

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.

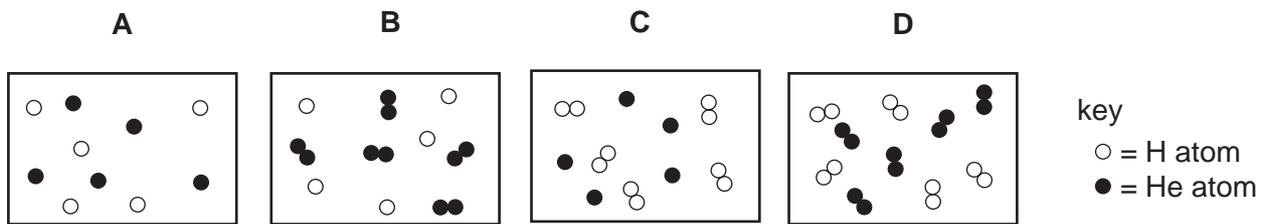
This document consists of **17** printed pages and **3** blank pages.



- 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

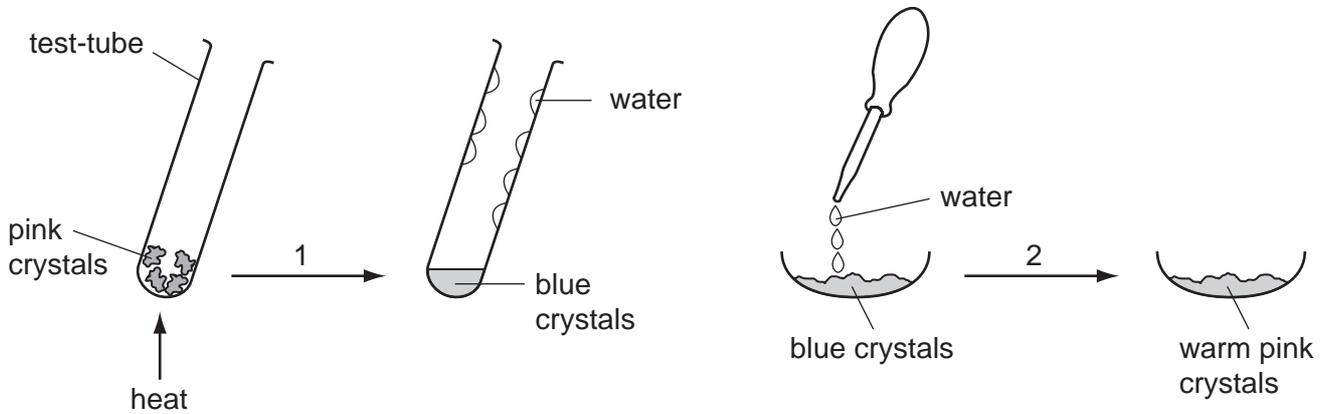
5 A model of a molecule is shown.



Which molecule could this be?

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

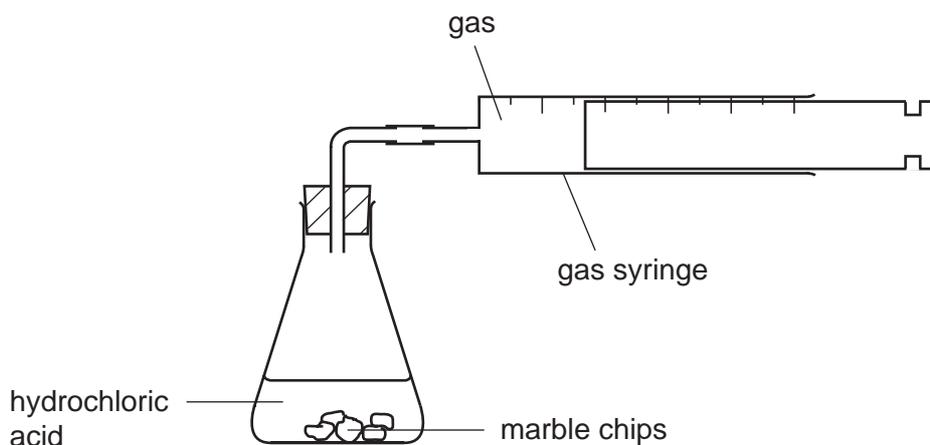
6 The diagrams show the changes that occur in an experiment on some pink crystals.



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 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

- 13 A yellow-green element **X** reacts with an aqueous solution of a potassium salt. 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.

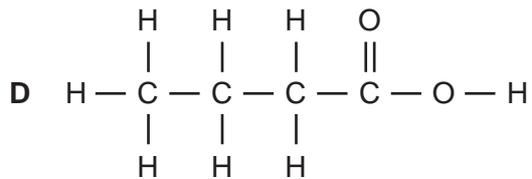
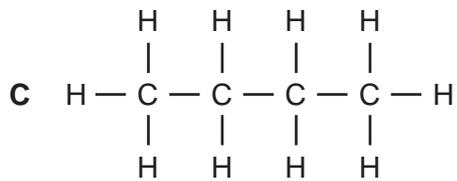
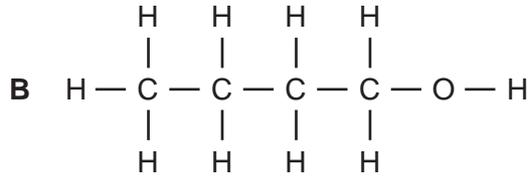
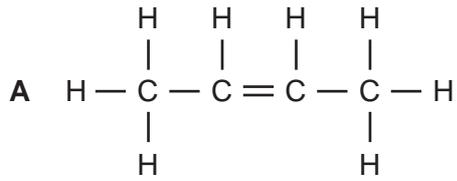
Which metals do they contain?

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

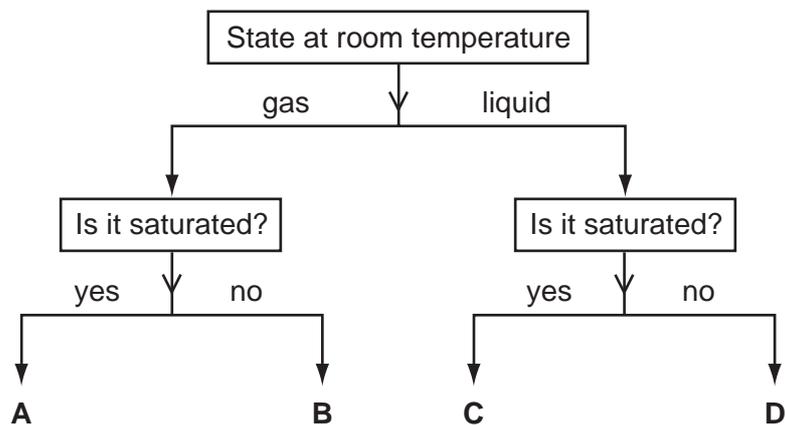
- 16 Which process is used in water treatment to kill bacteria?

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

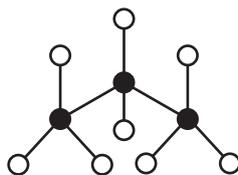
17 Which structure represents a carboxylic acid?



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

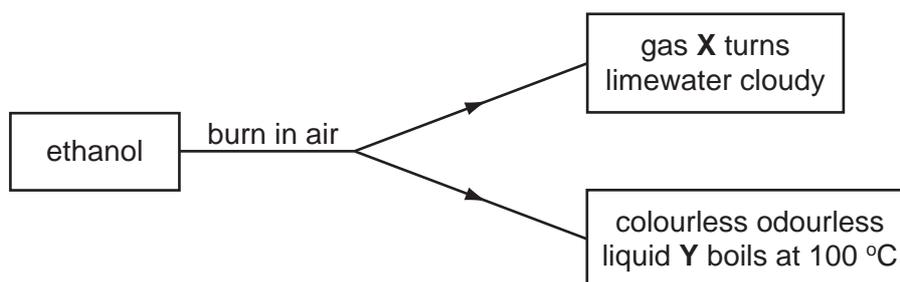


- 19 The diagram shows a model of propane, a member of the alkane series of hydrocarbons.



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

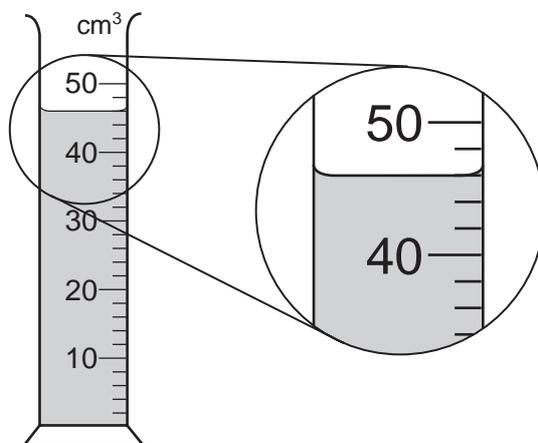
- A C_3H_6 B C_4H_8 C C_4H_{10} D C_6H_{10}
- 20 The diagram gives information about the burning of ethanol.



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

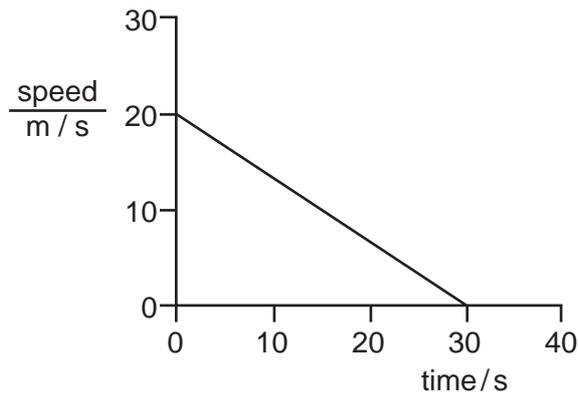
- 21 A measuring cylinder is used to measure the volume of a liquid.



What is the volume of the liquid?

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

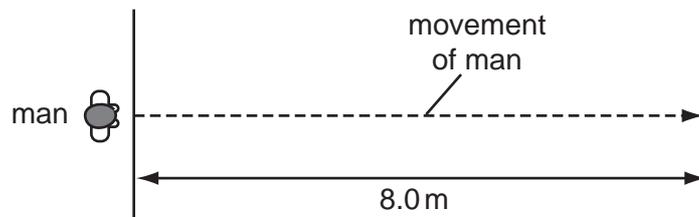
22 The graph represents part of the journey of a car.



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

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

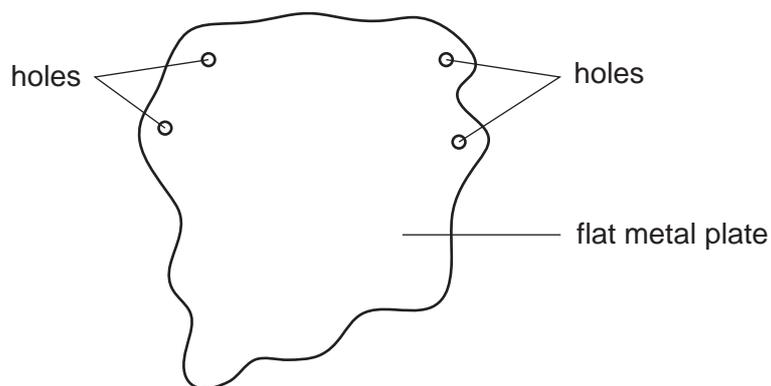
23 A man crosses a road 8.0 m wide at a speed of 2.0 m/s.



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.

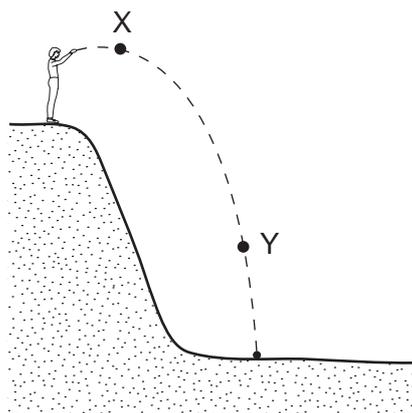


What is the smallest number of holes from which the flat metal plate should be hung in order to find its centre of gravity?

- 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.



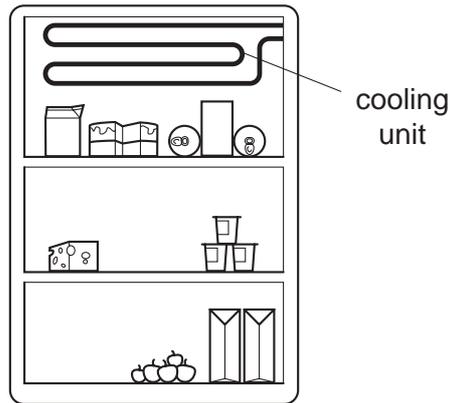
Which forms of energy does the stone have at X and at Y?

	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

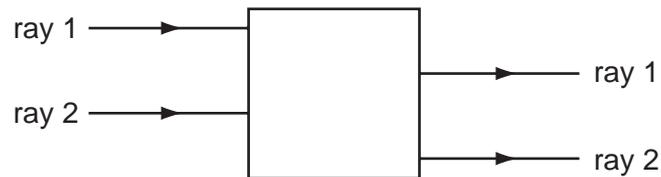
28 The diagram shows a cooling unit in a refrigerator.



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.

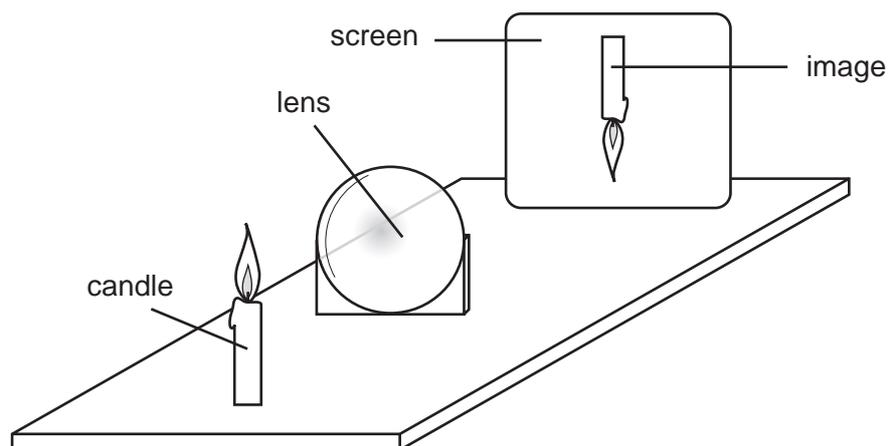
29 Rays of light enter and leave a box.



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

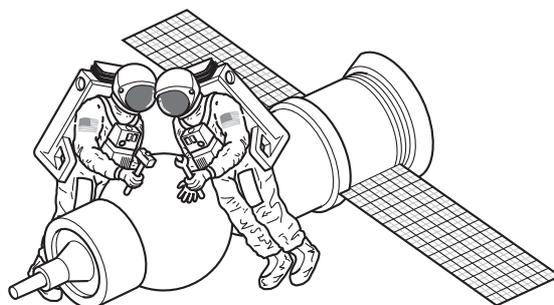
- 30 A thin converging lens is used to produce on a screen a focused image of a candle.



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

Which statement is **always** true?

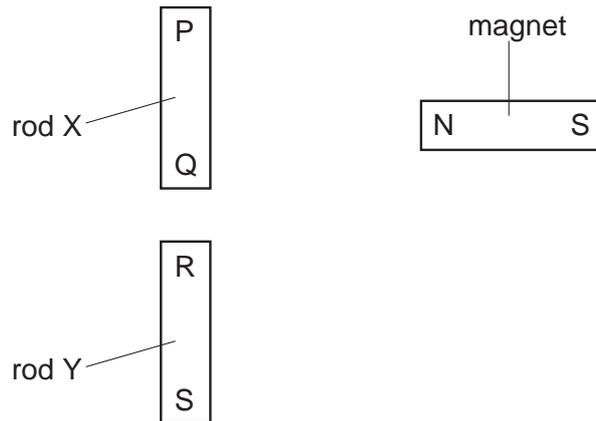
- A The image is at the principal focus (focal point) of the lens.
 - B The image is bigger than the object.
 - C The image is closer to the lens than the object is.
 - D The image is inverted.
- 31 Two astronauts without radios can only communicate in space if their helmets are touching. There is no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

32 Two rods X and Y look the same.



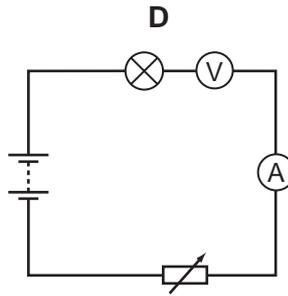
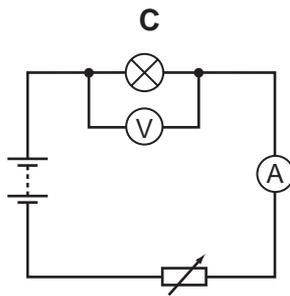
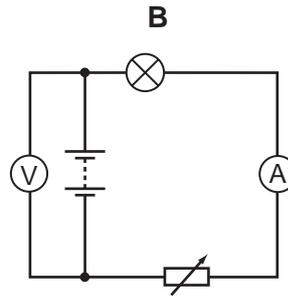
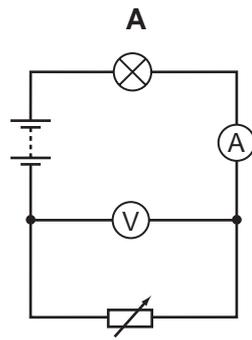
The N pole of a magnet is brought close, in turn, to each end of both rods. The results of these four actions are shown in the table.

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?

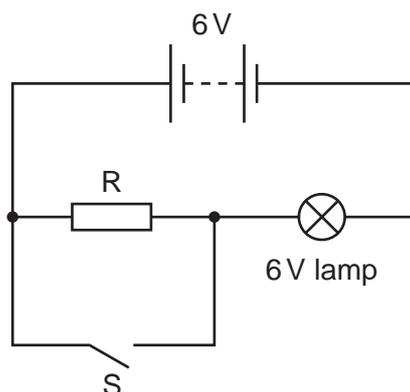


34 The table shows the voltage and current ratings for four electric heaters.

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.



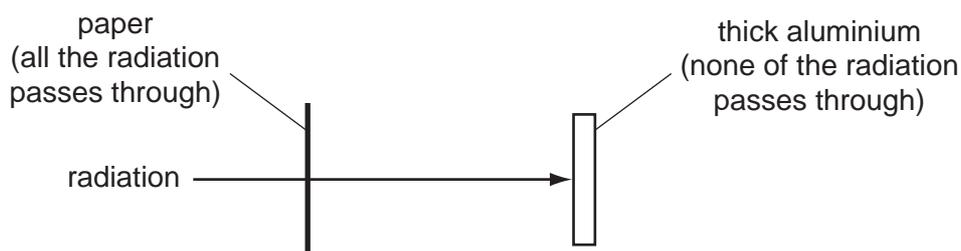
What happens to the brightness of the lamp when switch S is closed?

- 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 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 1										4 He Helium 2	
7 Li Lithium 3	9 Be Beryllium 4											20 Ne Neon 10	
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	35.5 Cl Chlorine 17	40 Ar Argon 18					
39 K Potassium 19	40 Ca Calcium 20	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18						
85 Rb Rubidium 37	88 Sr Strontium 38	65 Zn Zinc 30	64 Cu Copper 29	59 Ni Nickel 28	56 Fe Iron 26	59 Co Cobalt 27	55 Mn Manganese 25	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	84 Kr Krypton 36	
133 Cs Caesium 55	137 Ba Barium 56	112 Cd Cadmium 48	108 Ag Silver 47	106 Pd Palladium 46	101 Ru Ruthenium 44	103 Rh Rhodium 45	105 Tc Technetium 43	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	131 Xe Xenon 54	
		201 Hg Mercury 80	197 Au Gold 79	195 Pt Platinum 78	190 Os Osmium 76	192 Ir Iridium 77	186 Re Rhenium 75	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83		210 Po Polonium 84	210 Rn Radon 86

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92

*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.).