

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.

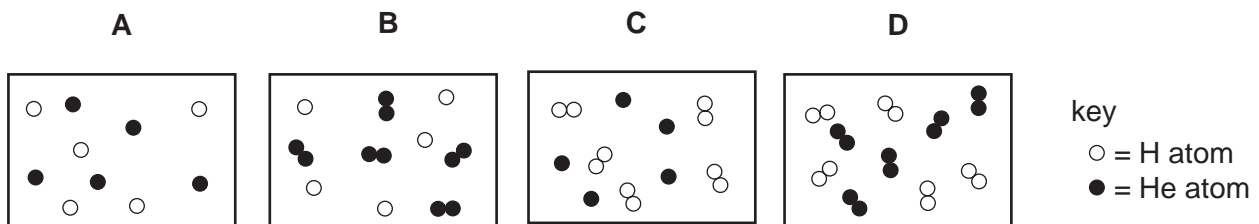
This document consists of **17** printed pages and **3** blank pages.



- 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
A	6	12
B	6	24
C	12	12
D	12	24

3

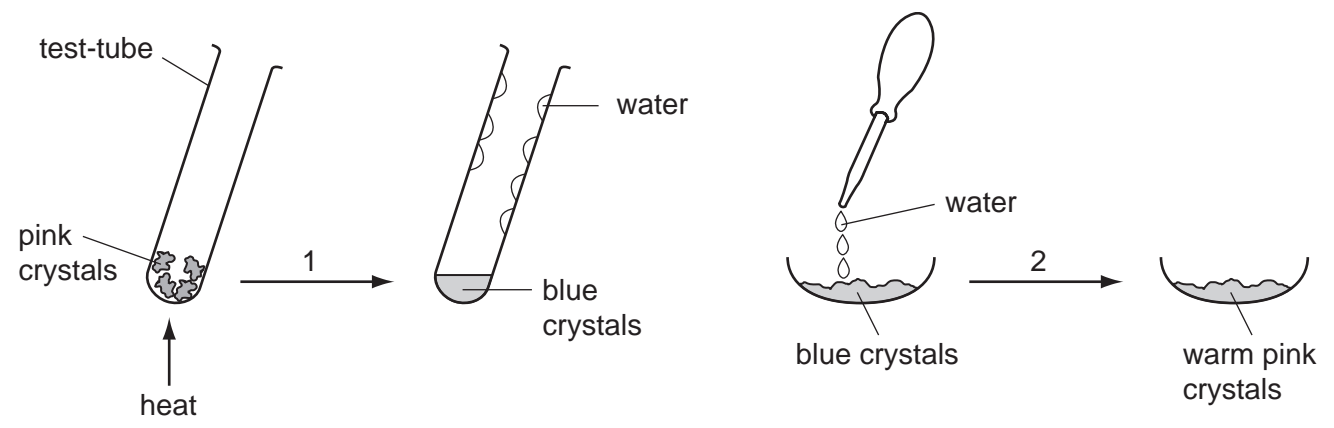
5 A model of a molecule is shown.



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.

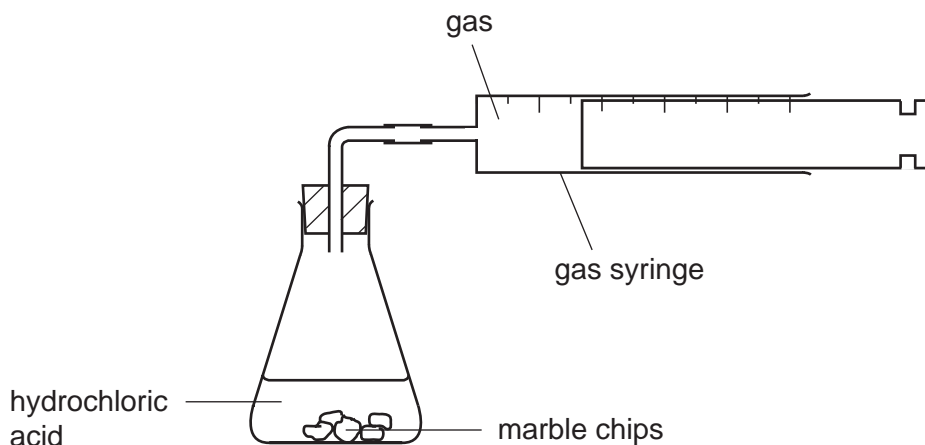


Which changes are exothermic?

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

4

- 7 A 1 g sample of marble chips reacts with an excess of 1 mol / dm^3 hydrochloric acid, as shown in the diagram. 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 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 different metal ions.

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

What are the cations?

- A Al³⁺ and Cu²⁺
- B Al³⁺ and Fe²⁺
- C Ca²⁺ and Cu²⁺
- D Ca²⁺ and Fe²⁺

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

- 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 white precipitate is formed and element **Y** is formed.

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

	X	Y
A	bromine	chlorine
B	bromine	iodine
C	chlorine	bromine
D	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.

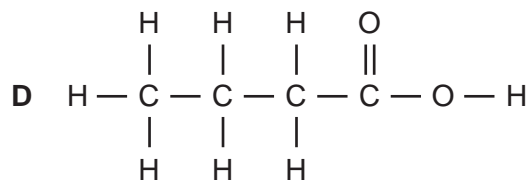
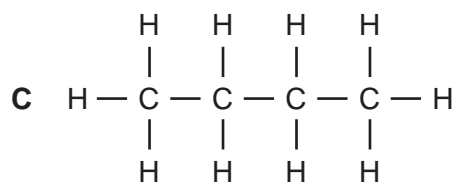
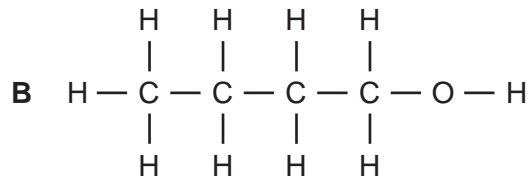
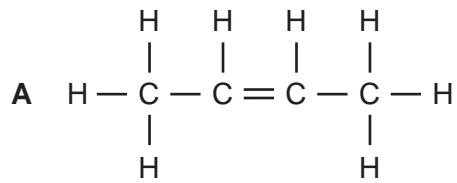
Which metals do they contain?

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

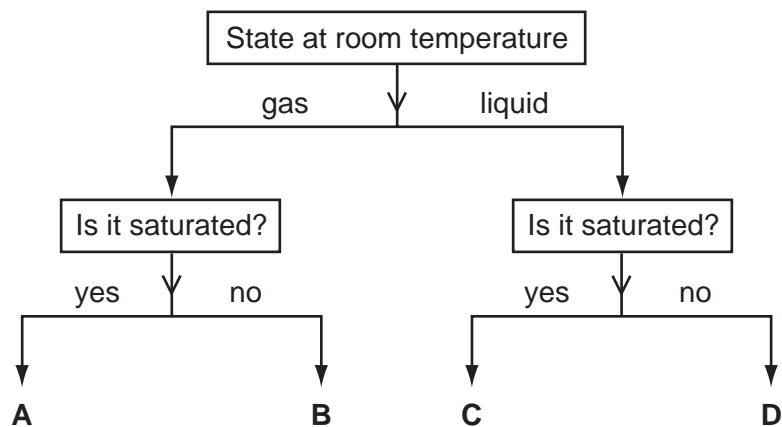
- 16 Which process is used in water treatment to kill bacteria?

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

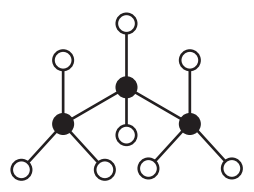
17 Which structure represents a carboxylic acid?



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



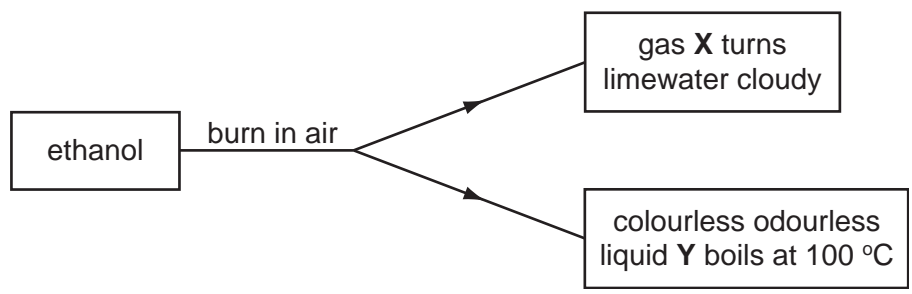
19 The diagram shows a model of propane, a member of the alkane series of hydrocarbons.



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}

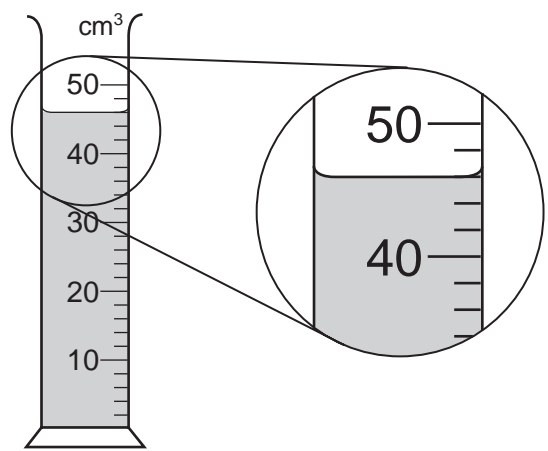
20 The diagram gives information about the burning of ethanol.



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

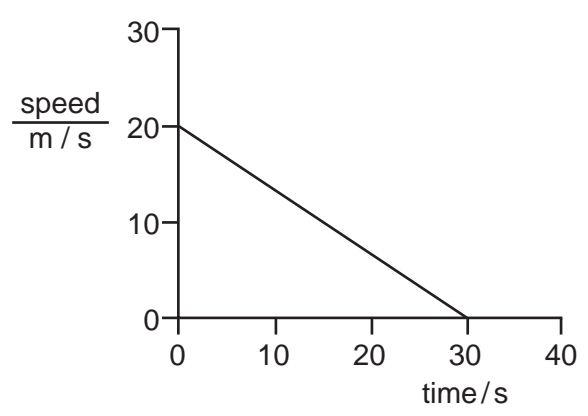
21 A measuring cylinder is used to measure the volume of a liquid.



What is the volume of the liquid?

- A 43 cm^3 B 46 cm^3 C 48 cm^3 D 54 cm^3

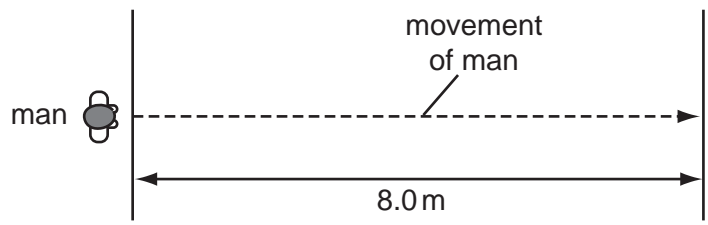
22 The graph represents part of the journey of a car.



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

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

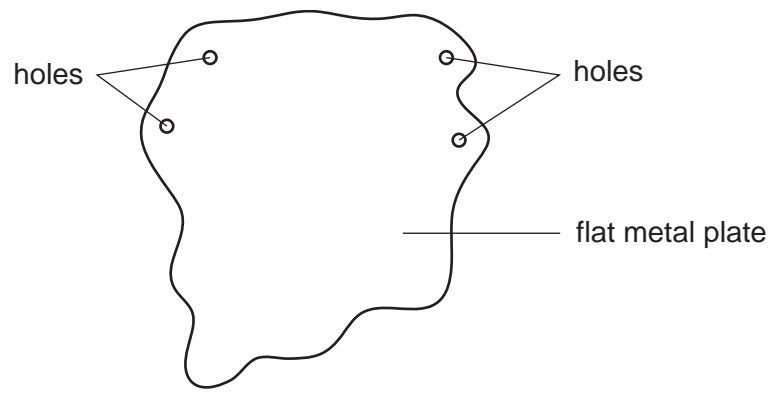
23 A man crosses a road 8.0 m wide at a speed of 2.0 m/s.



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.



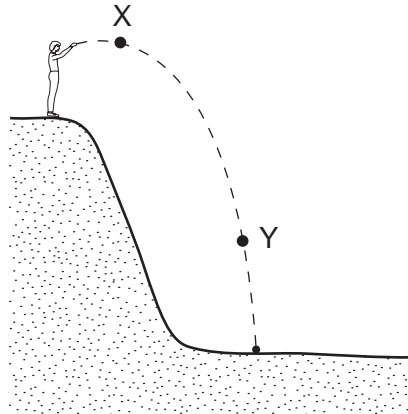
What is the smallest number of holes from which the flat metal plate should be hung in order to find its centre of gravity?

- 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.



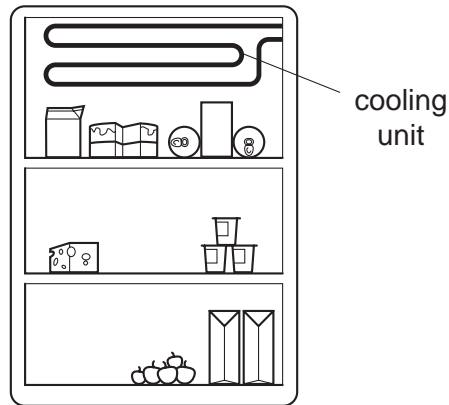
Which forms of energy does the stone have at X and at Y?

	energy at X	energy at Y
A	gravitational only	energy of motion only
B	energy of motion only	gravitational only
C	gravitational only	gravitational and energy of motion
D	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
A	-218	-183
B	-39	357
C	44	280
D	119	444

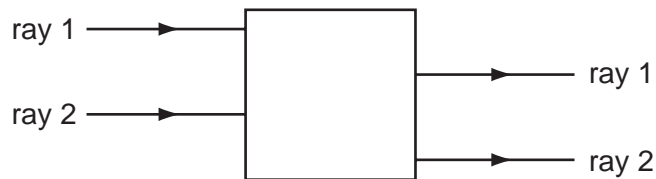
28 The diagram shows a cooling unit in a refrigerator.



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.

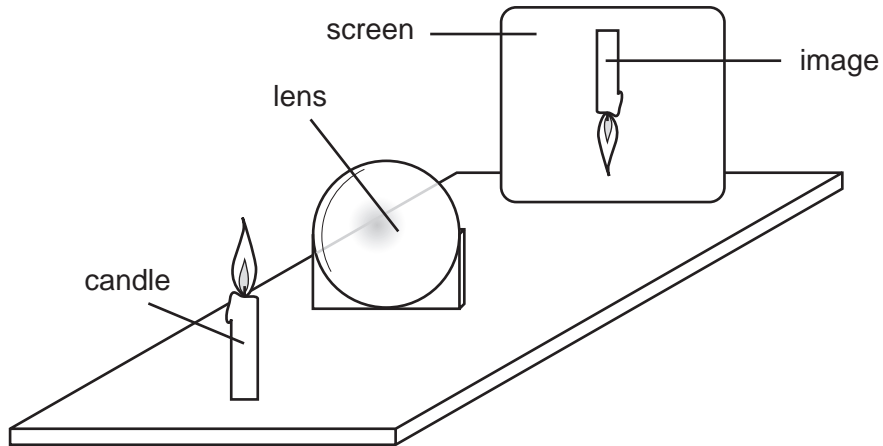
29 Rays of light enter and leave a box.



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

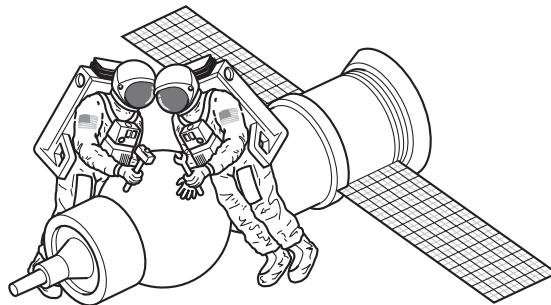
- 30 A thin converging lens is used to produce on a screen a focused image of a candle.



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.

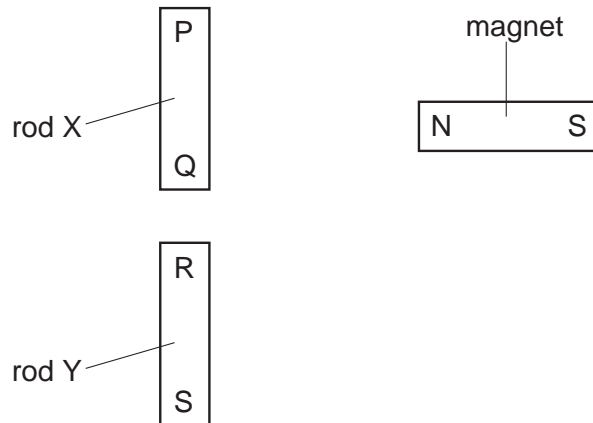


What does this show about sound?

	through a solid	through a vacuum
A	can travel	can travel
B	can travel	cannot travel
C	cannot travel	can travel
D	cannot travel	cannot travel

13

32 Two rods X and Y look the same.



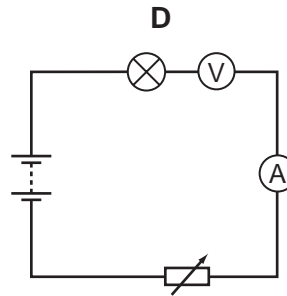
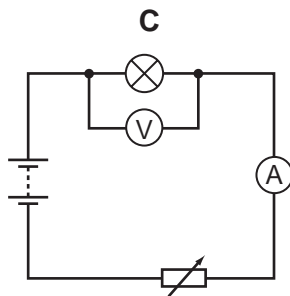
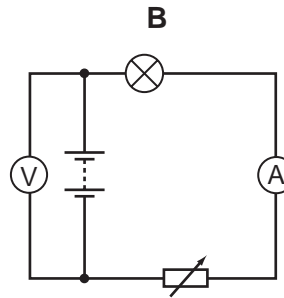
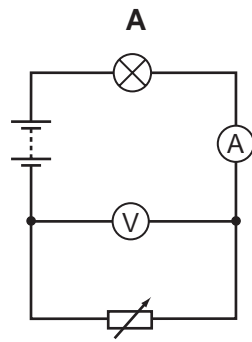
The N pole of a magnet is brought close, in turn, to each end of both rods. The results of these four actions are shown in the table.

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?

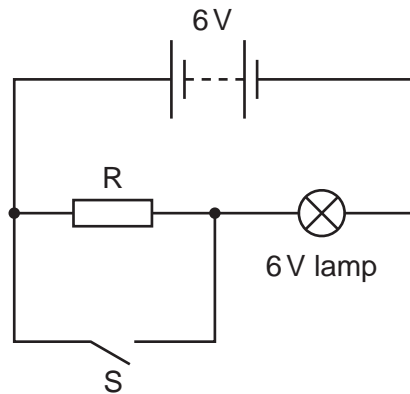


34 The table shows the voltage and current ratings for four electric heaters.

Which heater has the least resistance?

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

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



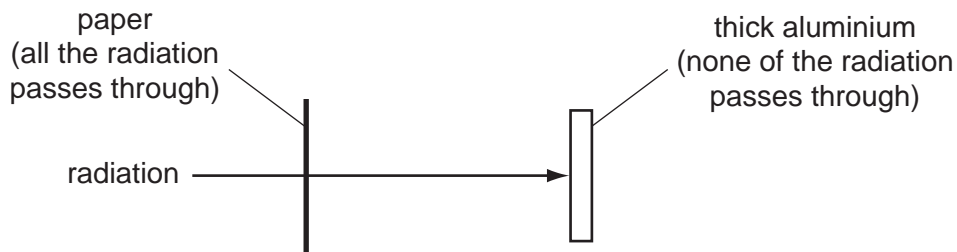
What happens to the brightness of the lamp when switch S is closed?

- 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
A	electrons	negative
B	electrons	positive
C	protons	negative
D	protons	positive

- 38 A radioactive source emits radiation which can pass through a sheet of paper but not through a 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
A	144	92
B	144	93
C	145	91
D	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

DATA SHEET
The Periodic Table of the Elements

		Group															
I	II	III	IV	V	VI	VII	O										
1 H Hydrogen											2 He Helium						
3 Li Lithium	4 Be Beryllium											10 Ne Neon					
11 Na Sodium	12 Mg Magnesium	13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon										
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
55 Cs Caesium	56 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
87 Fr Francium	88 Ra Radium	89 Ac Actinium															

140 Ce Cerium	141 Pr Praseodymium	144 Nd Neodymium	150 Sm Samarium	152 Eu Europium	157 Gd Gadolinium	162 Dy Dysprosium	165 Ho Holmium	167 Er Erbium	169 Tm Thulium	173 Yb Ytterbium	175 Lu Lutetium
90 Th Thorium	91 Pa Protactinium	92 U Uranium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium

*58-71 Lanthanoid series
90-103 Actinoid series

Key

a	X
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.).