

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/01

Paper 1 Multiple Choice

May/June 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.

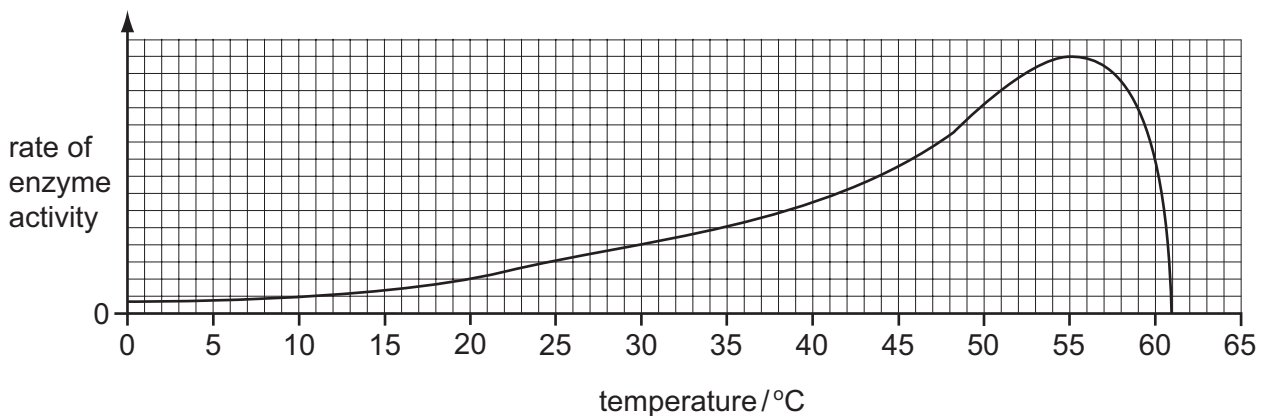
A copy of the Periodic Table is printed on page 20.

This document consists of **19** printed pages and **1** blank page.



- 1 Two characteristics of all living organisms are
- A breathing and reproduction.
 - B photosynthesis and excretion.
 - C reproduction and respiration.
 - D respiration and photosynthesis.
- 2 Which structure provides the best surface for diffusion?
- A alveolus
 - B heart wall
 - C trachea
 - D vagina

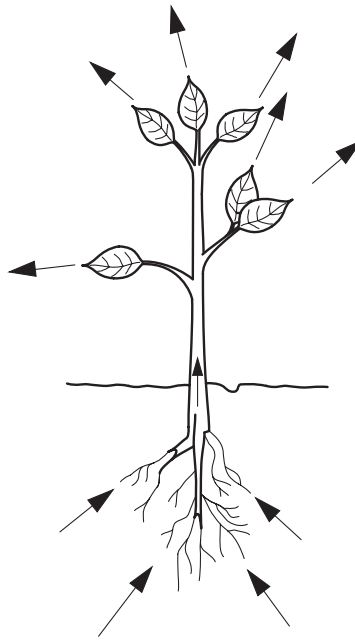
- 3 The graph shows how temperature affects the rate at which an enzyme works.



What does the graph show about this enzyme?

- A The enzyme is denatured by temperatures above 65 °C.
- B The enzyme is denatured by temperatures below 8 °C.
- C The enzyme works fastest at 48 °C.
- D The rate of enzyme activity doubles when the temperature is raised from 10 °C to 20 °C.

- 4 The arrows on the diagram show the path taken by a substance through a plant.



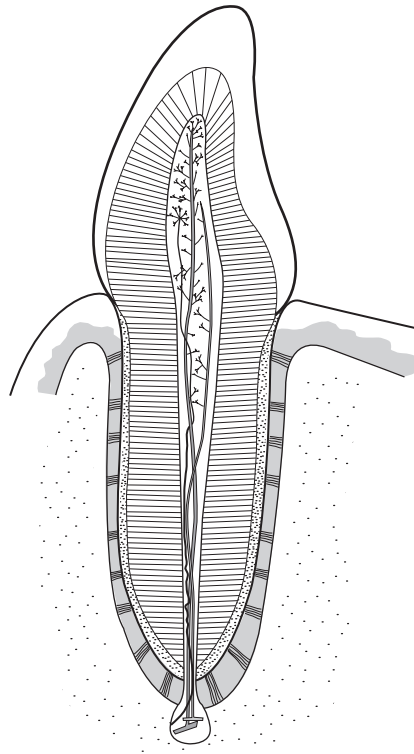
Which substance follows this path?

- A carbon dioxide
 - B glucose
 - C oxygen
 - D water
- 5 Which symptoms occur when there is a deficiency of vitamin C or of iron in the diet?

	symptoms	
	vitamin C deficiency	iron deficiency
A	anaemia (lack of haemoglobin)	bleeding gums
B	bleeding gums	anaemia (lack of haemoglobin)
C	poor teeth	weak bones
D	weak bones	poor teeth

- 6 What enters a green leaf through its stomata for use during photosynthesis?
- A carbon dioxide only
 - B carbon dioxide and oxygen
 - C carbon dioxide and water
 - D water only

7 The diagram shows the internal structure of a tooth.

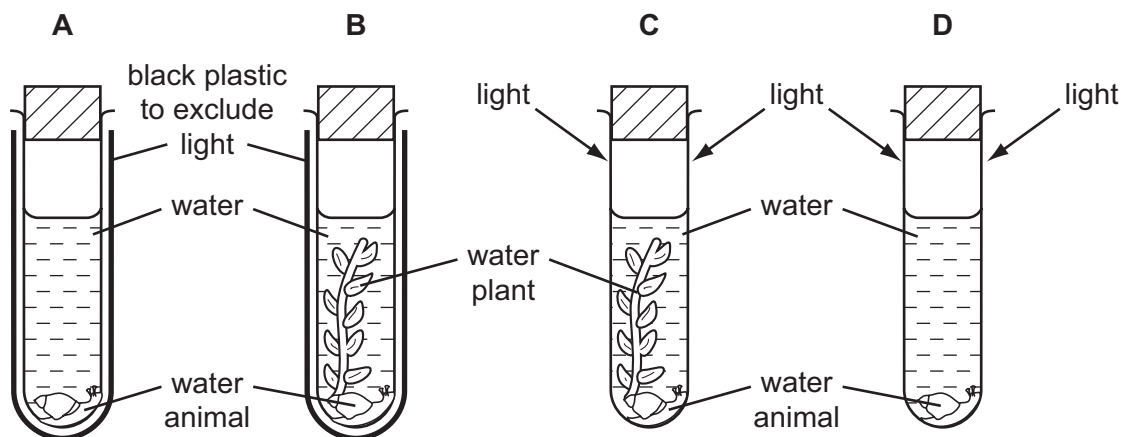


Most of this tooth consists of

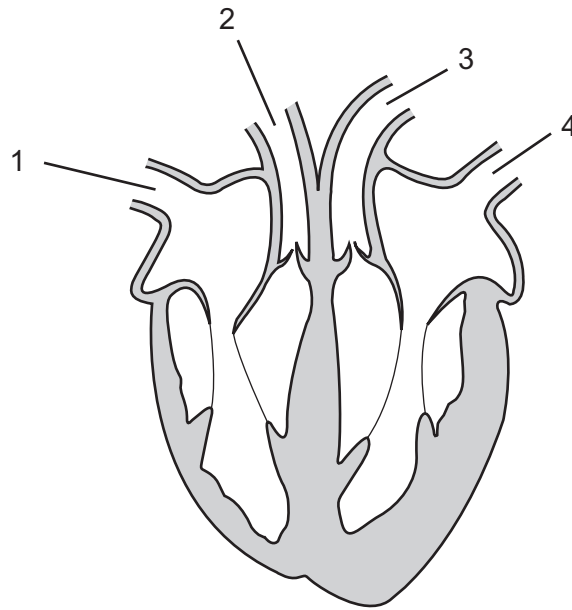
- A cement.
- B dentine.
- C enamel.
- D pulp.

8 Four tubes are set up as shown in the diagram.

In which tube does the water animal survive the longest?



9 The diagram shows a vertical section through the heart.



Which blood vessels contain oxygenated blood?

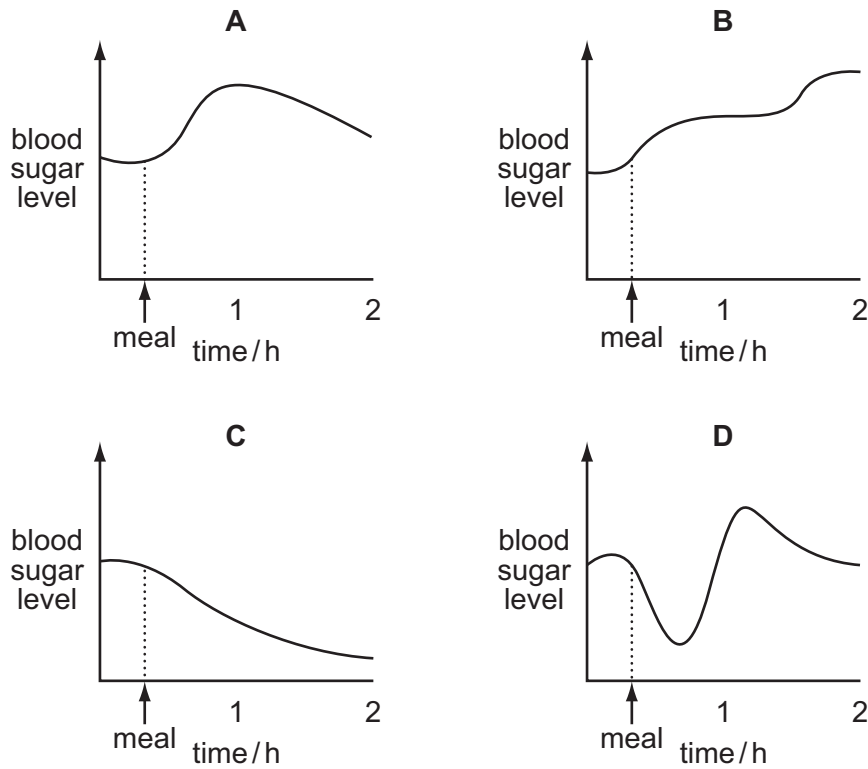
- A** 1 and 2 **B** 2 and 3 **C** 2 and 4 **D** 3 and 4

10 What describes the oxygen and carbon dioxide levels in blood as it passes through the lungs?

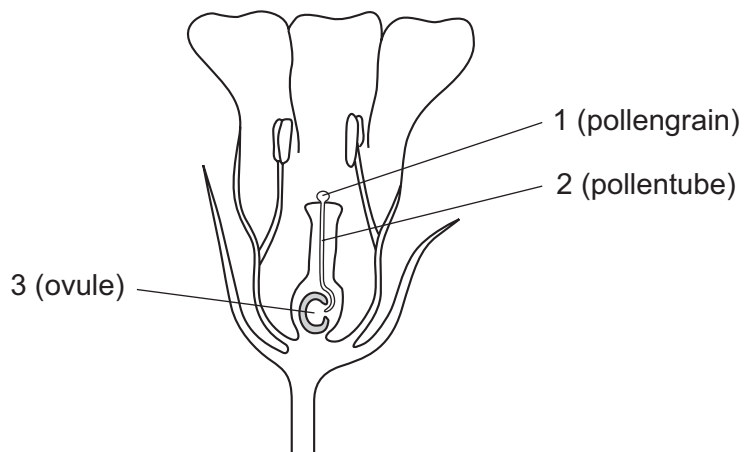
	oxygen level	carbon dioxide level
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

11 A person does not eat for several hours but then has a meal rich in carbohydrate.

Which graph shows how the person's blood sugar level changes after the meal?



12 The diagram shows a flower just before fertilisation.



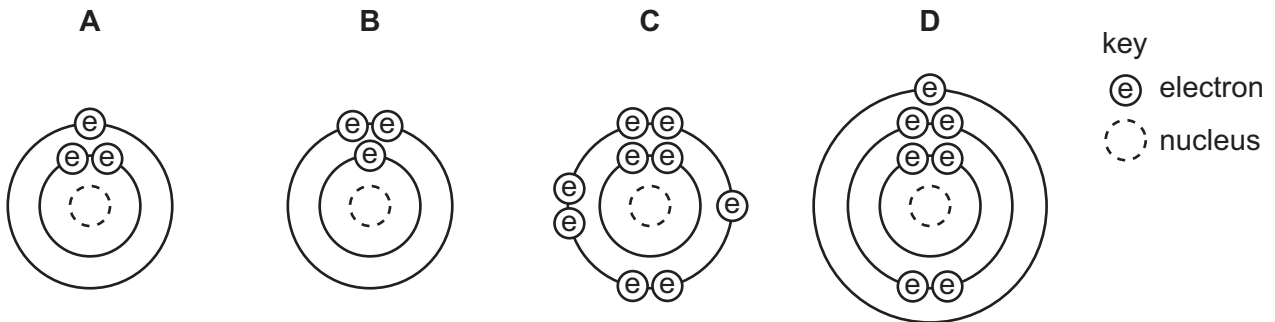
Where are the male and female gametes?

	male gamete	female gamete
A	1	2
B	1	3
C	2	3
D	3	2

13 What describes the placenta of a pregnant woman?

- A the cord connecting the baby to the mother, through which blood is circulated
- B the protective fluid-filled sac surrounding the embryo
- C the region of the female oviduct into which the egg is passed when it leaves the ovary
- D the structure where materials are exchanged between the mother's and the baby's tissues

14 What is the electronic structure of the atom ${}^7_3\text{Li}$?

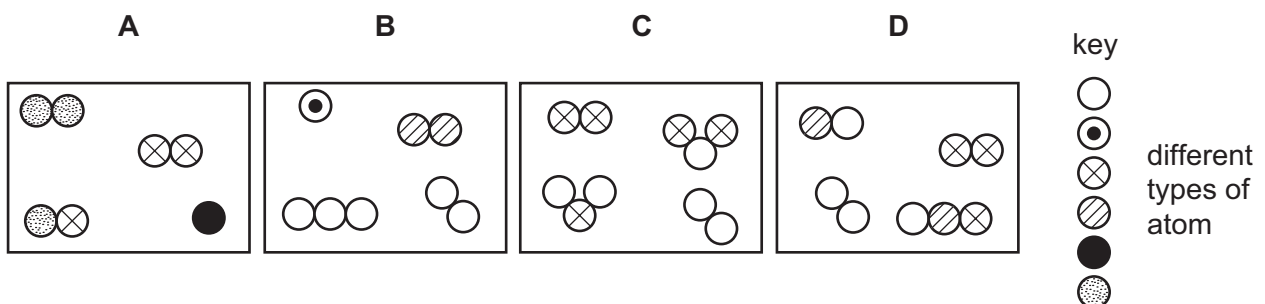


15 Which displayed formula correctly represents a molecule of carbon dioxide?

- A O – C – O
- B O = C = O
- C C – O – O
- D C = O = O

16 Four different mixtures of gases are made.

Which diagram represents a mixture containing only elements and **no** compounds?



17 The diagram shows an outline of the Periodic Table.

Which two elements have similar chemical properties?

V																		
	X																W	
																	Y	Z

- A V and W B V and X C W and Y D Y and Z

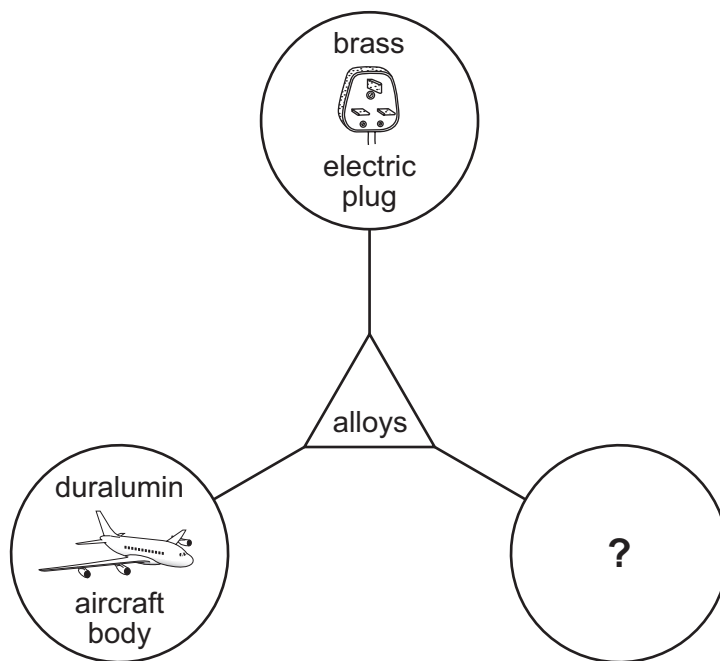
18 What is the reason for the lack of reactivity of the noble gases?

- A They have a complete outer shell of electrons.
B They have an even number of electrons.
C They have an even number of shells of electrons.
D They have two electrons in the first shell.

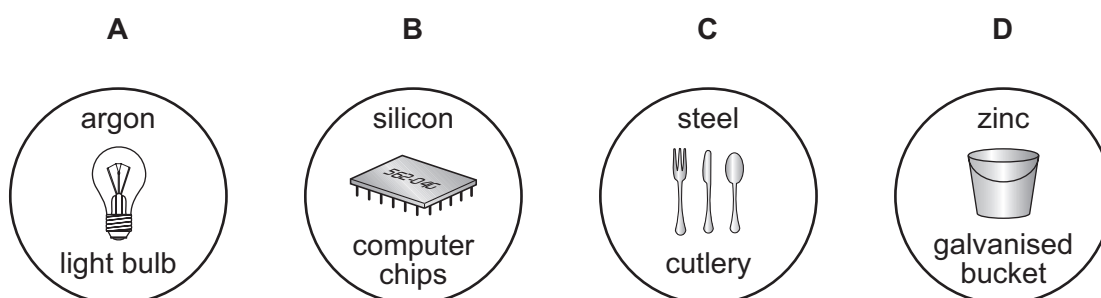
19 Which two elements react explosively with dilute acids?

- A Ca and Mg B Ca and K C K and Mg D K and Na

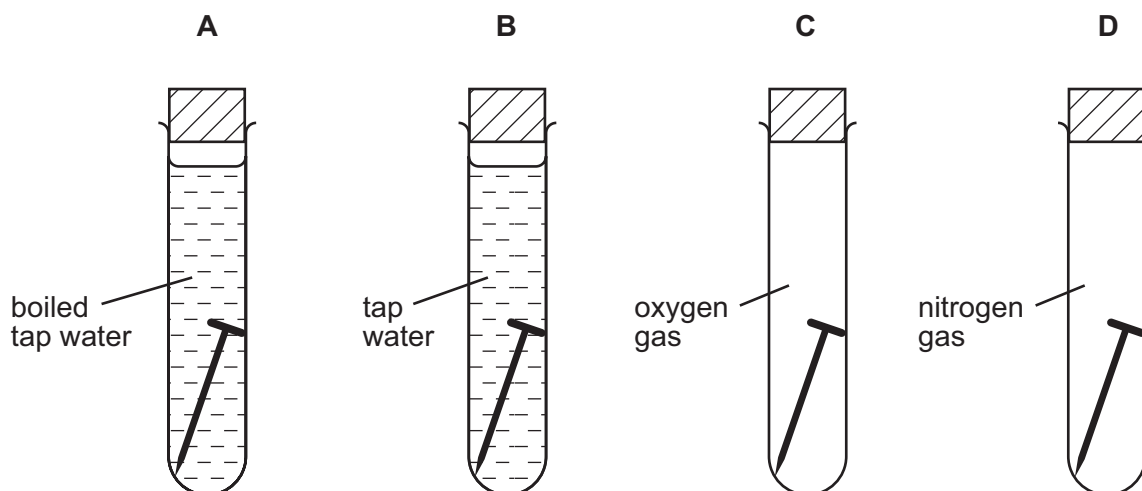
20 The diagram shows uses of alloys.



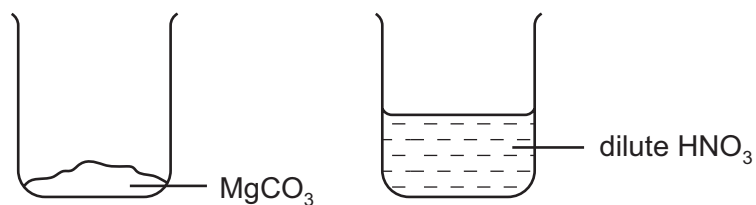
Which picture could be used to complete the diagram?



21 In which tube does the iron nail go rusty in the shortest time?



22 The contents of the labelled beakers shown are mixed.



Which salt is formed?

- A magnesium nitrate
- B magnesium sulphate
- C manganese nitrate
- D manganese sulphate

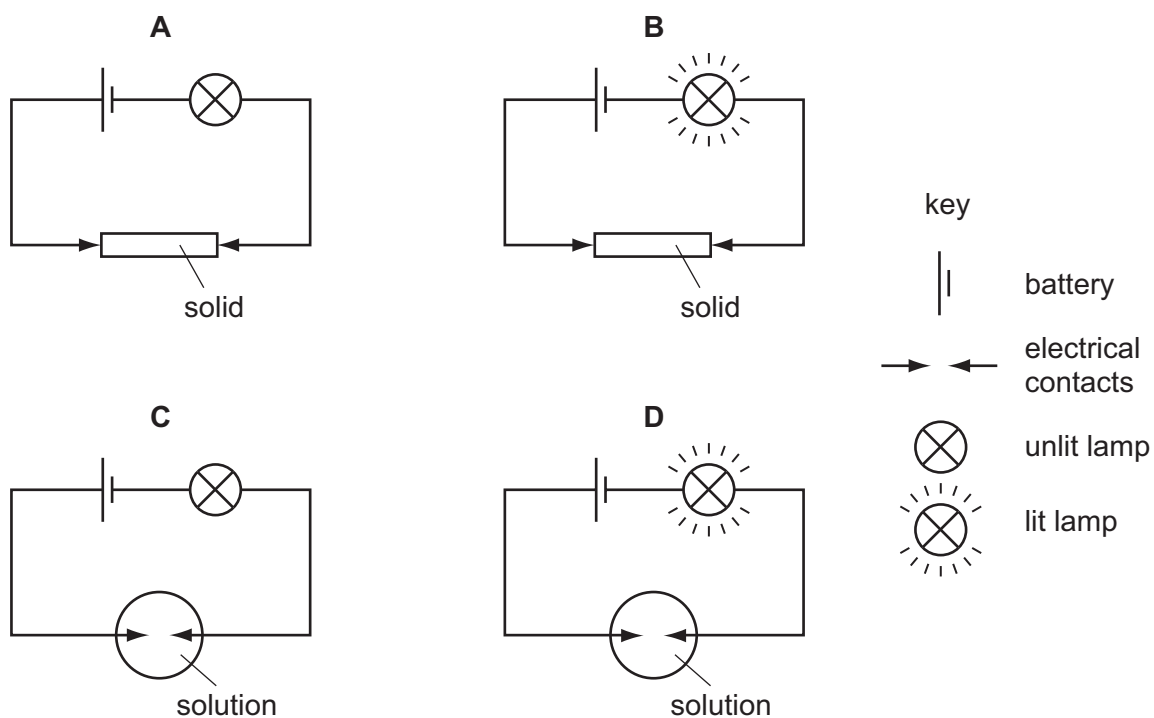
23 The table shows the results of tests on solution X.

test	result
blue litmus paper	turns red
aqueous silver nitrate	white precipitate

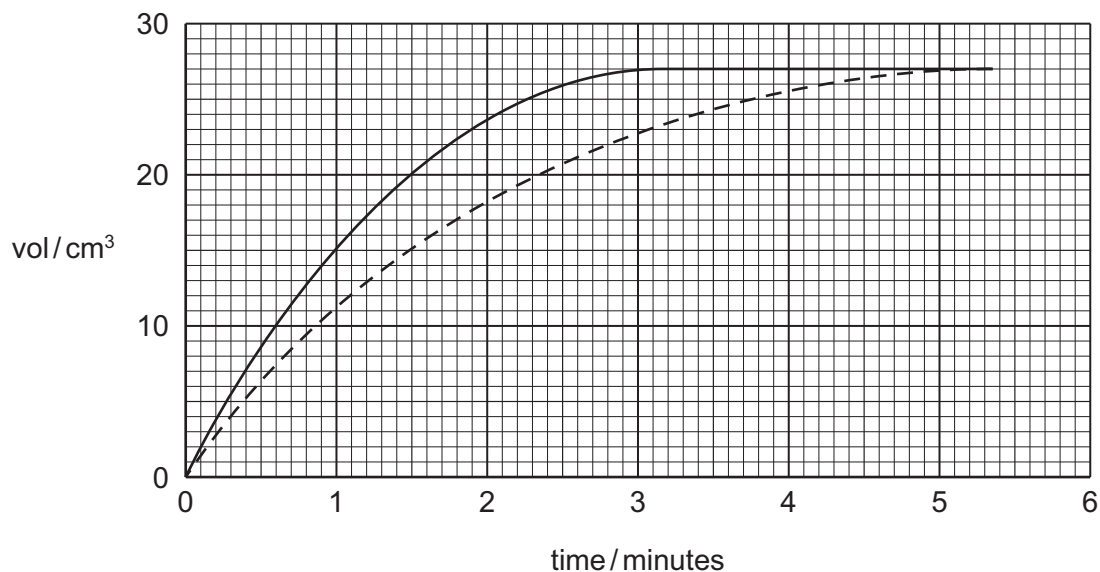
What could solution X contain?

- A HCl
- B HNO₃
- C NaCl
- D NaOH

24 Which diagram shows that an electrolyte is present?

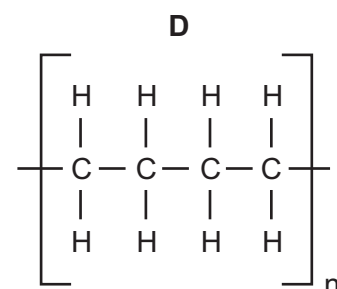
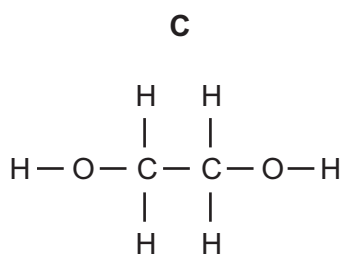
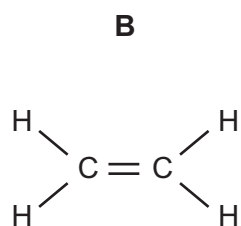
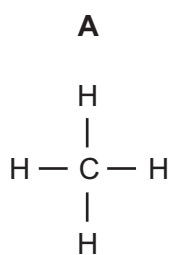


- 25 The solid line on the graph shows the volume of gas given off when calcium carbonate reacts with dilute hydrochloric acid.

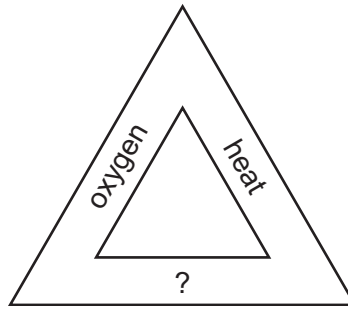


Which change to the conditions gives the results shown by the dotted line?

- A decrease the temperature of the acid
 - B decrease the size of the calcium carbonate pieces
 - C increase the concentration of the acid
 - D increase the mass of the calcium carbonate pieces
- 26 Which structure shows a polymer?



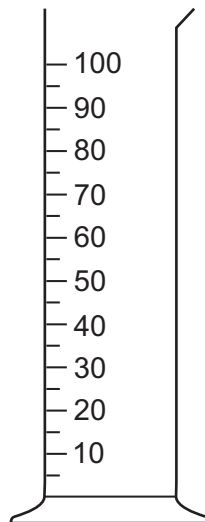
27 The diagram shows part of the fire triangle.



What completes the fire triangle?

- A carbon dioxide
- B flame
- C fuel
- D water

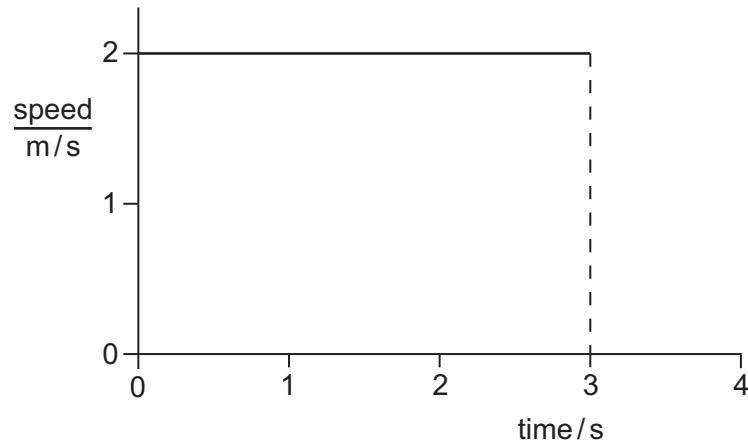
28 The diagram shows a measuring cylinder.



Which unit would be most suitable for its scale?

- A mm^2
- B mm^3
- C cm^2
- D cm^3

29 The diagram shows the speed-time graph for an object moving at constant speed.



What is the distance travelled by the object in the first 3 s?

- A** 1.5 m **B** 2.0 m **C** 3.0 m **D** 6.0 m

30 Which statement about the mass of a falling object is correct?

- A** It decreases as the object falls.
B It is equal to the weight of the object.
C It is measured in newtons.
D It stays the same as the object falls.

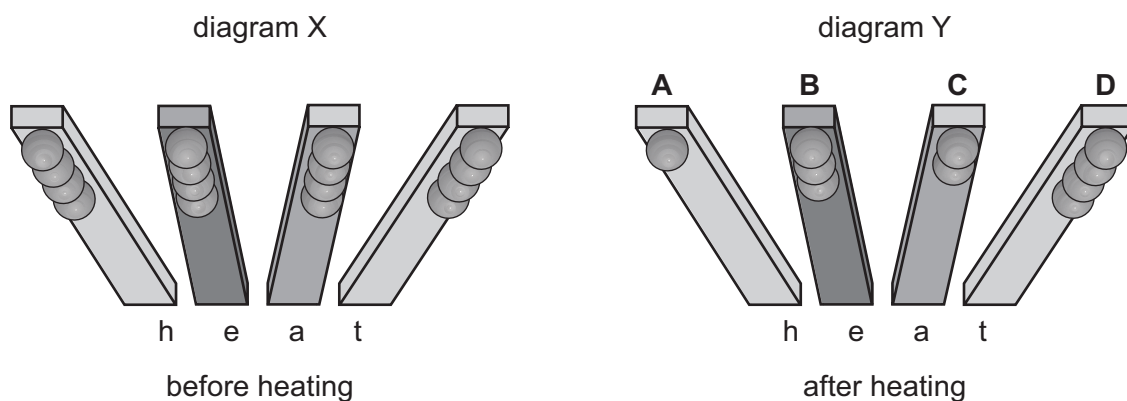
31 Which of the following is a unit of density?

- A** cm^3/g
B g/cm^2
C g/cm^3
D kg/m^2

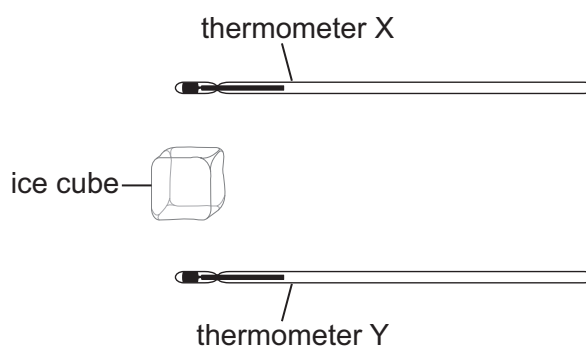
- 32 An experiment is set up to find out which metal is the best conductor of heat. Balls are stuck with wax to rods made from different metals, as shown in diagram X.

The rods are heated at one end. Some of the balls fall off, leaving some as shown in diagram Y.

Which labelled metal is the best conductor of heat?



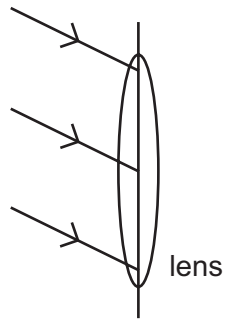
- 33 Thermometer X is held above an ice cube and thermometer Y is held the same distance below the ice cube. After several minutes, the reading on one thermometer changes. The ice cube does not melt.



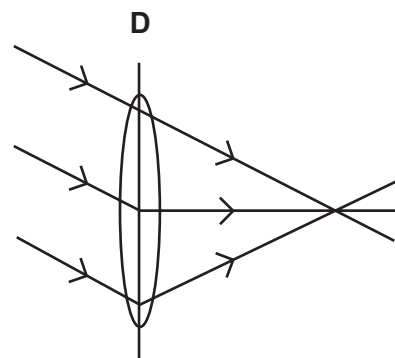
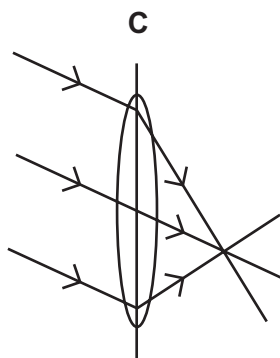
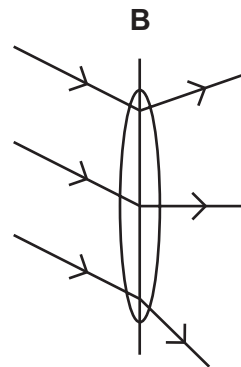
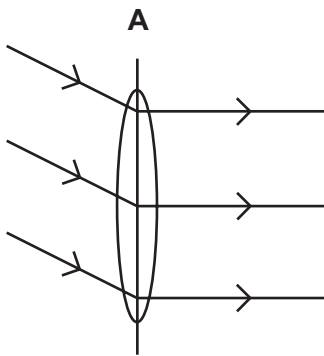
Which thermometer reading changes and why?

	thermometer	reason
A	X	cool air rises from the ice cube
B	X	warm air rises from the ice cube
C	Y	cool air falls from the ice cube
D	Y	warm air falls from the ice cube

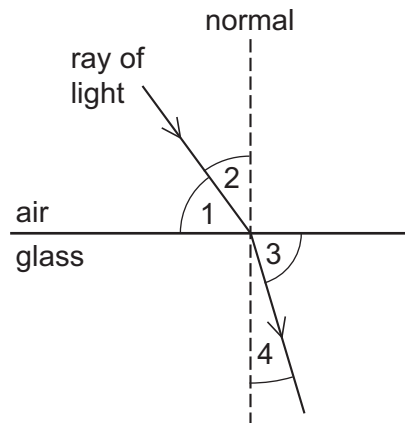
34 Three rays of light fall on a converging lens as shown.



Which diagram shows the path of the rays after passing through the lens?



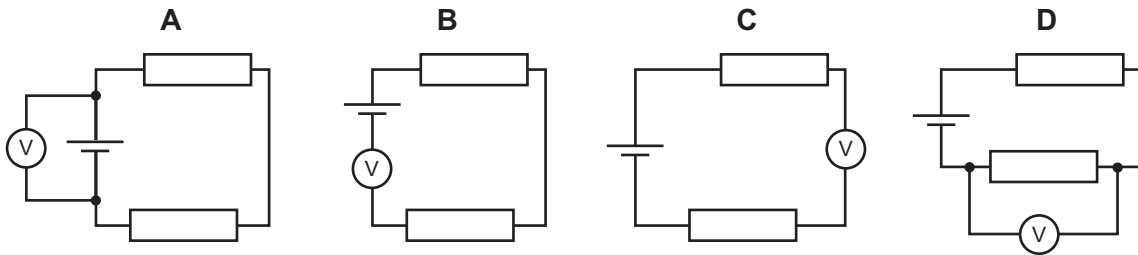
35 The diagram shows a ray of light entering a block of glass.



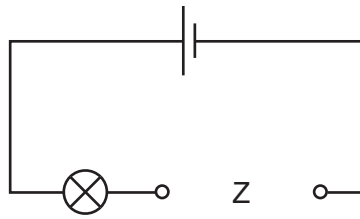
Which numbered angles are the angles of incidence and of refraction?

	angle of incidence	angle of refraction
A	1	3
B	1	4
C	2	3
D	2	4

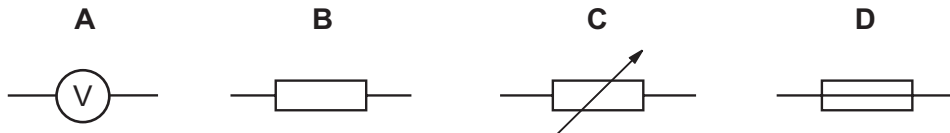
36 Which circuit shows how a voltmeter is connected to measure the potential difference across the cell?



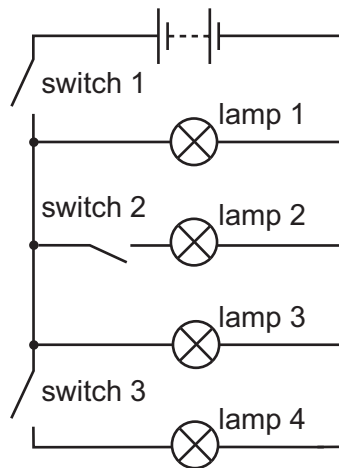
- 37 An electrical component is to be placed in the circuit at Z, to allow the brightness of the lamp to be varied from bright to dim.



What should be connected at Z?



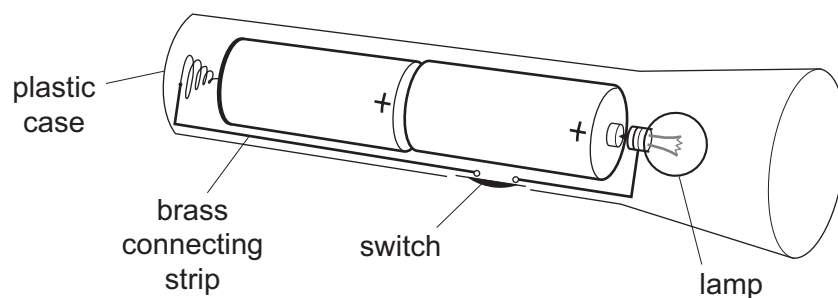
- 38 The circuit shown contains four lamps and three switches.



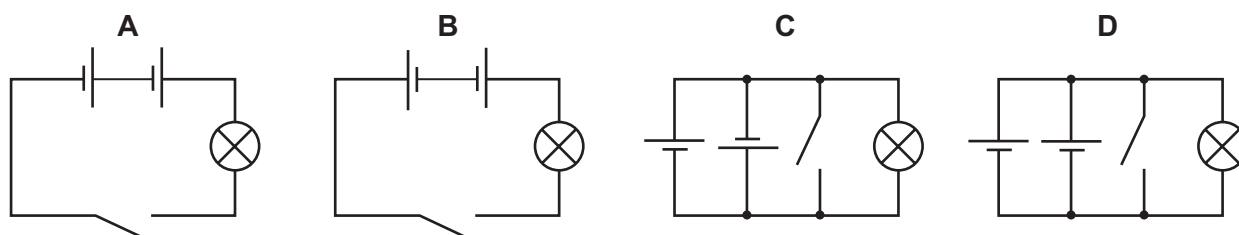
Which switches must be closed to light only lamps 1 and 3?

- A switch 1 only
- B switch 1 and switch 2 only
- C switch 1 and switch 3 only
- D switch 2 and switch 3 only

39 The diagram shows a torch containing two 2 V cells, a switch and a lamp.



What is the circuit diagram for the torch?



40 Which line correctly describes α -particles?

	electric charge	penetrates 1 cm of aluminium?
A	negative	yes
B	negative	no
C	positive	yes
D	positive	no

DATA SHEET The Periodic Table of the Elements

		Group										
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
7 Li Lithium 3	9 Be Beryllium 4	1 H Hydrogen 1										4 He Helium 2
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	13 Al Aluminium 13	14 Si Silicon 14	15 P Phosphorus 15	16 S Sulphur 16	17 Cl Chlorine 17	18 Ar Argon 18	19 F Fluorine 9	20 Ne Neon 10	
39 K Potassium 19	40 Ca Calcium 20	27 Co Cobalt 27	28 Ni Nickel 28	29 Cu Copper 29	30 Zn Zinc 30	31 Ga Gallium 31	32 Ge Germanium 32	33 As Arsenic 33	34 Se Selenium 34	35 Br Bromine 35	36 Kr Krypton 36	
85 Rb Rubidium 37	88 Sr Strontium 38	45 Sc Scandium 21	46 Ti Titanium 22	47 V Vanadium 23	48 Cr Chromium 24	49 Mn Manganese 25	50 Fe Iron 26	51 Co Cobalt 27	52 Ni Nickel 28	53 Cu Copper 29	54 Zn Zinc 30	
133 Cs Caesium 55	137 Ba Barium 56	89 Y Yttrium 39	90 Zr Zirconium 40	91 Nb Niobium 41	92 Mo Molybdenum 42	93 Tc Technetium 43	94 Ru Ruthenium 44	95 Rh Rhodium 45	96 Pd Palladium 46	97 Ag Silver 47	98 Cd Cadmium 48	
226 Ra Radium 88	227 Ac Actinium 89	140 Ce Cerium 58	141 Pr Praseodymium 59	142 Nd Neodymium 60	143 Pm Promethium 61	144 Sm Samarium 62	145 Eu Europium 63	146 Gd Gadolinium 64	147 Tb Terbium 65	148 Dy Dysprosium 66	149 Ho Holmium 67	
87 Fr Francium	88 Ra Radium	209 Bi Bismuth 83	210 Po Polonium 84	211 At Astatine 85	212 Rn Radon 86	213 Lu Lutetium 71	214 Yb Ytterbium 70	215 Lu Lutetium 71	216 Lr Lawrencium 103	217 No Nobelium 102	218 U Uranium 92	
55 Fr Francium	56 Ra Radium	81 Tl Thallium 81	82 Pb Lead 82	83 Bi Bismuth 83	84 Po Polonium 84	85 At Astatine 85	86 Rn Radon 86	87 Lu Lutetium 71	88 Yb Ytterbium 70	89 Lu Lutetium 71	90 Lr Lawrencium 103	

*58-71 Lanthanoid series
90-103 Actinoid series

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

Key

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).