



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

www.PapaCambridge.com

CO-ORDINATED SCIENCES

0654/13

Paper 1 Multiple Choice

October/November 2010

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 4 5 1 6 1 5 3 9 8 2 *

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 **18** printed pages and **2** blank pages.



- 1 How do bacteria cause tooth decay?
- A They release acids that dissolve enamel.
 - B They release alkalis that dissolve enamel.
 - C They release enzymes that digest enamel.
 - D They release ethanol that digests enamel.

- 2 Which row is correct for the blood in veins?

| | direction of flow | oxygen content |
|----------|-------------------|----------------|
| A | away from heart | always high |
| B | away from heart | high or low |
| C | towards heart | always low |
| D | towards heart | high or low |

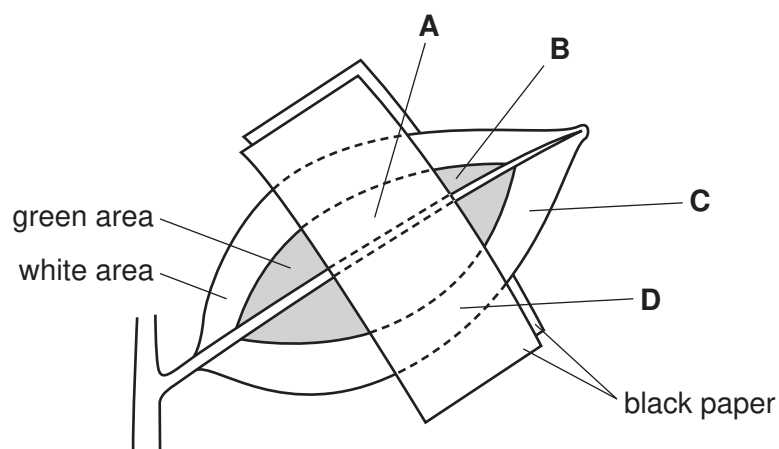
- 3 What happens during anaerobic respiration in muscle cells?

- A carbon dioxide is released
- B energy is released
- C lactic acid is oxidised
- D water is released

- 4 The diagram shows a leaf, still attached to a plant, with both green and white regions that have been partly covered with black paper.

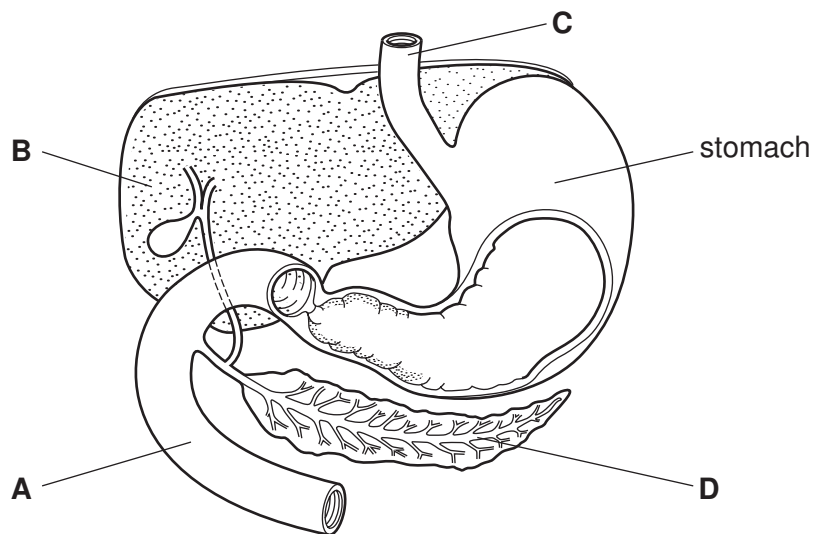
The leaf is left in bright light for six hours and then tested for starch.

Which area of the leaf turns blue-black after the starch test?



- 5 Which cells produce starch in their cytoplasm?
- A all animal cells
 B all plant cells
 C some animal cells
 D some plant cells
- 6 Which features are found in mammals but **not** in other vertebrates?
- A claws and hair
 B claws and lungs
 C hair and milk
 D lungs and milk
- 7 The diagram shows part of the digestive system.

Where does lipase digest fat?



- 8 Which internal conditions in a human being are maintained at a more or less constant level as the result of homeostasis?

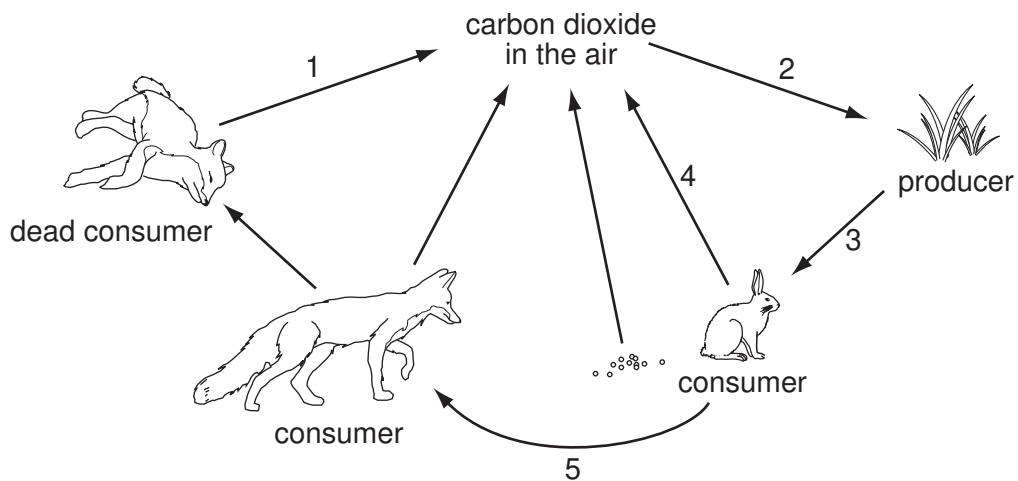
| | blood glucose | blood insulin | body temperature |
|---|---------------|---------------|------------------|
| A | ✓ | ✓ | ✓ |
| B | ✓ | ✓ | x |
| C | ✓ | x | ✓ |
| D | x | ✓ | ✓ |

- 9 The alleles for a particular character are H and h.

Which term describes an organism whose genotype is Hh?

- A heterozygote
- B homozygote
- C phenotype
- D recessive

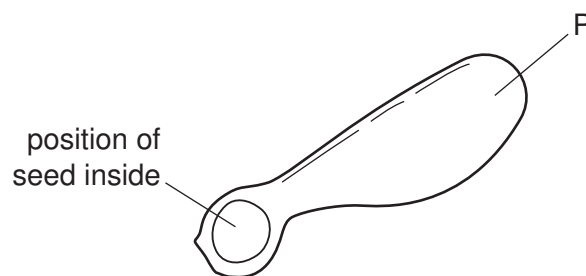
- 10 The diagram shows part of the carbon cycle which includes a food chain.



Which arrows are part of the food chain?

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

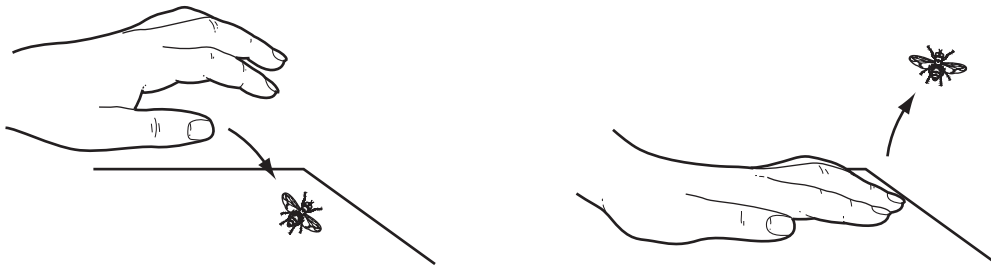
- 11 The diagram shows a wind-dispersed, single-seeded fruit.



Structure P is an extension of which part?

- A cotyledon
- B leaf
- C ovary wall
- D testa

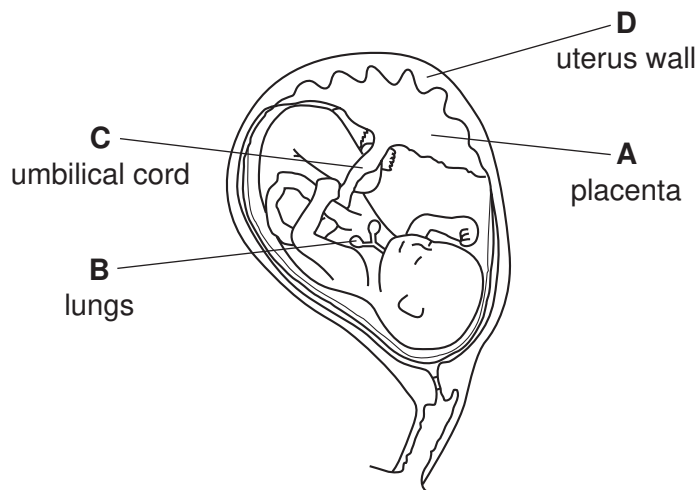
12 The diagram shows two stages in an attempt to kill a fly.



What else does the diagram show?

- A The fly converts impulses to stimuli.
 - B The fly responds to a stimulus.
 - C The hand produces impulses.
 - D The hand is a receptor.
- 13 The diagram shows a developing fetus.

Where does the fetal blood become oxygenated?

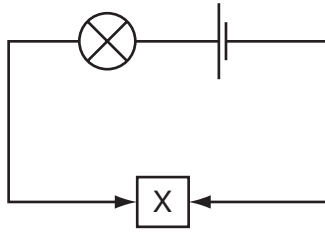


14 Which molecules join into long chains to make proteins?

- A amino acids
- B ethene
- C glucose
- D starch

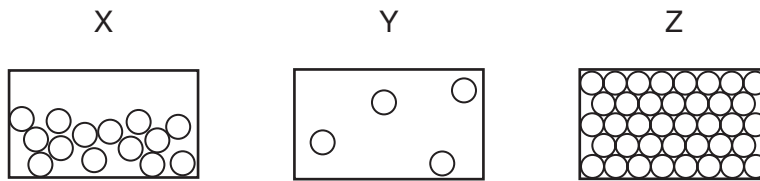
15 The diagram shows a circuit.

Solid X makes the lamp light.



What is solid X?

- A rubber
 - B silicon(IV) oxide
 - C sulfur
 - D zinc
- 16 The three states of matter are represented by diagrams X, Y and Z.

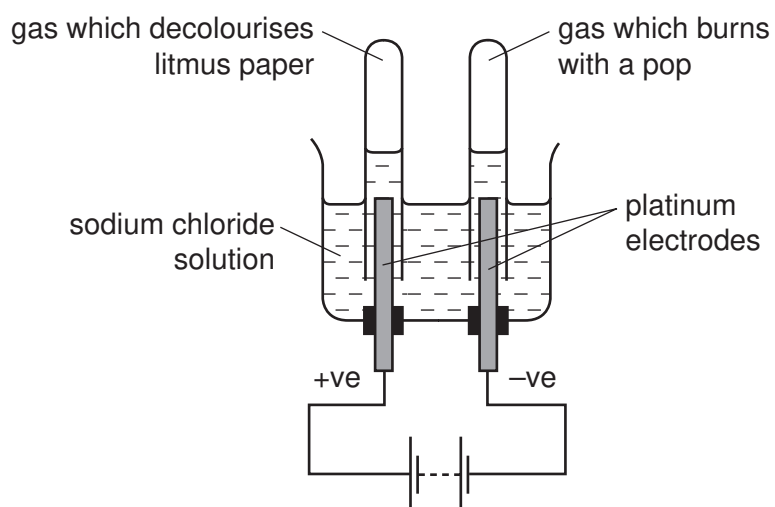


Which change occurs during condensation?

- A X to Y
- B X to Z
- C Y to X
- D Z to X

17 Sodium chloride solution is electrolysed and a gas is collected at each electrode.

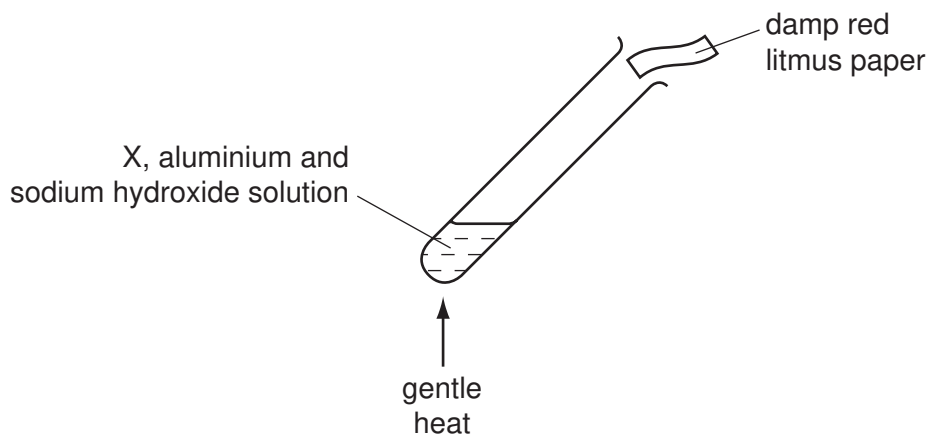
One gas decolourises moist litmus paper, the other gas burns with a pop.



Which statement is correct?

- A Chlorine gas is collected at the anode.
- B Hydrogen gas is collected at the anode.
- C Oxygen gas is collected at the cathode.
- D The cathode is the positive electrode.

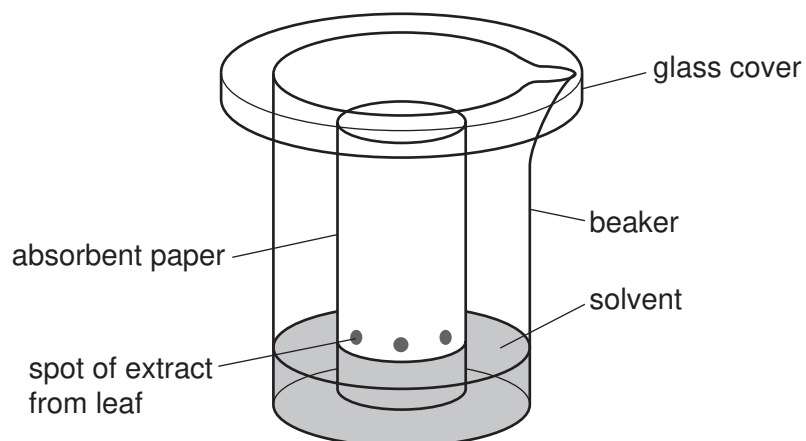
- 18 Compound X is heated gently with aluminium powder and sodium hydroxide solution.



The damp red litmus paper turns blue.

What does X contain?

- A carbonate
 - B chloride
 - C nitrate
 - D sulfate
- 19 A student uses the apparatus shown to find out how many different pigments are in leaves.



What is this separation method called?

- A chromatography
- B distillation
- C evaporation
- D filtration

20 Which two elements are present in the compounds found in petroleum?

- A carbon and nitrogen
- B carbon and oxygen
- C hydrogen and carbon
- D hydrogen and oxygen

21 Carbon is used in the extraction of some metals from their ores because

- 1 carbon forms strong alloys with metals,
- 2 carbon reacts with oxygen in the ore.

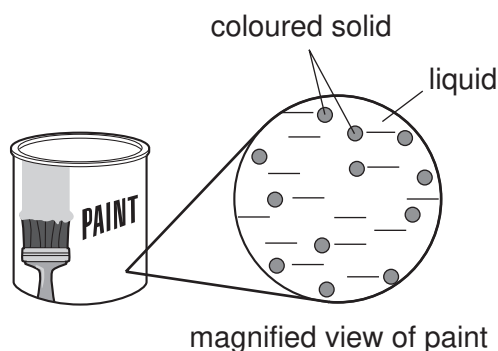
Which of these statements are correct?

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

22 Which material is made from silicon(IV) oxide combined with metal oxides?

- A brass
- B glass
- C polythene
- D steel

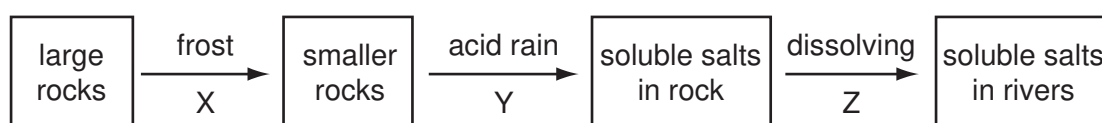
23 Paint contains particles of solid finely dispersed in a liquid.



Which term correctly describes paint?

- A emulsion
- B gel
- C sol
- D solution

24 Rocks can be weathered by natural changes.



Which row correctly describes the type of change?

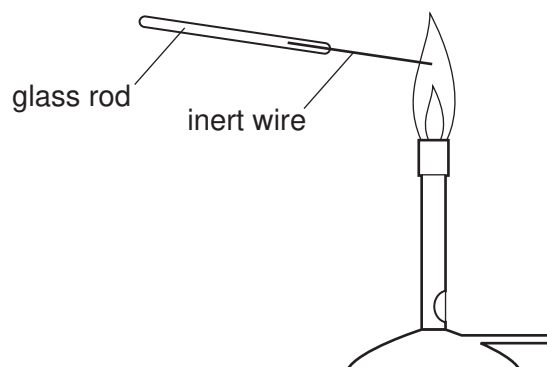
| | X | Y | Z |
|----------|----------|----------|----------|
| A | chemical | chemical | chemical |
| B | chemical | physical | chemical |
| C | physical | chemical | physical |
| D | physical | physical | physical |

25 100 cm^3 of a liquid has a mass of 85g.

How does the density of this liquid compare with the density of water (1 g/cm^3)?

- A Its density is higher than that of water.
- B Its density is lower than that of water.
- C Its density is the same as that of water.
- D It is impossible to say with only this data.

- 26 In separate experiments, an inert wire is dipped into two solutions, P and Q. The wire is then placed in the flame of a Bunsen burner.



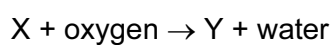
The table shows the results.

| | solution P | solution Q |
|------------------------|------------|------------|
| colour of Bunsen flame | yellow | green |

Which metal ions are present in the solutions?

| | P | Q |
|----------|--------|---------|
| A | copper | calcium |
| B | copper | sodium |
| C | sodium | calcium |
| D | sodium | copper |

- 27 Waste material buried underground can decay to form gas X which can be used as a fuel. X burns to form an oxide Y and water.

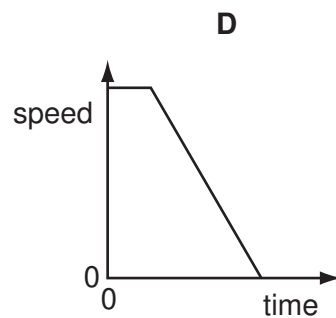
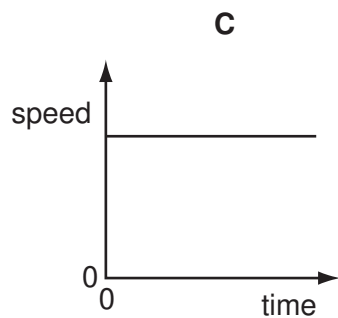
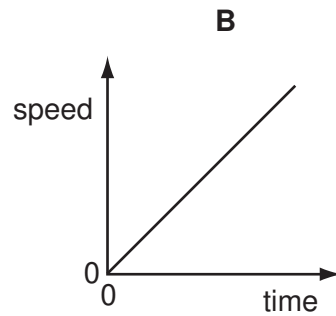
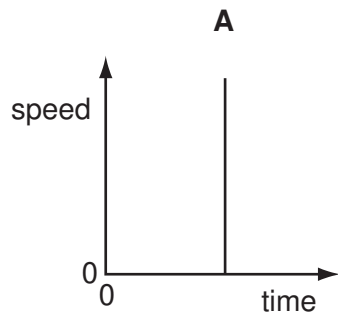


What is Y?

- A** carbon dioxide
- B** nitrogen dioxide
- C** sulfur dioxide
- D** sulfur trioxide

31 Four speed-time graphs are shown below.

Which graph could **not** show the motion of a car being driven normally?

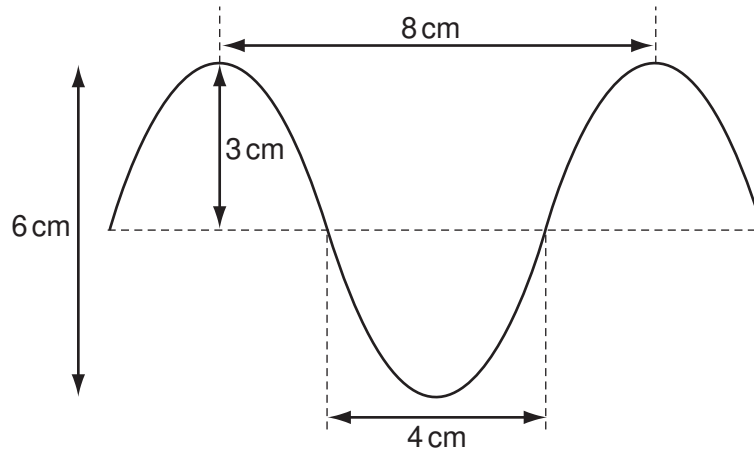


32 1 kg of water and 1 kg of aluminium are heated to the same temperature and then allowed to cool in a room.

Which of these could be a reason why the aluminium cools more quickly than the water?

- A** Aluminium does not evaporate but water does.
- B** Aluminium has a higher specific heat capacity than water.
- C** Aluminium has a lower specific heat capacity than water.
- D** Aluminium is a better insulator of heat than water.

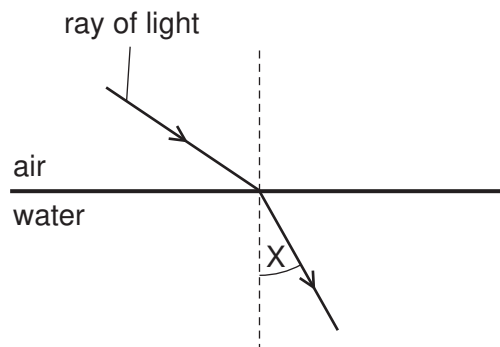
33 The diagram shows a wave.



What are the amplitude and the wavelength of this wave?

| | amplitude / cm | wavelength / cm |
|----------|----------------|-----------------|
| A | 3 | 4 |
| B | 3 | 8 |
| C | 6 | 4 |
| D | 6 | 8 |

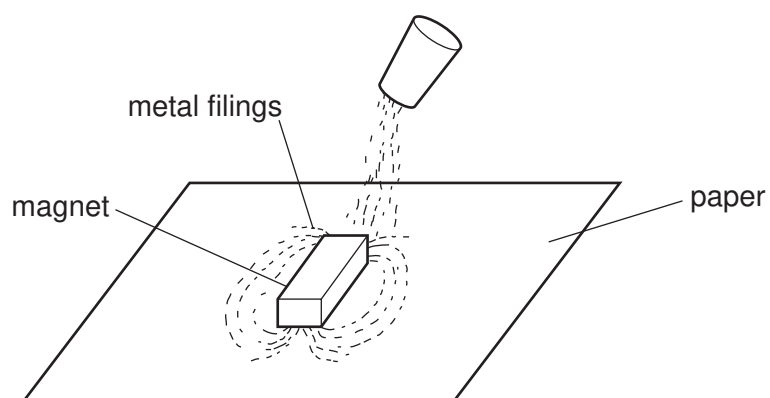
34 The diagram shows a ray of light passing from air into water.



What is the name of angle X?

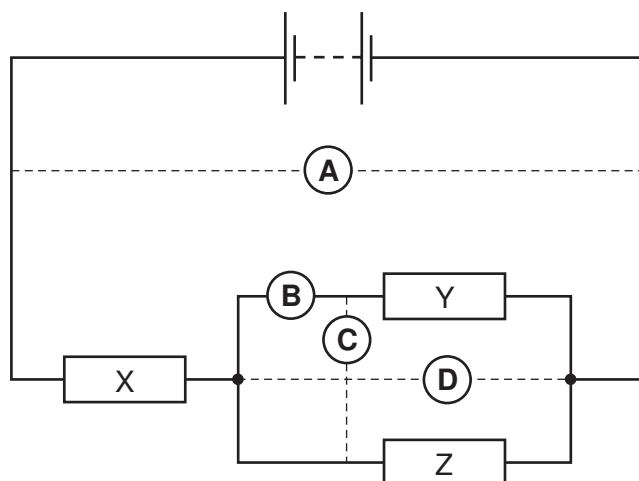
- A** the angle of incidence
- B** the angle of reflection
- C** the angle of refraction
- D** the critical angle

- 35 The pattern of field lines around a bar magnet on a sheet of paper can be shown by sprinkling metal filings on to the paper.

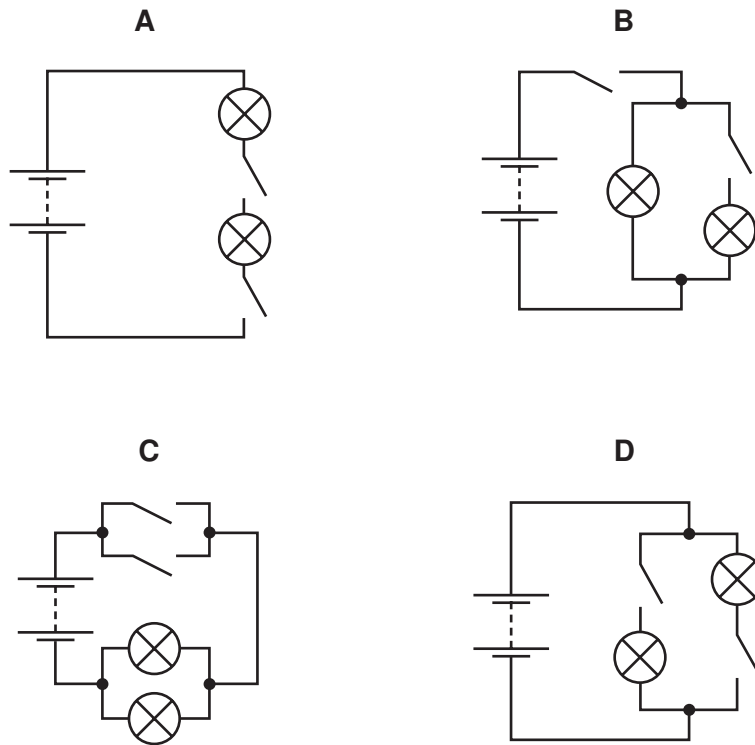


From which metal could the filings be made?

- A aluminium
 - B copper
 - C iron
 - D zinc
- 36 A circuit consists of three resistors, X, Y and Z, connected to a battery as shown in the diagram. The potential difference across resistor Y is measured. In which position should the voltmeter be connected to do this?



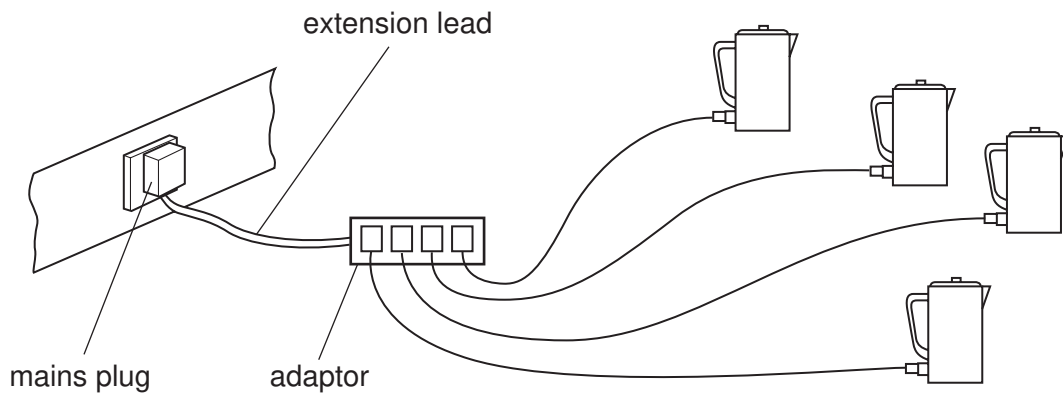
37 Which diagram shows a circuit that will allow the lamps to be switched on and off independently?



38 The diagram shows four electric kettles plugged into a 4-way adaptor.

An extension lead connects the adaptor to a single mains plug.

The mains plug is designed to work without a fuse.



Why is this use of the adaptor dangerous?

- A The extension lead connecting the adaptor to the mains plug will overheat.
- B The heating elements in the kettle will overheat.
- C The leads connecting the kettles to the adaptor will overheat.
- D The water in the kettles will overheat.

39 Compared with beta-particles and gamma-rays, alpha-particles

- A are the only radiation to carry a charge.
- B have the greatest ionising effect.
- C have the greatest penetrating effect.
- D have the smallest mass.

40 A small amount of a substance contains 72 billion radioactive atoms. The half-life of the substance is 4 hours.

How many radioactive atoms would remain after 12 hours?

- A 6 billion
- B 9 billion
- C 18 billion
- D 24 billion

DATA SHEET

The Periodic Table of the Elements

| Group | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------------|---------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|----------------------------------|--|--|--|--|-------------------------------|
| I | II | | | | | | | | | | | III | IV | V | VI | VII | 0 | | | | | |
| | | | | | | | | | | | 1 H Hydrogen 1 | | | | | | | | | | | 4 He Helium 2 |
| 7 Li Lithium 3 | 9 Be Beryllium 4 | | | | | | | | | | | 11 B Boron 5 | 12 C Carbon 6 | 14 N Nitrogen 7 | 16 O Oxygen 8 | 19 F Fluorine 9 | 20 Ne Neon 10 | | | | | |
| 23 Na Sodium 11 | 24 Mg Magnesium 12 | | | | | | | | | | | 27 Al Aluminium 13 | 28 Si Silicon 14 | 31 P Phosphorus 15 | 32 S Sulfur 16 | 35.5 Cl Chlorine 17 | 40 Ar Argon 18 | | | | | |
| 39 K Potassium 19 | 40 Ca Calcium 20 | 45 Sc Scandium 21 | 48 Ti Titanium 22 | 51 V Vanadium 23 | 52 Cr Chromium 24 | 55 Mn Manganese 25 | 56 Fe Iron 26 | 59 Co Cobalt 27 | 59 Ni Nickel 28 | 64 Cu Copper 29 | 65 Zn Zinc 30 | 70 Ga Gallium 31 | 73 Ge Germanium 32 | 75 As Arsenic 33 | 79 Se Selenium 34 | 80 Br Bromine 35 | 84 Kr Krypton 36 | | | | | |
| 85 Rb Rubidium 37 | 88 Sr Strontium 38 | 89 Y Yttrium 39 | 91 Zr Zirconium 40 | 93 Nb Niobium 41 | 96 Mo Molybdenum 42 | 96 Tc Technetium 43 | 101 Ru Ruthenium 44 | 103 Rh Rhodium 45 | 106 Pd Palladium 46 | 108 Ag Silver 47 | 112 Cd Cadmium 48 | 115 In Indium 49 | 119 Sn Tin 50 | 122 Sb Antimony 51 | 128 Te Tellurium 52 | 127 I Iodine 53 | 131 Xe Xenon 54 | | | | | |
| 133 Cs Caesium 55 | 137 Ba Barium 56 | 139 La Lanthanum 57 * | 178 Hf Hafnium 72 | 181 Ta Tantalum 73 | 184 W Tungsten 74 | 186 Re Rhenium 75 | 190 Os Osmium 76 | 192 Ir Iridium 77 | 195 Pt Platinum 78 | 197 Au Gold 79 | 201 Hg Mercury 80 | 204 Tl Thallium 81 | 207 Pb Lead 82 | 209 Bi Bismuth 83 | 210 Po Polonium 84 | 210 At Astatine 85 | 210 Rn Radon 86 | | | | | |
| 87 Fr Francium | 226 Ra Radium | 227 Ac Actinium † | | | | | | | | | | | | | | | | | | | | |

*58-71 Lanthanoid series

†90-103 Actinoid series

Key

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

| | | | | | | | | | | | | | |
|-----------------------------------|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|------------------------------------|--|-------------------------------------|---------------------------------------|
| 140 Ce Cerium 58 | 141 Pr Praseodymium 59 | 144 Nd Neodymium 60 | Pm Promethium 61 | 150 Sm Samarium 62 | 152 Eu Europium 63 | 157 Gd Gadolinium 64 | 159 Tb Terbium 65 | 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 Pa Protactinium 91 | 238 U Uranium 92 | 238 Np Neptunium 93 | 238 Pu Plutonium 94 | 238 Am Americium 95 | 238 Cm Curium 96 | 238 Bk Berkelium 97 | 238 Cf Californium 98 | 238 Es Einsteinium 99 | 238 Fm Fermium 100 | 238 Md Mendelevium 101 | 238 No Nobelium 102 | 238 Lr Lawrencium 103 |

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

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of