

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**PHYSICAL SCIENCE**

**0652/01**

Paper 1 Multiple Choice

October/November 2005

**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.

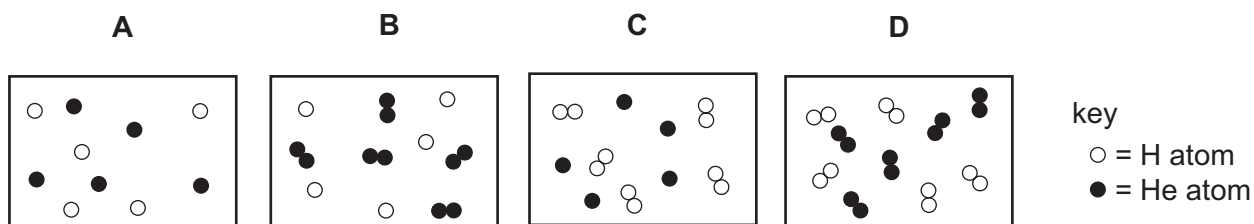


1 Which method would be most suitable for obtaining a sample of pure water from aqueous sodium chloride?

- A chromatography
- B distillation
- C electrolysis
- D precipitation

2 A gaseous mixture contains hydrogen and helium.

Which diagram best represents this mixture?



3 Which element is a metal?

- A barium, Ba
- B helium, He
- C selenium, Se
- D tellurium, Te

4 What are the nucleon numbers for carbon and magnesium?

	carbon	magnesium
<b>A</b>	6	12
<b>B</b>	6	24
<b>C</b>	12	12
<b>D</b>	12	24

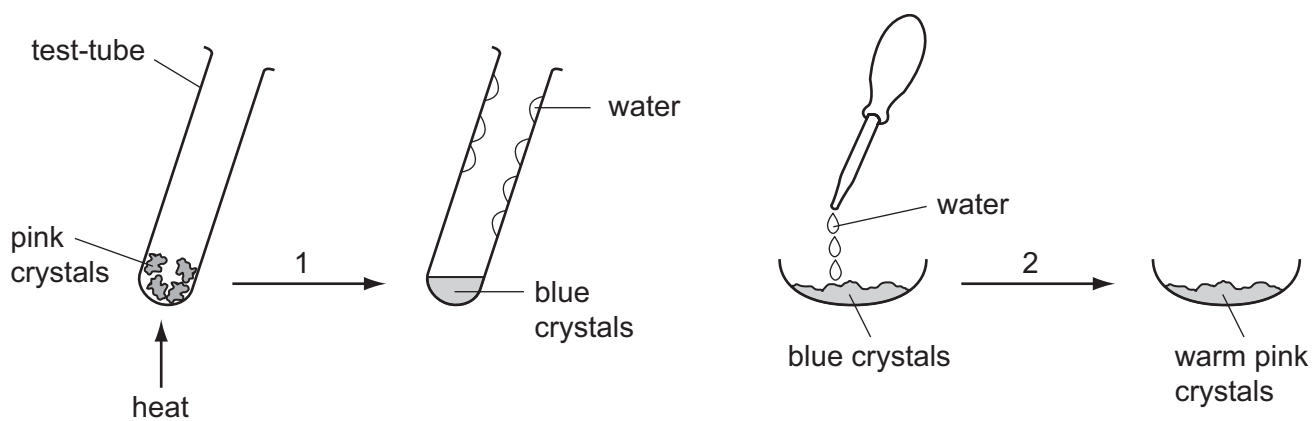
5 A model of a molecule is shown.



Which molecule could this be?

- A ammonia
- B hydrogen chloride
- C methane
- D water

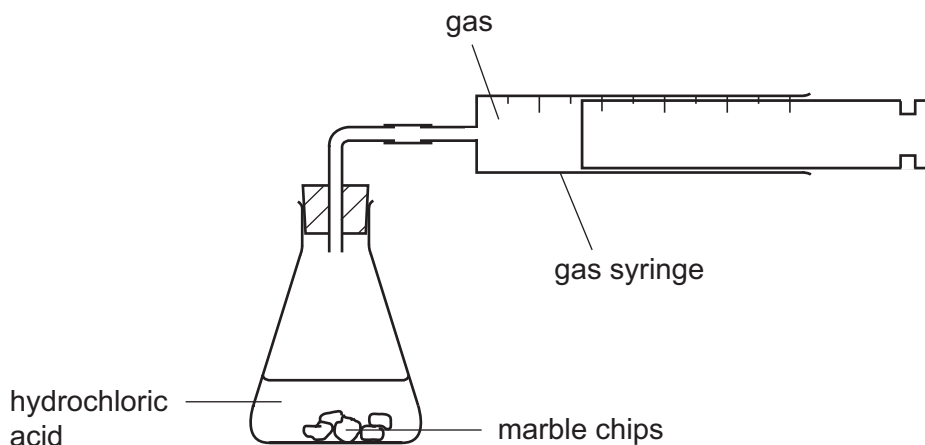
6 The diagrams show the changes that occur in an experiment on some pink crystals.



Which changes are exothermic?

- A 1 only
- B 2 only
- C both 1 and 2
- D neither 1 nor 2

- 7 A 1 g sample of marble chips reacts with an excess of  $1 \text{ mol / dm}^3$  hydrochloric acid, as shown.  
A measured volume of gas is collected in 60 seconds.

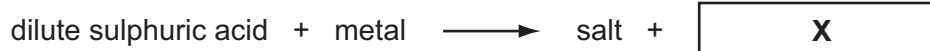


The experiment is repeated using 2 g of marble chips and an excess of  $2 \text{ mol / dm}^3$  hydrochloric acid.

How long does it take for the **same** volume of gas to be collected?

- A 30 s                      B 60 s                      C 120 s                      D 240 s
- 8 Which reaction is an example of neutralisation?
- A  $\text{KMnO}_4(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{KMnO}_4(\text{aq})$
- B  $2\text{Na}(\text{s}) + \text{Cl}_2(\text{g}) \rightarrow 2\text{NaCl}(\text{s})$
- C  $\text{PbBr}_2(\text{l}) \rightarrow \text{Pb}(\text{s}) + \text{Br}_2(\text{g})$
- D  $\text{H}_2\text{SO}_4(\text{aq}) + \text{CuO}(\text{s}) \rightarrow \text{CuSO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l})$

- 9 An incomplete equation is given.



What is **X**?

- A hydrogen
- B oxygen
- C sulphur dioxide
- D water

10 The table shows the results of two experiments on an aqueous solution containing two cations.

	experiment 1	experiment 2
reagent	add an excess of NaOH (aq)	add an excess of NH <sub>3</sub> (aq)
result	pale blue precipitate in a colourless solution	white precipitate in a dark blue solution

What are the cations?

- A Al<sup>3+</sup> and Cu<sup>2+</sup>
- B Al<sup>3+</sup> and Fe<sup>2+</sup>
- C Ca<sup>2+</sup> and Cu<sup>2+</sup>
- D Ca<sup>2+</sup> and Fe<sup>2+</sup>

11 Which pair of numbered elements combine together to form an ionic compound?

1	3																				
2																				4	5

- A 1 and 2
- B 2 and 3
- C 3 and 4
- D 4 and 5

12 Which type of element is found on the left-hand side of the Periodic Table?

- A halogen
- B metal
- C noble gas
- D non-metal

- 13 A yellow-green element **X** reacts with an aqueous solution of a potassium salt. A red-brown element **Y** is formed.

What are **X** and **Y**?

	<b>X</b>	<b>Y</b>
<b>A</b>	bromine	chlorine
<b>B</b>	bromine	iodine
<b>C</b>	chlorine	bromine
<b>D</b>	chlorine	iodine

- 14 Which property do all metals have?

- A** They are hard.
- B** They are less dense than water.
- C** They are very reactive.
- D** They conduct electricity.

- 15 Bauxite and haematite are important ores.

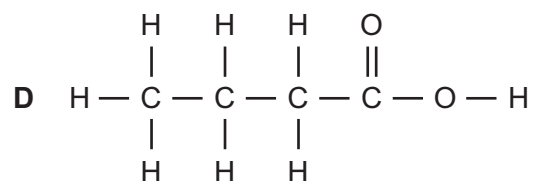
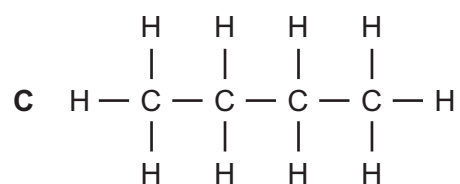
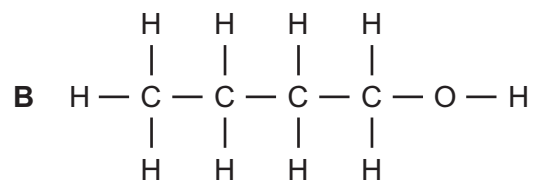
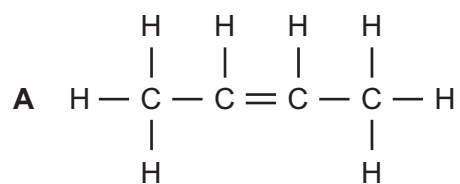
Which metals do they contain?

	bauxite	haematite
<b>A</b>	<i>Al</i>	Cu
<b>B</b>	<i>Al</i>	Fe
<b>C</b>	Fe	Cu
<b>D</b>	Cu	<i>Al</i>

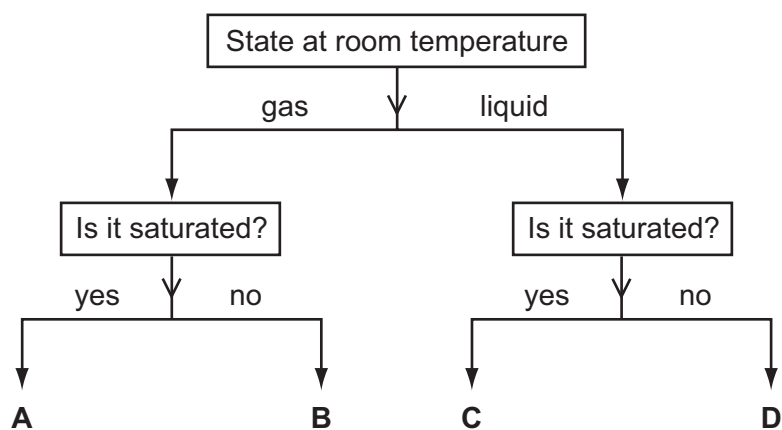
- 16 Which process is used in water treatment to kill bacteria?

- A** adding lime
- B** chlorination
- C** crystallisation
- D** filtration

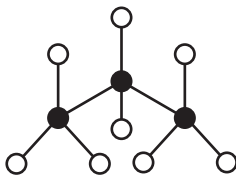
17 Which structure represents a carboxylic acid?



18 In the diagram, which substance **A**, **B**, **C** or **D** could be methane?



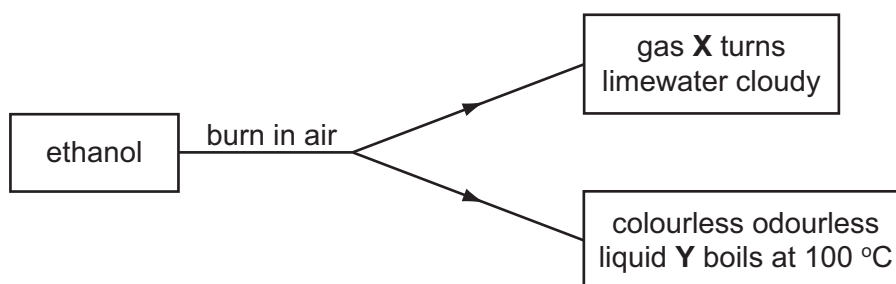
19 The diagram shows a model of propane, a member of the alkane series of hydrocarbons.



Which of the following is also a member of the alkane homologous series?

- A  $C_3H_6$       B  $C_4H_8$       C  $C_4H_{10}$       D  $C_6H_{10}$

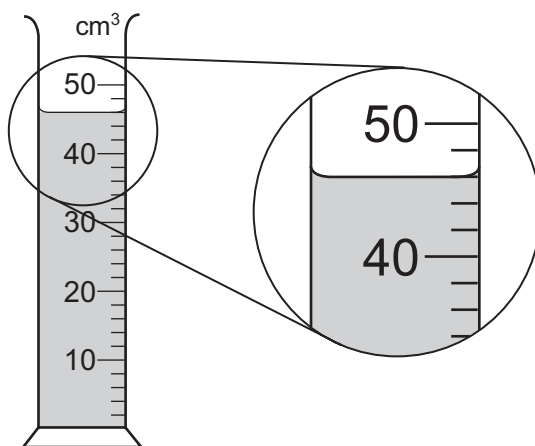
20 The diagram gives information about the burning of ethanol.



What are X and Y?

	X	Y
A	carbon dioxide	ethanoic acid
B	carbon dioxide	water
C	carbon monoxide	ethanoic acid
D	carbon monoxide	water

21 A measuring cylinder is used to measure the volume of a liquid.

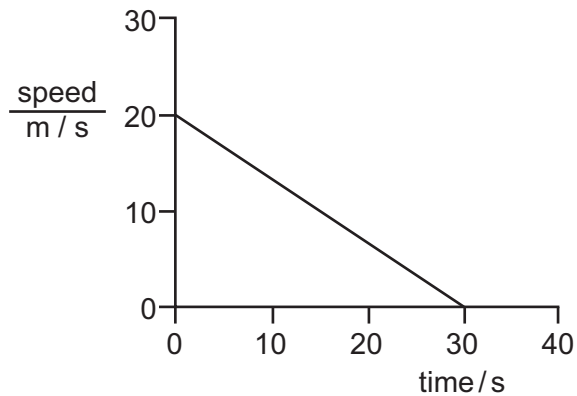


What is the volume of the liquid?

- A  $43\text{ cm}^3$       B  $46\text{ cm}^3$       C  $48\text{ cm}^3$       D  $54\text{ cm}^3$



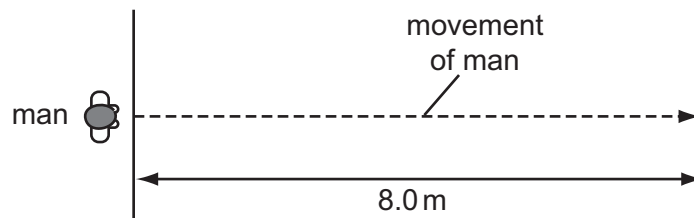
22 The graph represents part of the journey of a car.



What distance does the car travel during this part of the journey?

- A** 150 m      **B** 300 m      **C** 600 m      **D** 1200 m

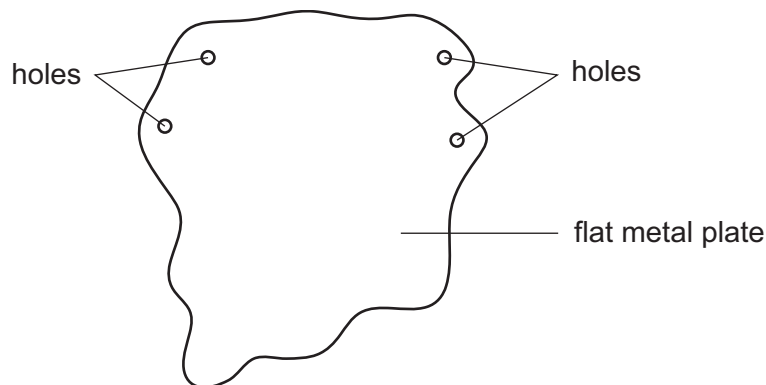
23 A man crosses a road 8.0 m wide at a speed of 2.0 m/s.



How long does the man take to cross the road?

- A** 4.0 s      **B** 6.0 s      **C** 10 s      **D** 16 s

24 The diagram shows a flat metal plate that may be hung from a nail so that it can rotate about any of four holes.



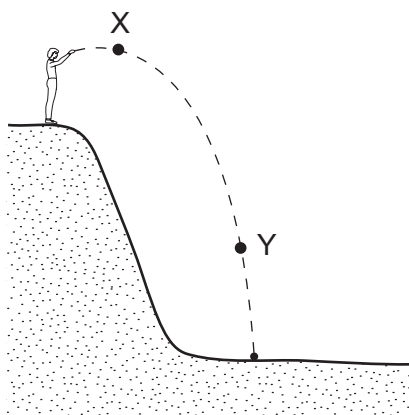
What is the smallest number of holes from which the flat metal plate should be hung in order to find its centre of gravity?

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

25 Which type of power station does **not** use steam from boiling water to generate electricity?

- A geothermal
- B hydroelectric
- C nuclear
- D oil-fired

26 A man standing at the top of a cliff throws a stone.



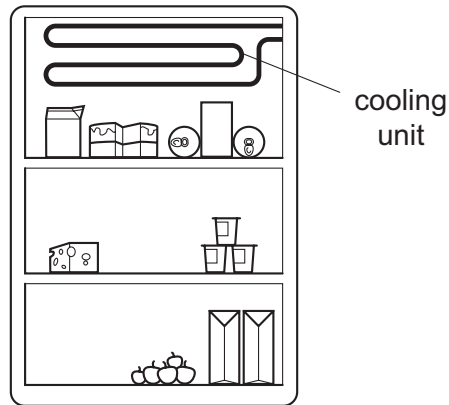
Which forms of energy does the stone have at X and at Y?

	energy at X	energy at Y
<b>A</b>	gravitational only	energy of motion only
<b>B</b>	energy of motion only	gravitational only
<b>C</b>	gravitational only	gravitational and energy of motion
<b>D</b>	gravitational and energy of motion	gravitational and energy of motion

27 Which substance is a liquid at a room temperature of 25°C?

substance	melting point/°C	boiling point/°C
<b>A</b>	-218	-183
<b>B</b>	-39	357
<b>C</b>	44	280
<b>D</b>	119	444

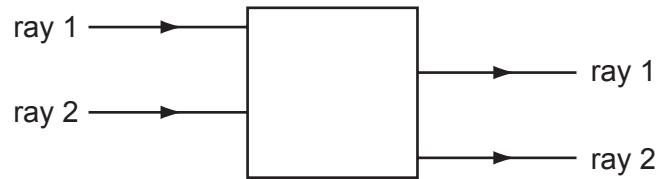
28 The diagram shows a cooling unit in a refrigerator.



Why is the cooling unit placed at the top?

- A Cold air falls and warm air is displaced upwards.
- B Cold air is a bad conductor so heat is not conducted into the refrigerator.
- C Cold air is a good conductor so heat is conducted out of the refrigerator.
- D Cold air stops at the top and so prevents convection.

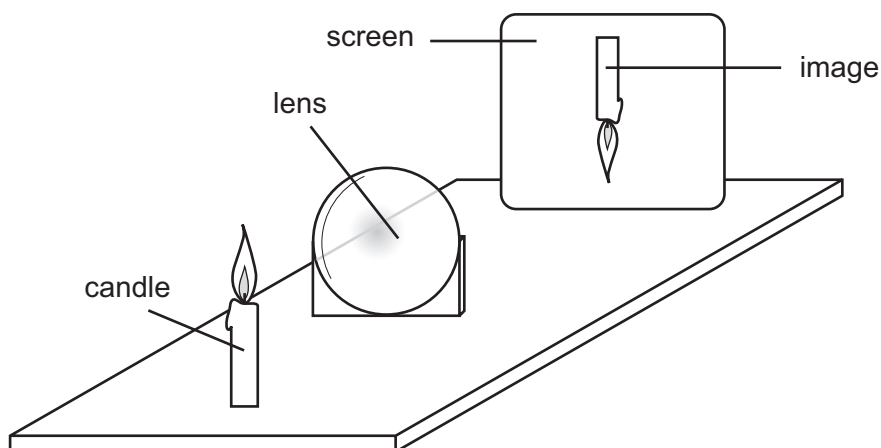
29 Rays of light enter and leave a box.



What could be inside the box to make the rays behave as shown?

- A a converging lens
- B a parallel-sided glass block
- C a plane mirror
- D a triangular prism

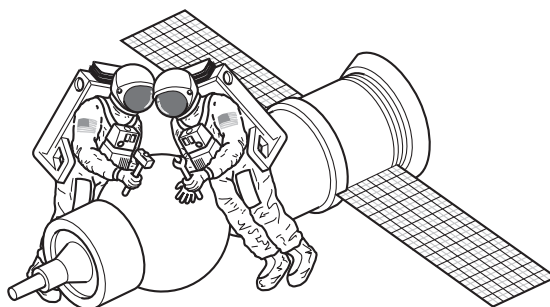
- 30 A thin converging lens is used to produce on a screen a focused image of a candle.



The screen and the lens are moved back and forth and various focused images are produced on the screen.

Which statement is **always** true?

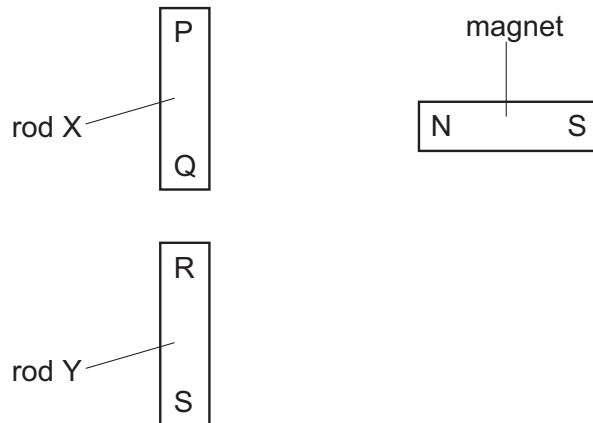
- A The image is at the principal focus (focal point) of the lens.
  - B The image is bigger than the object.
  - C The image is closer to the lens than the object is.
  - D The image is inverted.
- 31 Two astronauts without radios can only communicate in space if their helmets are touching. There is no air in space.



What does this show about sound?

	through a solid	through a vacuum
<b>A</b>	can travel	can travel
<b>B</b>	can travel	cannot travel
<b>C</b>	cannot travel	can travel
<b>D</b>	cannot travel	cannot travel

32 Two rods X and Y look the same.



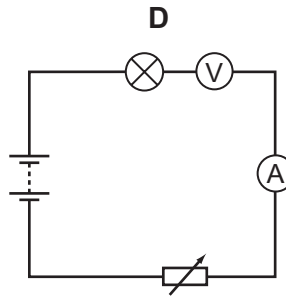
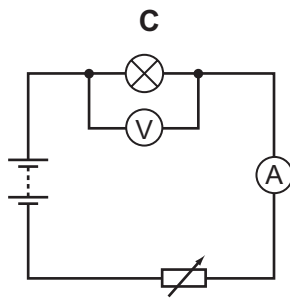
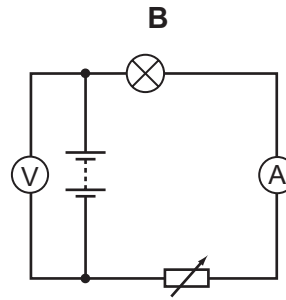
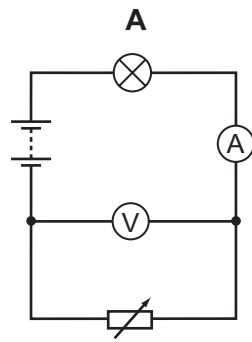
The N pole of a magnet is brought close, in turn, to each end of both rods. The results of these four actions are shown in the table.

end tested	result
P	attraction
Q	attraction
R	attraction
S	repulsion

Which of the rods is a magnet?

- A neither of the rods
- B both of the rods
- C rod X only
- D rod Y only

33 Which circuit should be used to find the resistance of a lamp?

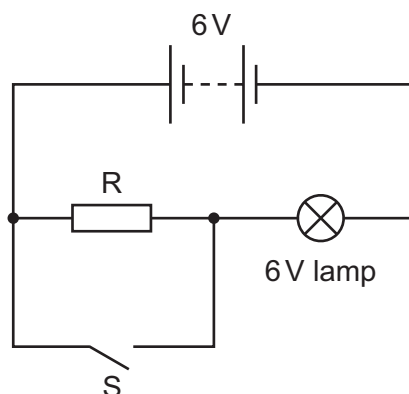


34 The table shows the voltage and current ratings for four electric heaters.

Which heater has the least resistance?

	voltage / V	current / A
<b>A</b>	110	5.0
<b>B</b>	110	10
<b>C</b>	230	5.0
<b>D</b>	230	10

- 35 When the circuit shown is connected with switch S open, the 6 V lamp glows.



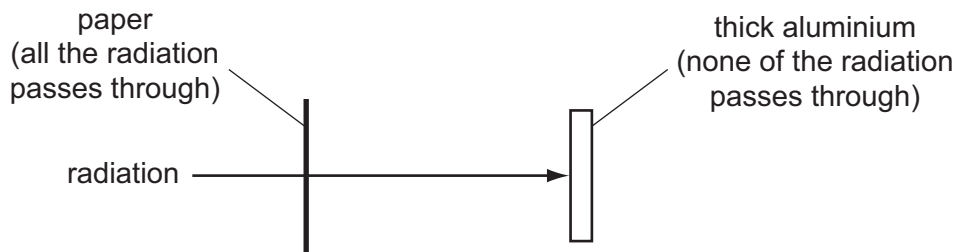
What happens to the brightness of the lamp when switch S is closed?

- A** It becomes brighter.  
**B** It remains the same.  
**C** It becomes dimmer.  
**D** It goes off.
- 36 Why are the electric lamps in a house lighting circuit normally connected in parallel?
- A** The current in every circuit must be the same.  
**B** The lamps are always switched on and off at the same time.  
**C** The voltage across each lamp must be the mains voltage.  
**D** When one of the lamps blows, all the others go out.
- 37 Charged particles are emitted from the cathode of an oscilloscope.

What is the name and the charge of these particles?

	name of particles	charge of particles
<b>A</b>	electrons	negative
<b>B</b>	electrons	positive
<b>C</b>	protons	negative
<b>D</b>	protons	positive

- 38 A radioactive source emits radiation which can pass through a sheet of paper but not through thick aluminium.



What does this show about the radiation?

- A It is alpha-particles.
  - B It is beta-particles.
  - C It is gamma-rays.
  - D It is a mixture of alpha-particles and gamma-rays.
- 39 An unstable nucleus has 145 neutrons and 92 protons. It emits a beta-particle.

How many neutrons and protons does it have after this?

	neutrons	protons
<b>A</b>	144	92
<b>B</b>	144	93
<b>C</b>	145	91
<b>D</b>	145	93

- 40 Which particles are found in the nucleus of an atom?
- A neutrons and protons only
  - B neutrons only
  - C protons and electrons only
  - D protons, electrons and neutrons





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**DATA SHEET**  
**The Periodic Table of the Elements**

Group																					
I	II	III	IV	V	VI	VII	O														
		1 <b>H</b> Hydrogen 1															4 <b>He</b> Helium 2				
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4																20 <b>Ne</b> Neon 10				
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12																35.5 <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	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	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	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	101 <b>Rh</b> Rhodium 45	103 <b>Rh</b> Rhodium 45	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54				
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	190 <b>Os</b> Osmium 76	190 <b>Ir</b> Iridium 77	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	84 <b>Po</b> Polonium 84	85 <b>At</b> Astatine 85	86 <b>Rn</b> Radon 86				
226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89											175 <b>Lu</b> Lutetium 71									
<p><b>*58-71 Lanthanoid series</b> <b>90-103 Actinoid series</b></p>																					
<p><b>Key</b></p> <table style="display: inline-table; border: 1px solid black; padding: 5px;"> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;"><b>X</b></td> </tr> <tr> <td style="text-align: center;">b</td> <td style="text-align: center;">b</td> </tr> </table> <p>a = relative atomic mass X = atomic symbol b = proton (atomic) number</p>																		a	<b>X</b>	b	b
a	<b>X</b>																				
b	b																				

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