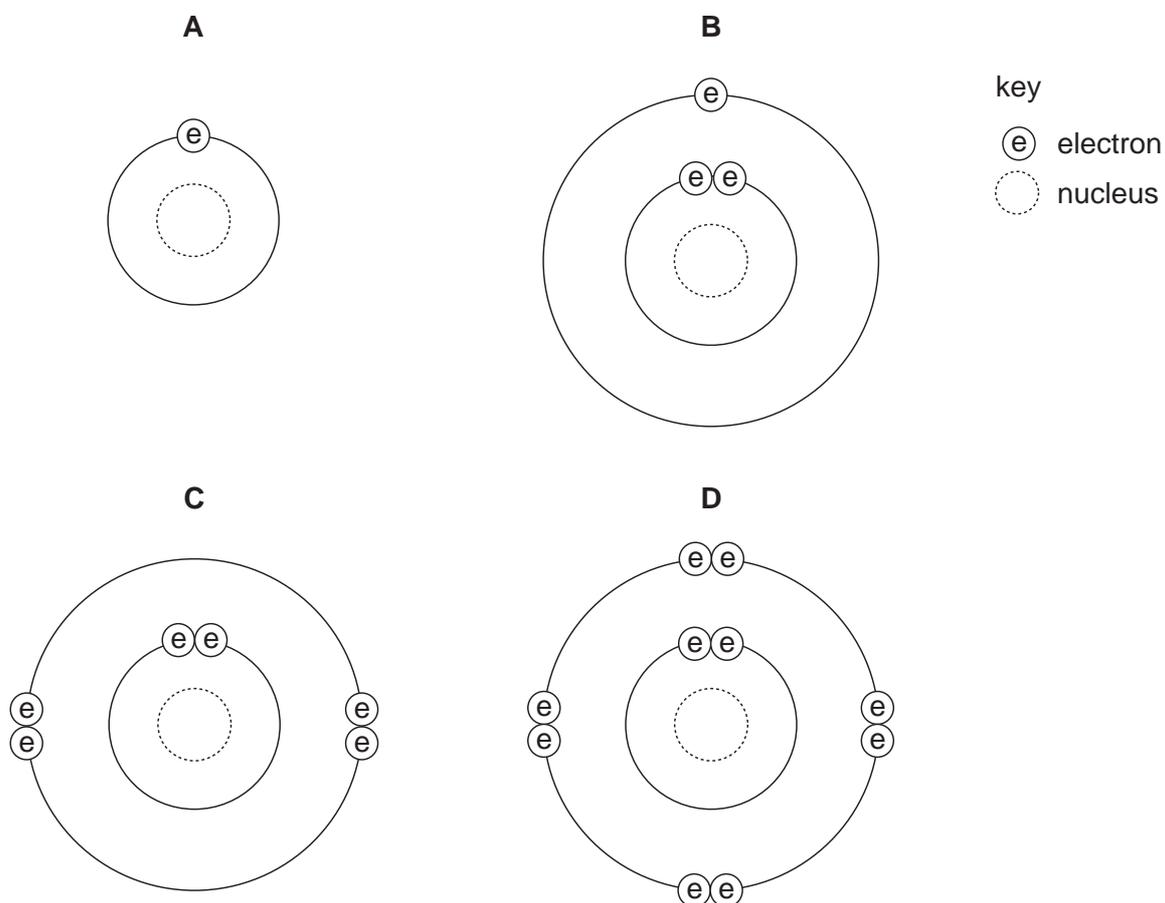
4 Propanone, a liquid covalent compound, is soluble in water.

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?

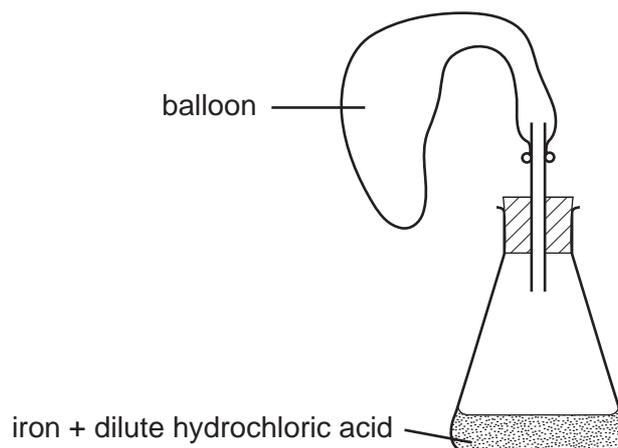
**A**  $C_2H_5Cl$       **B**  $LiBH_4$       **C**  $SeO_2$       **D**  $Si_2H_6$

- 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

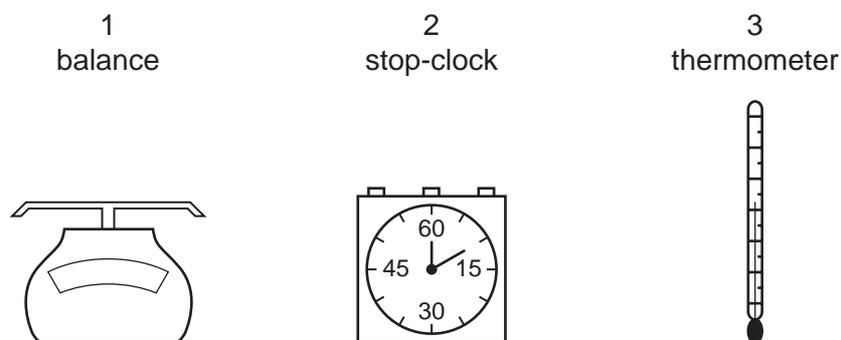
10 The diagram shows apparatus being used to fill a balloon with hydrogen.



Which form of iron makes the balloon fill most quickly?

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

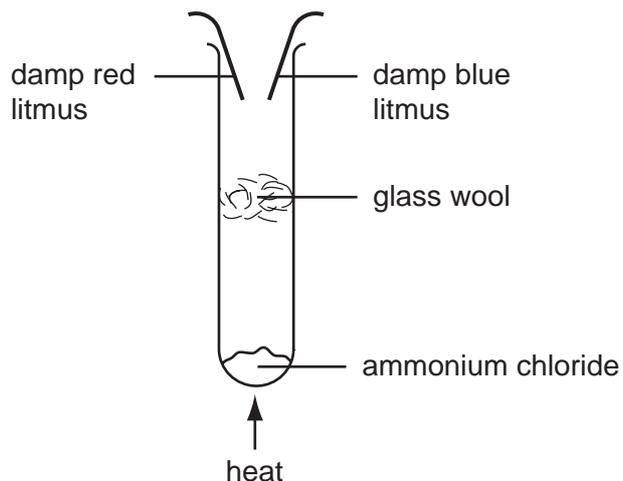
11 The diagrams show some pieces of laboratory equipment.



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

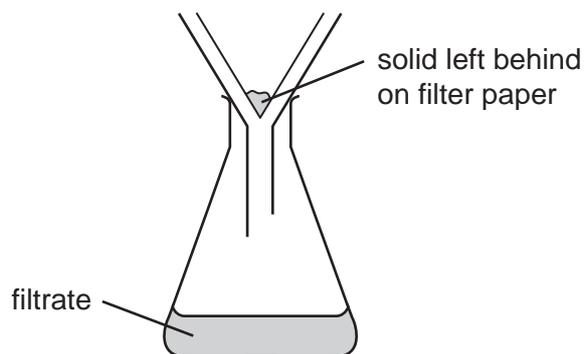
13 Samples of sodium oxide and sulphur dioxide are dissolved in water.

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.



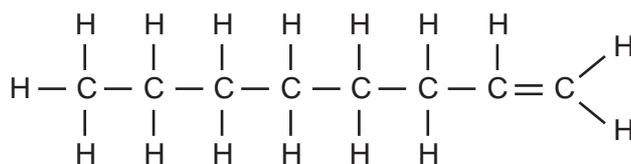
Which type of reaction is this?

- 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

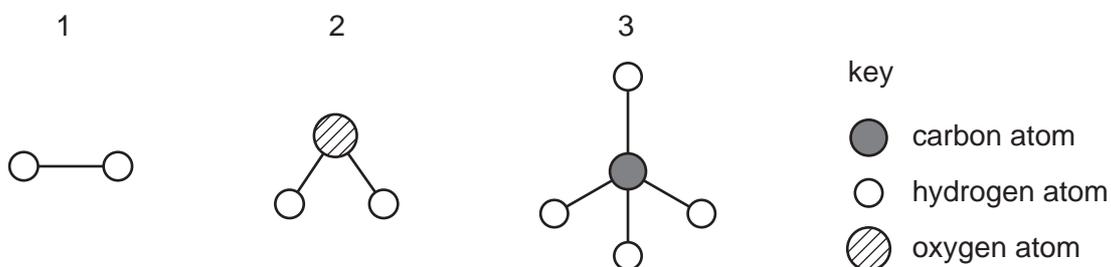
17 The structure of an organic compound is shown.



To which homologous series does this compound belong?

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

18 The diagrams show models of three molecules.



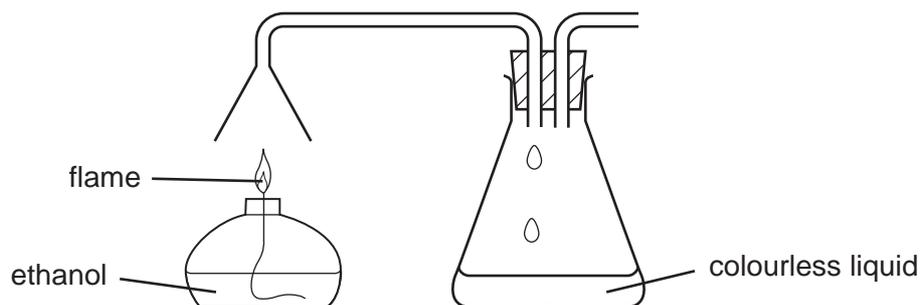
Which of these molecules is formed by the incomplete combustion of ethane?

	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

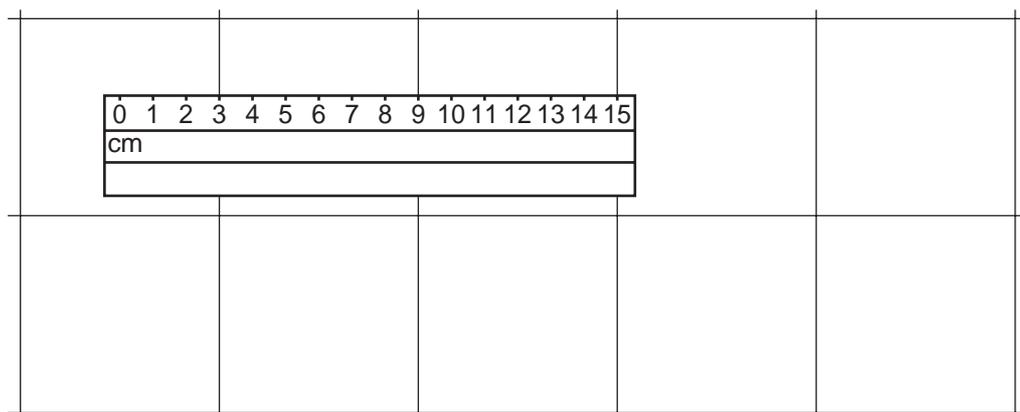
20 The combustion of ethanol can be investigated by using a simple burner.



What is the colourless liquid collected in the flask?

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

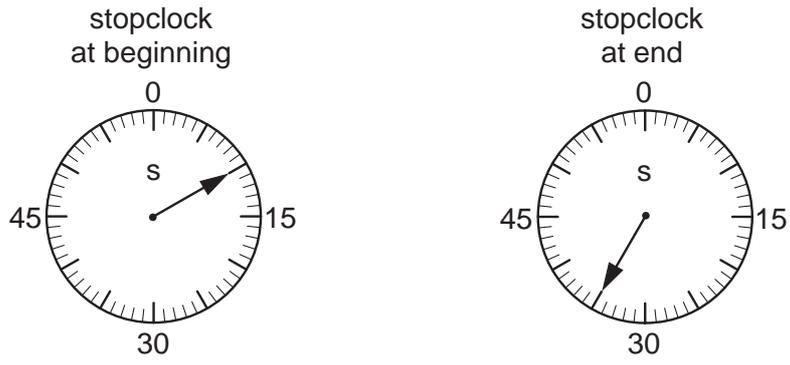
21 A floor is covered with square tiles. The diagram shows a ruler on the tiles.



How long is one tile?

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

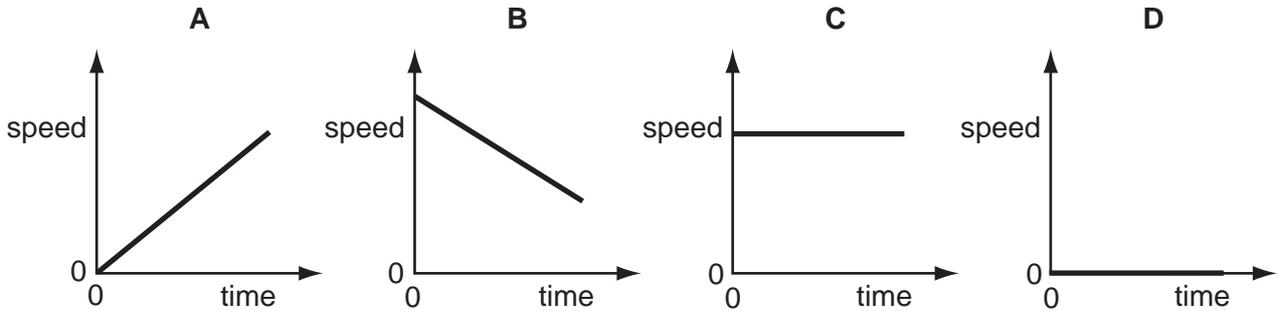
22 The diagrams show the times on a stopclock at the beginning and at the end of an experiment.



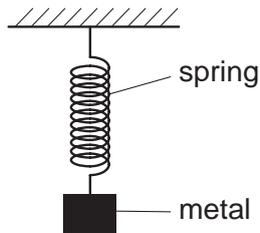
How long did the experiment take?

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

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



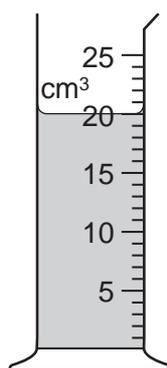
24 A spring is stretched by hanging a piece of metal from it.



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

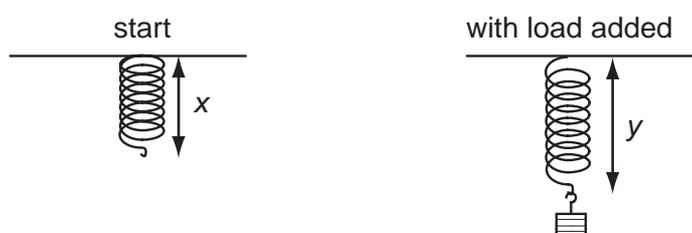
- A friction
- B mass
- C power
- D weight

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



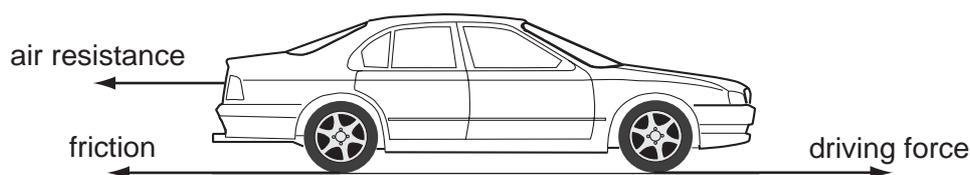
What is the density of the liquid?

- A 320 g/cm<sup>3</sup>    B 36 g/cm<sup>3</sup>    C 1.25 g/cm<sup>3</sup>    D 0.8 g/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

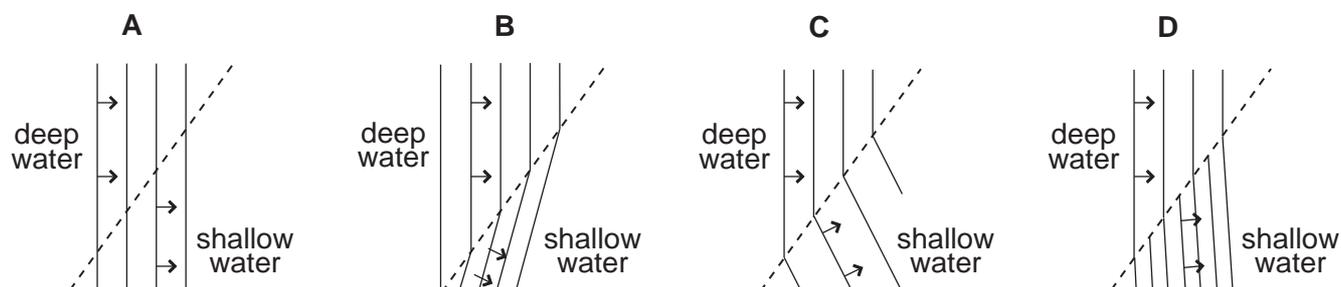
29 A beaker of water is heated at its base.

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.

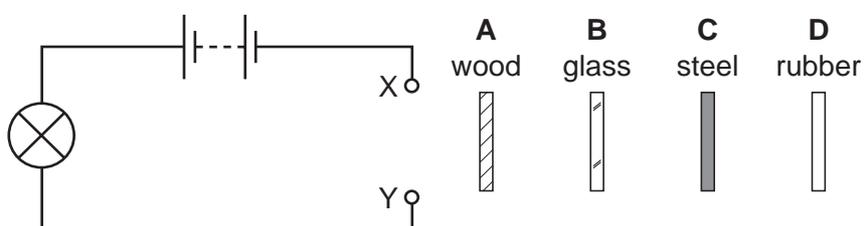


Which of these times is shown?

- 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?

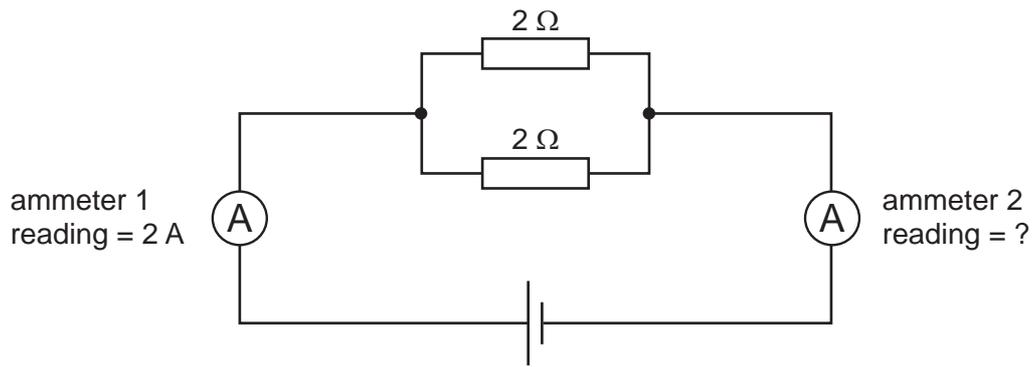


- 35 A pupil measures the potential difference across a device and the current in it.

Which calculation gives the resistance of the device?

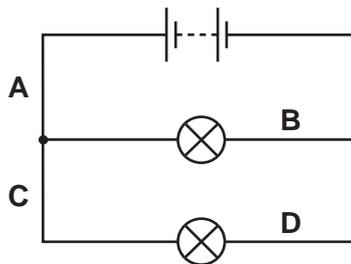
- A current + potential difference  
 B current  $\div$  potential difference  
 C potential difference  $\div$  current  
 D potential difference  $\times$  current

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



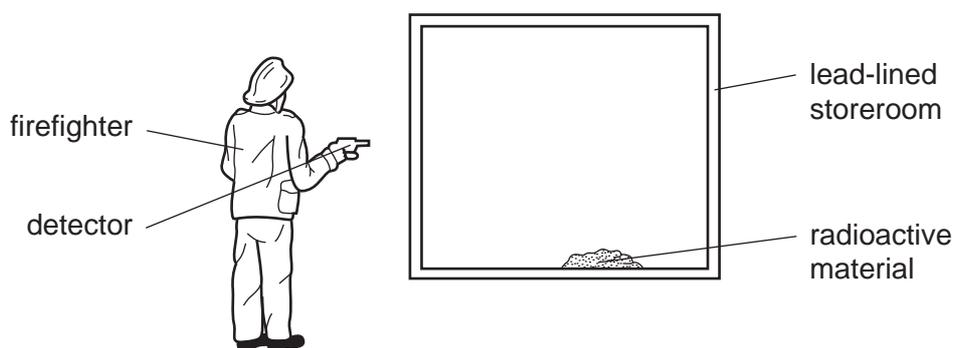
What is the reading on ammeter 2?

- 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 from the spilled 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 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4	1 <b>H</b> Hydrogen 1	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10	11 <b>B</b> Boron 5	13 <b>Al</b> Aluminium 13	15 <b>P</b> Phosphorus 15	17 <b>Cl</b> Chlorine 17	4 <b>He</b> Helium 2																																																															
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulphur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18	39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	56 <b>Fe</b> Iron 26	65 <b>Zn</b> Zinc 30	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	84 <b>Kr</b> Krypton 36	85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	101 <b>Ru</b> Ruthenium 44	112 <b>Cd</b> Cadmium 48	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54	133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	204 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89	87 <b>Fr</b> Francium 87	88 <b>Ra</b> Radium 88	81 <b>Tl</b> Thallium 81	82 <b>Pb</b> Lead 82	80 <b>Hg</b> Mercury 80	84 <b>Po</b> Polonium 84	85 <b>At</b> Astatine 85	86 <b>Rn</b> Radon 86	150 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	159 <b>Tb</b> Terbium 65	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71	232 <b>Th</b> Thorium 90	238 <b>U</b> Uranium 92	90 <b>Th</b> Thorium 90	91 <b>Pa</b> Protactinium 91	92 <b>U</b> Uranium 92	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

**Key**

a	<b>X</b>	a = relative atomic mass
	<b>X</b>	X = atomic symbol
b		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.).