



Cambridge IGCSE™

CO-ORDINATED SCIENCES

0654/12

Paper 1 Multiple Choice (Core)

May/June 2021

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

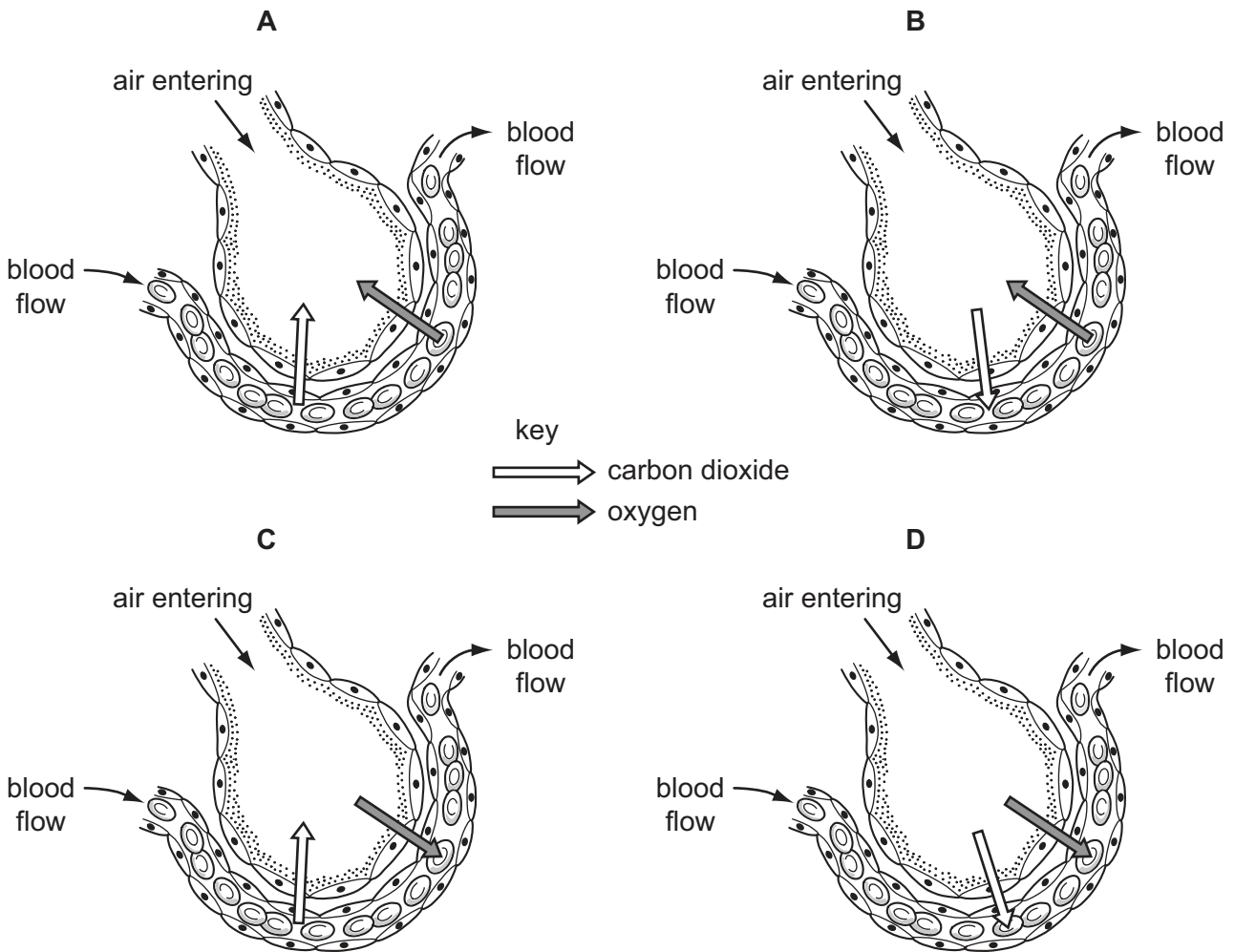
This document has **16** pages.



1 What is respiration?

- A breakdown of food by enzymes in the alimentary canal
- B breathing to supply oxygen to cells
- C release of carbon dioxide from the lungs
- D release of energy for body activities

2 Which diagram correctly shows the diffusion of carbon dioxide and oxygen between an alveolus and a capillary?



3 Which row matches the nutrient to the chemical elements that it contains?

| | nutrient | carbon | hydrogen | oxygen | nitrogen |
|----------|----------|--------|----------|--------|----------|
| A | fat | ✓ | ✓ | X | X |
| B | protein | ✓ | ✓ | ✓ | ✓ |
| C | starch | ✓ | X | ✓ | ✓ |
| D | sugar | X | ✓ | ✓ | ✓ |

key

✓ = contains element

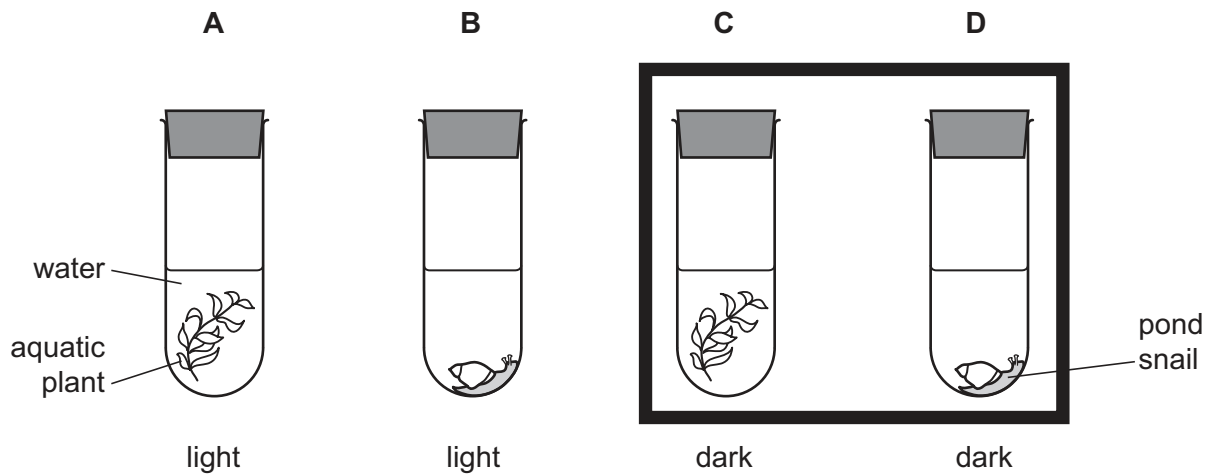
X = does not contain element

4 Which type of molecule are enzymes?

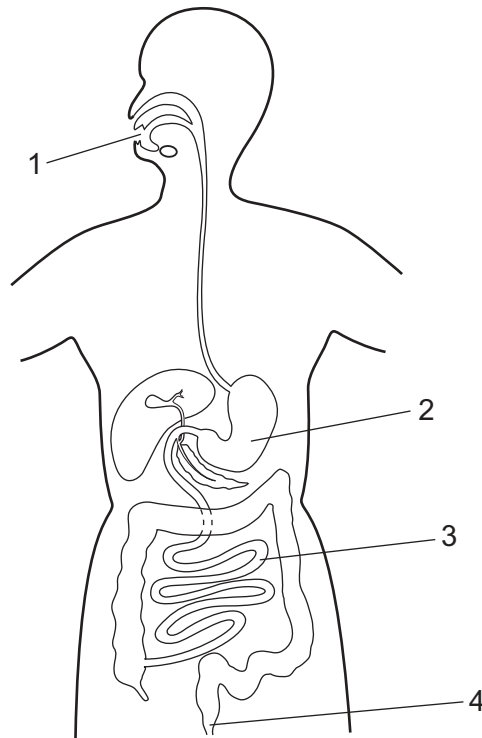
- A** fat
- B** carbohydrate
- C** protein
- D** DNA

5 Four test-tubes were set up as shown.

Which test-tube will contain the most dissolved oxygen after 24 hours?



6 The diagram shows the human digestive system.



Where do digestion, egestion, ingestion and absorption take place?

| | digestion | egestion | ingestion | absorption |
|----------|-----------|----------|-----------|------------|
| A | 1 | 4 | 2 | 3 |
| B | 2 | 4 | 1 | 3 |
| C | 3 | 1 | 4 | 2 |
| D | 4 | 3 | 2 | 1 |

7 Transpiration is the process by which water moves through a plant.

From which cells in the leaf does most of the water evaporate and through which structure is it lost as water vapour to the atmosphere?

| | evaporates from | lost as water vapour through |
|----------|-----------------|------------------------------|
| A | epidermis | cuticle |
| B | epidermis | stomata |
| C | mesophyll | cuticle |
| D | mesophyll | stomata |

- 8 A child blows into a rubber balloon.

What is the percentage of oxygen inside the balloon?

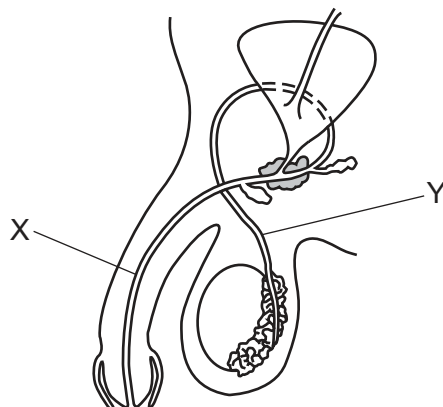
- A 0% B 4% C 16% D 21%

- 9 A student is in a dangerous situation and adrenaline is released into the blood. The table shows changes to pulse rate, breathing rate and pupil diameter.

Which row correctly describes the effect of adrenaline?

| | pulse rate | breathing rate | pupil diameter |
|----------|------------|----------------|----------------|
| A | decrease | increase | decrease |
| B | decrease | decrease | increase |
| C | increase | increase | increase |
| D | increase | decrease | decrease |

- 10 The diagram shows the human male reproductive system.



What are the functions of X and Y?

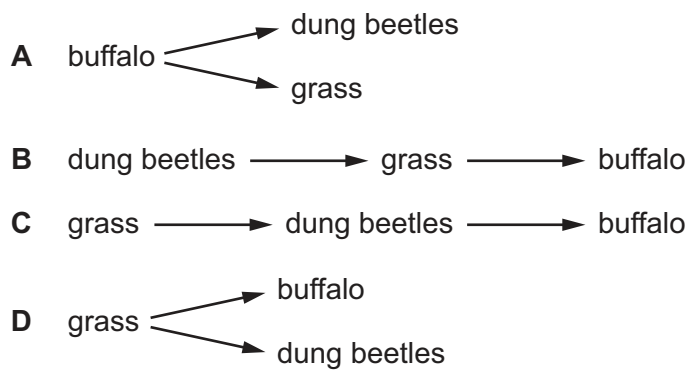
| | X | Y |
|----------|---|---|
| A | carries urine and semen out of the body | transfers sperm to the urethra |
| B | production of male gametes | transfers semen to the vagina during sexual intercourse |
| C | transfers semen to the vagina during sexual intercourse | production of male gametes |
| D | transfers sperm to the urethra | carries urine and semen out of the body |

11 Which row is correct for the inheritance of sex in humans?

| | female | male |
|----------|--------|------|
| A | XX | XY |
| B | XY | XX |
| C | YY | XX |
| D | XX | YY |

12 Dung beetles lay their eggs in the faeces of plant-eating mammals like buffalo. Both the adult beetles and their young stages eat the **undigested** food in the faeces.

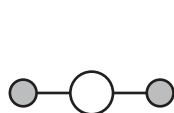
Which diagram shows this food relationship?



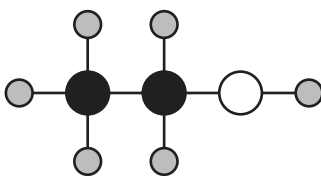
13 Which process removes carbon dioxide from the atmosphere?

- A** combustion
- B** photosynthesis
- C** respiration
- D** transpiration

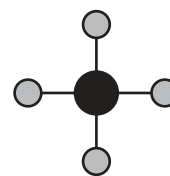
14 The structures of some substances are shown.



water



ethanol



methane

Which row shows the total number of different elements and the total number of atoms in the three structures?

| | total number of different elements | total number of atoms |
|----------|------------------------------------|-----------------------|
| A | 3 | 9 |
| B | 3 | 17 |
| C | 7 | 9 |
| D | 7 | 17 |

15 Which method can be used to separate graphite from dilute nitric acid?

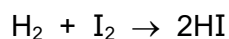
- A** chromatography
- B** crystallisation
- C** distillation
- D** filtration

16 Which statement about a carbon dioxide molecule is correct?

- A** It is composed of metallic elements, which are covalently bonded.
- B** It is composed of metallic elements, which are ionically bonded.
- C** It is composed of non-metallic elements, which are covalently bonded.
- D** It is composed of non-metallic elements, which are ionically bonded.

- 17 Hydrogen reacts with iodine to form hydrogen iodide.

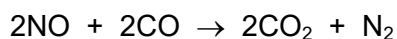
The equation for this reaction is shown.



During this reaction the temperature increases.

Which statement explains why the temperature increases?

- A One molecule of hydrogen is forming two molecules of hydrogen iodide.
 - B The reaction is exothermic.
 - C The reaction is very fast.
 - D The reaction takes in energy.
- 18 The catalytic converter in the exhaust of a car brings about the reaction shown.



Which row about this reaction is correct?

| | oxidation | reduction | |
|----------|-----------|-----------|--------------------|
| A | ✓ | ✓ | key |
| B | ✓ | x | ✓ = occurs |
| C | x | ✓ | x = does not occur |
| D | x | x | |

- 19 The results of two tests on substance X are listed.

- 1 A lilac flame is produced in a flame test.
- 2 A gas which turns damp red litmus blue is produced when X is heated with aluminium powder and aqueous sodium hydroxide.

What is X?

- A potassium nitrate
- B potassium sulfate
- C sodium nitrate
- D sodium sulfate

20 What reacts with ammonia gas?

| | hydrochloric acid | sodium hydroxide | |
|----------|-------------------|------------------|---|
| A | ✓ | ✓ | key ✓ = reacts x = does not react |
| B | ✓ | x | |
| C | x | ✓ | |
| D | x | x | |

21 Which row describes trends in the properties of Group I elements as the group is descended?

| | melting point | reactivity with water |
|----------|---------------|-----------------------|
| A | decreasing | decreasing |
| B | decreasing | increasing |
| C | increasing | decreasing |
| D | increasing | increasing |

22 Bauxite is the main ore of aluminium.

Which method is used to extract pure aluminium from bauxite?

- A** fractional distillation
- B** electrolysis
- C** neutralisation
- D** thermal decomposition

23 In order to make water from reservoirs fit to drink1..... is used to kill bacteria.

Water in a condenser is used during distillation as a2..... .

When water is used to make ethanol from ethene it is acting as a3..... .

Which words correctly complete gaps 1, 2 and 3?

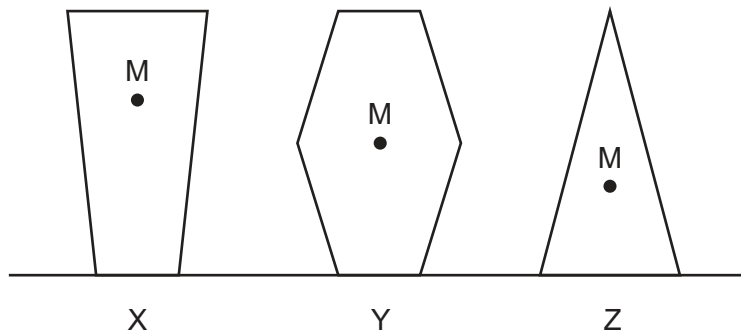
| | 1 | 2 | 3 |
|----------|--------------|---------|----------|
| A | chlorination | coolant | reactant |
| B | chlorination | solvent | solvent |
| C | filtration | coolant | reactant |
| D | filtration | solvent | solvent |

29 An object is falling freely near the Earth without air resistance.

Which statement about the acceleration of the object is correct?

- A It is constant, but not zero.
- B It is decreasing.
- C It is increasing.
- D It is zero.

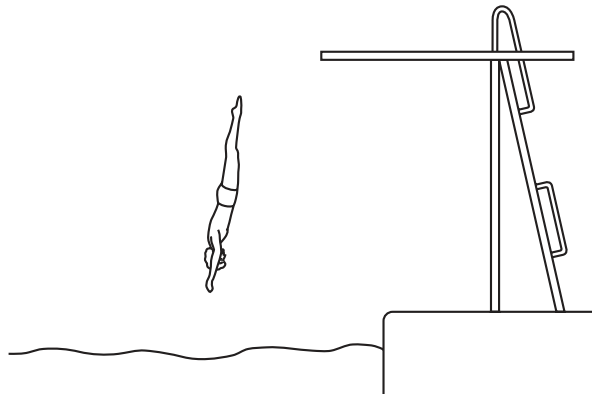
30 Three objects X, Y and Z are at rest on a table. The centre of mass of each object is labelled M.



What is the order of stability of these three objects, from most stable to least stable?

- A $X \rightarrow Y \rightarrow Z$
- B $Y \rightarrow Z \rightarrow X$
- C $X \rightarrow Z \rightarrow Y$
- D $Z \rightarrow Y \rightarrow X$

31 The diagram shows a man diving into water.



Which form of energy is increasing as he accelerates downwards through the air?

- A chemical
- B elastic potential (strain)
- C gravitational potential
- D kinetic

32 There is a vacuum between the double walls of a vacuum flask.

Which of the methods of thermal energy transfer are prevented by the vacuum?

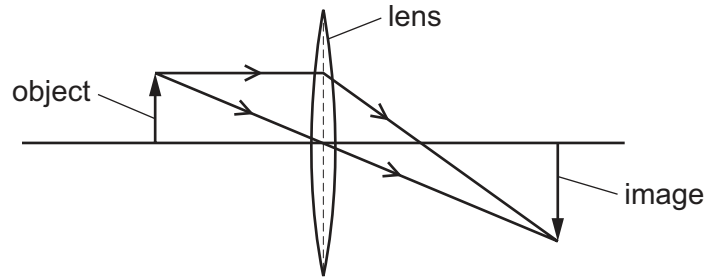
- A conduction only
- B conduction and convection
- C convection only
- D radiation only

33 A boy looks into a plane mirror that is 50 cm in front of his face.

How far from the boy's face is the image of his face?

- A 25 cm B 50 cm C 100 cm D 150 cm

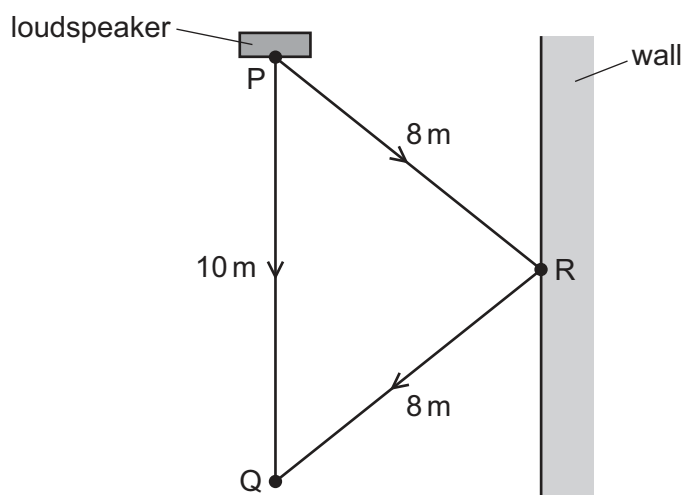
34 The diagram shows the image of an object produced by a thin converging lens.



How is the image described?

- A diminished and inverted
- B diminished and upright
- C enlarged and inverted
- D enlarged and upright

- 35 Sound from a loudspeaker at P travels directly to Q. Sound also reaches Q after being reflected from a wall at R.

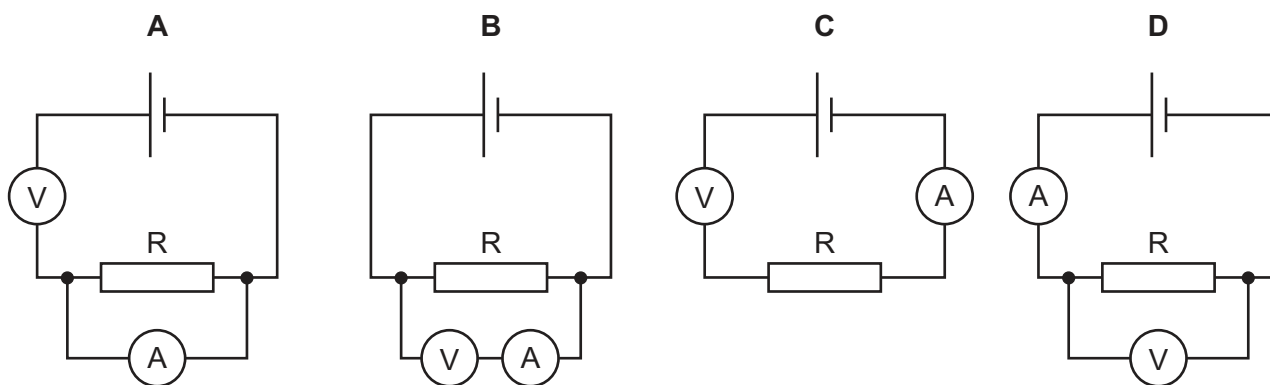


The speed of sound is 330 m/s.

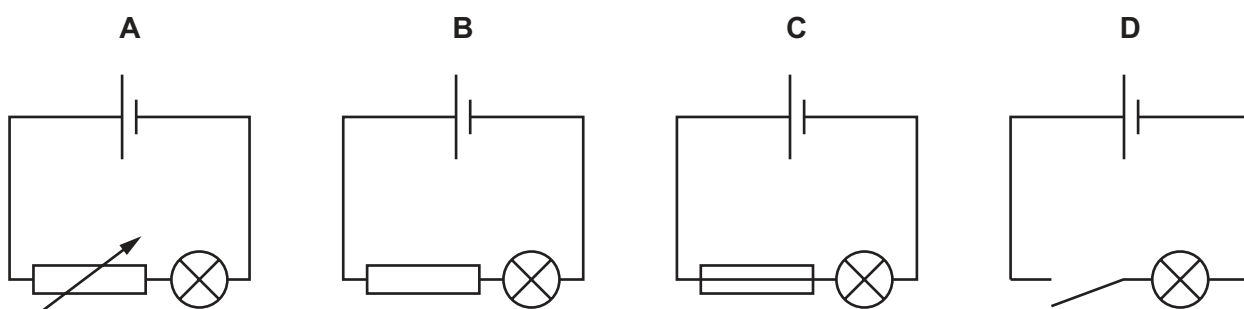
What is the **difference** in time for sound to travel from P to Q by the two routes?

- A $\left(\frac{6}{330}\right)$ s B $\left(\frac{16}{330}\right)$ s C (6×330) s D (16×330) s

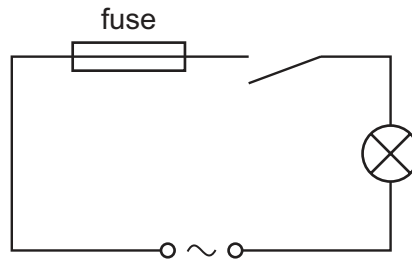
- 36 Which circuit can be used to take measurements to determine the resistance of resistor R?



- 37 In which circuit can the brightness of the lamp be varied continuously?



38 A student connects the circuit shown.

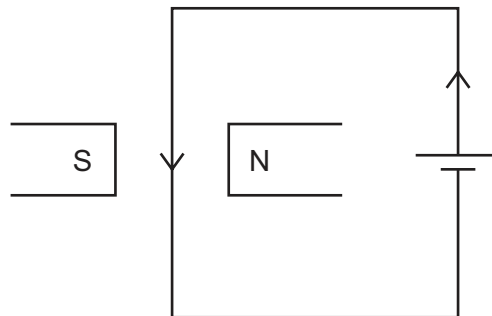


When the switch is closed the fuse blows and stops the current.

What is a possible reason for this?

- A The current rating of the fuse is too high.
 - B The current is too large.
 - C The lamp is too dim.
 - D The voltage is too small.
- 39 The diagram shows a wire in a magnetic field.

There is a current in the wire.



The force produced on the wire causes the wire to move into the page.

The direction of the current is now reversed.

What happens to the wire?

- A It does not move at all.
- B It moves out of the page.
- C It moves sideways towards one of the poles of the magnet.
- D It still moves into the page.

40 A radioactive nucleus emits a β -particle.

What happens to the proton number (atomic number) of the nucleus?

- A It stays the same.
- B It increases by 1.
- C It decreases by 2.
- D It decreases by 4.

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.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

