AQA GCSE Physics | 8463

SPECIFICATION POINT 4.7.1.2

Magnetic fields

Past-paper questions

Tier	**Foundation**
Question groups	**18**
Available paper years	**2008–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

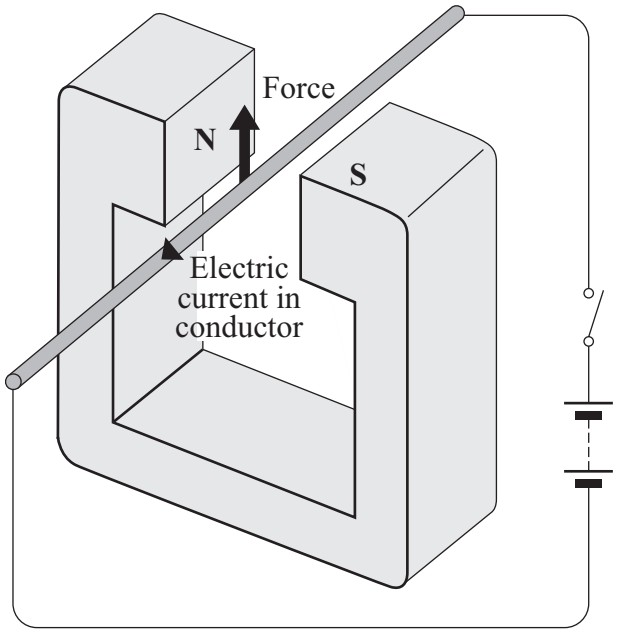
Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.7.1.2 Magnetic fields

Question 01

January 2008 | PHY3F | Original Q6 | Legacy

6 When a conductor carrying an electric current is placed in a magnetic field a force may act on it.



(a) State **two** ways in which this force can be increased.

1 .....

2 .....

(2 marks)

(b) State **two** ways in which this force can be made to act in the opposite direction.

1 .....

2 .....

(2 marks)

(c) In what circumstance will **no** force act on a conductor carrying an electric current and in a magnetic field?

.....

.....

(1 mark)

5

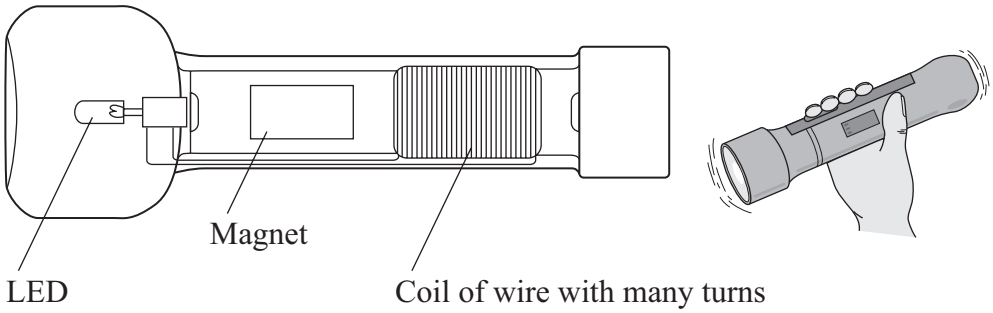
4.7.1.2 Magnetic fields

Question 02

June 2009 | PHY3F | Original Q8 | Legacy

8 The diagram shows some parts of a torch which works without batteries.
The coil is part of a complete circuit with the LED (light-emitting diode).

You have to shake the torch for a short time and then it is ready to use.



8 (a) Arrange the letters, **A**, **B**, **C**, **D** and **E**, in the correct order to explain how shaking the torch produces an electric current.

A An electric current is induced in the circuit.

B The magnetic field cuts through the coil.

C The magnet moves in and out of the coil.

D A potential difference (p.d.) is induced across the ends of the coil.

E The torch is shaken to and fro.

The first letter has been done for you.

E				

(2 marks)

8 (b) Give **two** changes which you would make to the design of the torch to increase the size of the induced potential difference.

1 .....

.....

2 .....

.....

(2 marks)

4.7.1.2 Magnetic fields

Question 02 · continued

for mark

8 (c) A few minutes after shaking, the LED gets dimmer and then stops giving out light.

A student tests the torch. She shakes it for a period of time. Then she switches it on and times how long the light lasts.

These are her results.

Period of time torch is shaken measured in seconds	How long the light lasts measured in seconds
30	168
60	312
90	420
120	546
150	654

8 (c) (i) What conclusion can the student come to on the basis of these results?

.....

.....

(1 mark)

8 (c) (ii) The student's friend says that the results are **not** reliable. Her friend is correct.

Give **two** reasons why.

1 .....

.....

.....

2 .....

.....

.....

(2 marks)

7

4.7.1.2 Magnetic fields

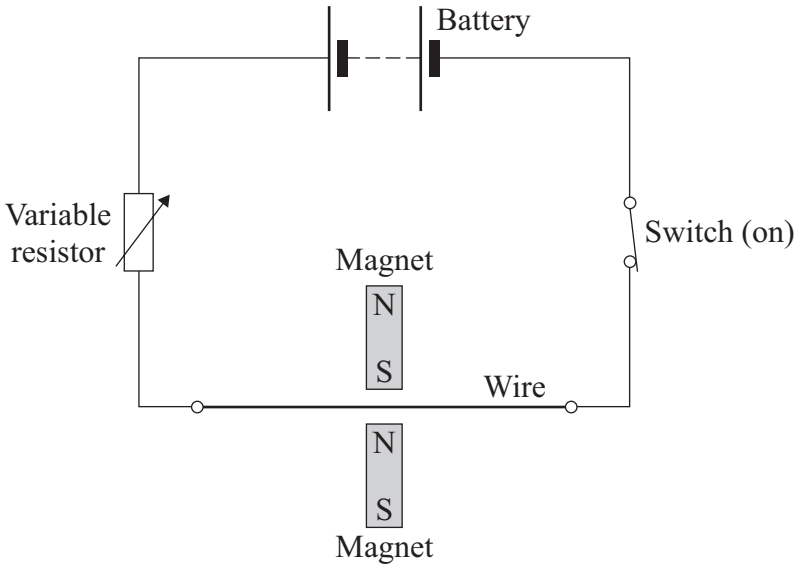
Question 03

January 2010 | PHY3F | Original Q6 | Legacy

6 A student investigates the electromagnetic force acting on a wire which carries an electric current. The wire is in a magnetic field.

The diagram shows the circuit which the student uses.

6 (a) Draw an **X** on the diagram, with the centre of the **X** in the most strongest part of the magnetic field.



(1 mark)

6 (b) Give **one** change that she can make to the magnets to **decrease** the electromagnetic force on the wire.

.....

.....

(1 mark)

6 (c) The student wants to change the electromagnetic force on the wire without changing the magnets or moving their position.

6 (c) (i) Give **one** way in which she can **increase** the electromagnetic force.

.....

.....

(1 mark)

6 (c) (ii) Give **one** way in which she can **reverse** the direction of the electromagnetic force.

.....

.....

(1 mark)

4

4.7.1.2 Magnetic fields

Question 04

March 2010 | PHY1BP | Original Q4 | Legacy

QUESTION FOUR

This question is about types of radiation.

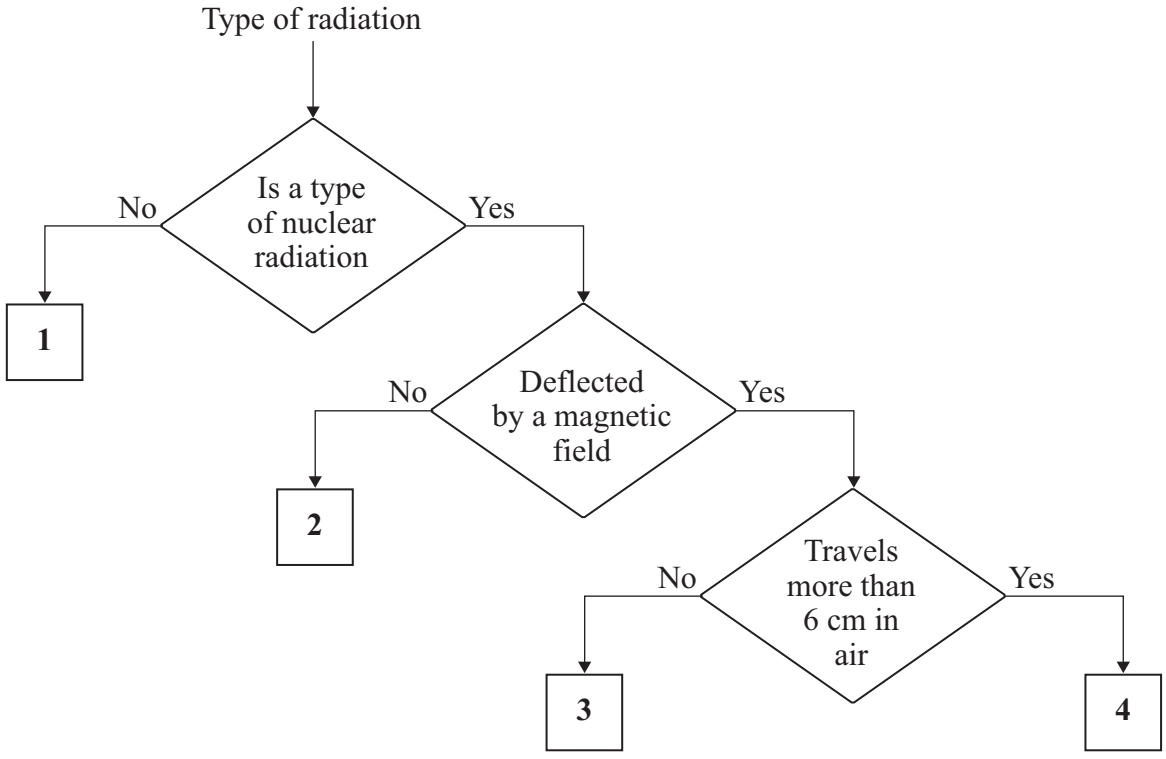
Match radiations, **A**, **B**, **C** and **D**, with the boxes **1–4** on the flow diagram.

A alpha

B beta

C gamma

D X-rays



4.7.1.2 Magnetic fields

Question 05

June 2010 | PHY1BP | Original Q6 | Legacy

QUESTION SIX

In 1896, Henri Becquerel was doing an experiment with uranium.

6A Becquerel thought that uranium absorbed energy from the Sun, and then re-emitted the energy as X-rays.

This was . . .

1 a conclusion.

2 an estimate.

3 an observation.

4 a theory.

6B Becquerel found that the uranium emitted radiation even when the sample was sealed in black paper.

He had discovered radioactivity.

Becquerel had to change his ideas because . . .

1 the Sun does not provide energy on a cloudy day.

2 sunlight could not pass through the black paper.

3 X-rays could not pass through the black paper.

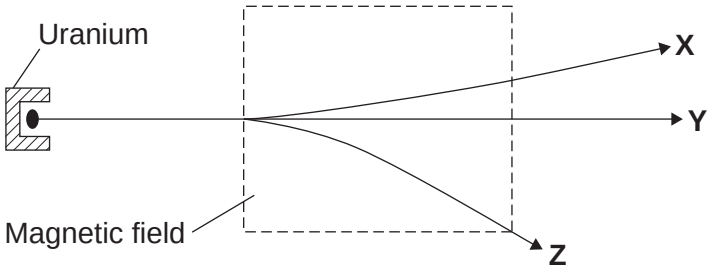
4 radiation could not pass through the black paper.

4.7.1.2 Magnetic fields

Question 05 · continued

6C When Becquerel passed the radiation emitted by uranium through a magnetic field, he found that there were three different types of radiation.

The diagram shows the paths of the three types of radiation, **X**, **Y** and **Z**, in the magnetic field.



Which of the following is the path of gamma radiation?

1 **X**

2 **Y**

3 **Z**

4 **X** and **Z**

6D Two types of radiation were deflected in the magnetic field.

These two types of radiation were deflected because they are . . .

1 electrically charged.

2 electrically neutral.

3 have a smaller mass than the third type of radiation.

4 have a bigger mass than the third type of radiation.

4.7.1.2 Magnetic fields

Question 06

January 2011 | PHY1F | Original Q3 | Legacy

3 (a) The names of the three types of nuclear radiation are given in **List A**.
Some properties of these types of radiation are given in **List B**.

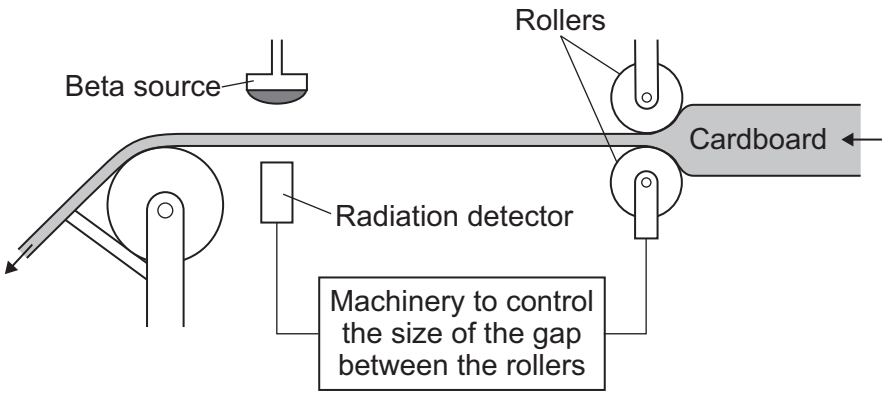
Draw a straight line to link each type of radiation in **List A** to its correct property in **List B**.

Draw only **three** lines.

List A **Type of nuclear radiation**	**List B** **Property of radiation**
Alpha	Has the same mass as an electron
Beta	Very strongly ionising
Gamma	Passes through 10 cm of aluminium
	Deflected by a magnetic field but not deflected by an electric field

(3 marks)

3 (b) The diagram shows a system used to control the thickness of cardboard as it is made.



4.7.1.2 Magnetic fields

Question 06 · continued

The cardboard passes through a narrow gap between a beta radiation source and a radiation detector.

The table gives the detector readings over 1 hour.

Time	Detector reading
08:00	150
08:15	148
08:30	151
08:45	101
09:00	149

3 (b) (i) Between 08:00 and 08:30, the cardboard is produced at the usual, correct thickness.

Explain how you can tell from the detector readings that the cardboard produced at 08:45 is thicker than usual.

.....

.....

.....

.....

(2 marks)

3 (b) (ii) Which would be the most suitable half-life for the beta source?

Draw a ring around your answer.

six days **six months** **six years**

(1 mark)

3 (b) (iii) This control system would **not** work if the beta radiation source was replaced by an alpha radiation source.

Why not?

.....

.....

(1 mark)

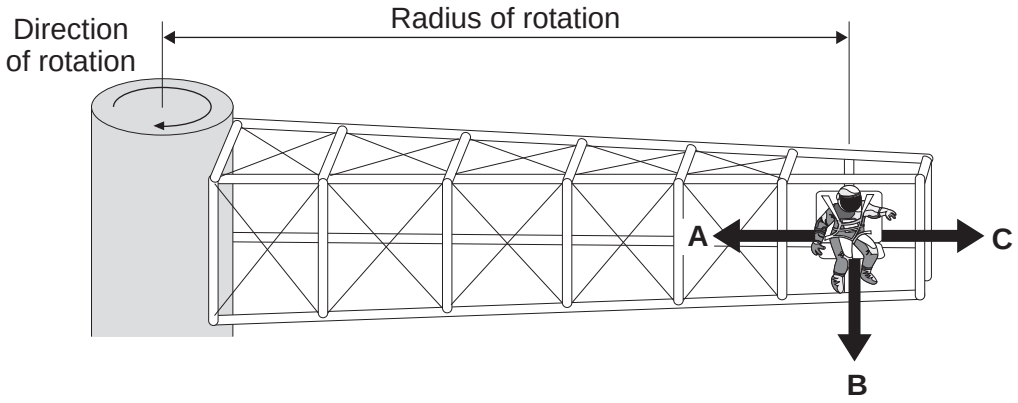
7

4.7.1.2 Magnetic fields

Question 07

June 2013 | PH3FP | Original Q5 | Legacy

5 The diagram shows a 'G-machine'. The G-machine is used in astronaut training.



The G-machine moves the astronaut in a horizontal circle.

5 (a) In which direction, **A**, **B** or **C**, does the centripetal force on the astronaut act?

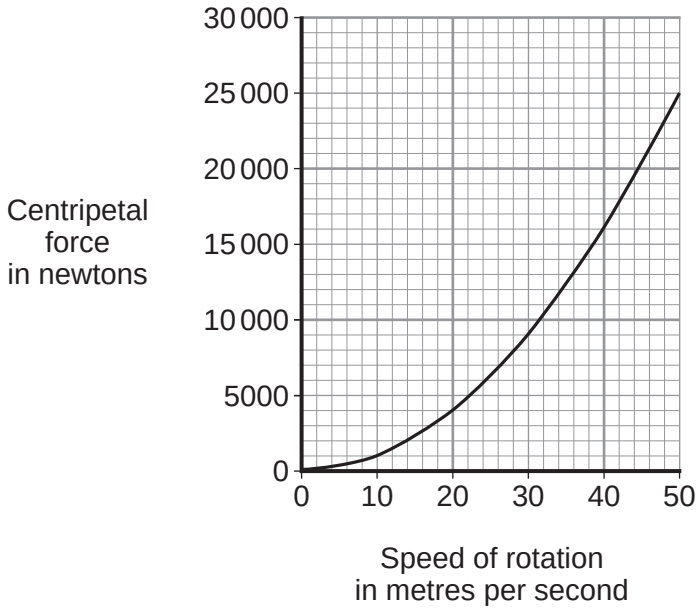
Write your answer in the box. ☐

(1 mark)

5 (b) The centripetal force on the astronaut is measured.

Graph X shows how the centripetal force is affected by the speed of rotation. The radius of rotation is kept the same.

Graph X



5 (b) (i) Use **Graph X** to determine the centripetal force on the astronaut when rotating at a speed of 30 metres per second.

Centripetal force = ... newtons

(1 mark)

Question 07 · continued

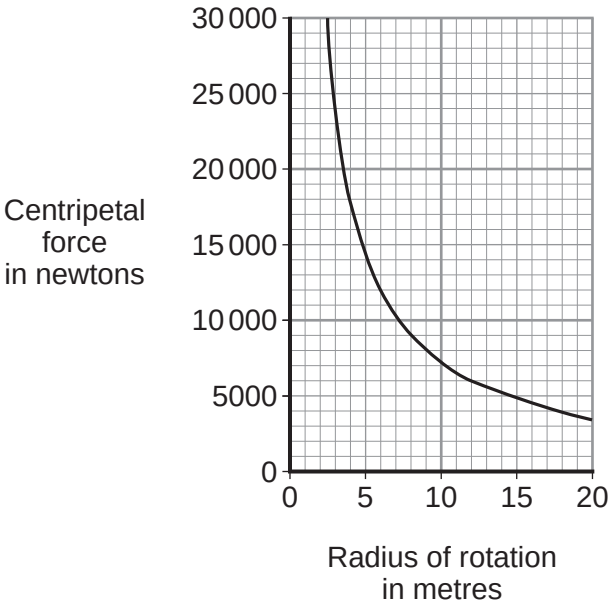
5 (b) (ii) Complete the following sentence to give the conclusion that can be made from **Graph X**.

Increasing the speed of rotation of a G-machine will ..... the centripetal force on the astronaut.

(1 mark)

5 (b) (iii) **Graph Y** shows how the centripetal force is affected by the radius of rotation, when the speed of rotation is kept the same.

Graph Y



Complete the following sentence to give the conclusion that can be made from **Graph Y**.

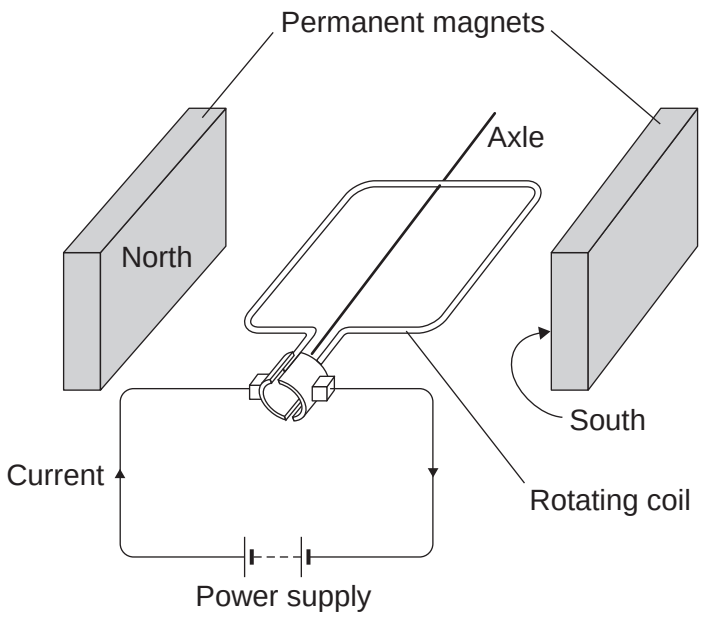
The greater the radius of rotation, the ..... the centripetal force on the astronaut.

(1 mark)

Question 5 continues on the next page

Question 07 · continued

5 (c) The G-machine is rotated by an electric motor. The diagram shows a simple electric motor.



The following statements explain how the motor creates a turning force. The statements are in the wrong order.

M – The magnetic field interacts with the magnetic field of the permanent magnets.

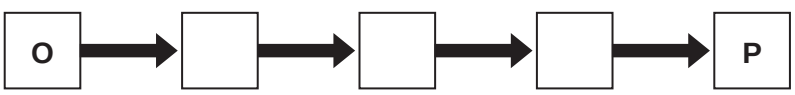
N – A magnetic field is created around the coil.

O – The power supply applies a potential difference across the coil.

P – This creates a force that makes the coil spin.

Q – A current flows through the coil.

Arrange the statements in the correct order. Two of them have been done for you.



(2 marks)

4.7.1.2 Magnetic fields

Question 07 · continued

5 (d) The electric motor produces a turning force.

Give **two** ways of increasing the turning force.

1 .....

.....

2 .....

.....

(2 marks)

5 (e) Draw a ring around the correct answer to complete the sentence.

It costs a lot of money to send astronauts into space.

This is | an economic | an environmental | a social | issue.

(1 mark)

9

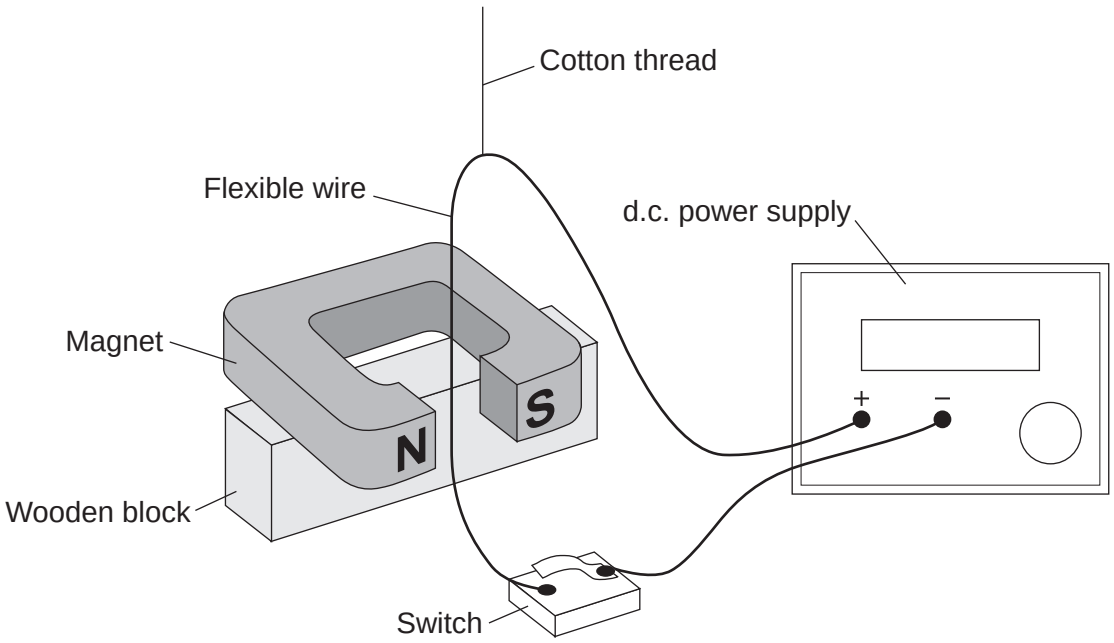
4.7.1.2 Magnetic fields

Question 08

June 2015 | PH3FP | Original Q4 | Legacy

4 **Figure 7** shows a demonstration carried out by a teacher.

Figure 7



When the switch is closed, there is a current of 2 A through the wire. The wire experiences a force and moves.

4 (a) Use the correct word from the box to complete the sentence.

[1 mark]

generator	**motor**	**transformer**

The demonstration shows the ..... effect.

4 (b) State **two** changes that the teacher could make to the demonstration, each of which would increase the force on the wire. The teacher does not touch the wire.

[2 marks]

1 .....

.....

2 .....

.....

4.7.1.2 Magnetic fields

Question 08 · continued

4 (c) State **one** change that the teacher could make to the demonstration to change the direction of the force on the wire.

[1 mark]

.....

.....

4 (d) With the switch closed, the teacher changes the position of the wire so that the force on the wire is zero.

What is the position of the wire?

[1 mark]

Tick (✓) **one** box.

The wire is at 90° to the direction of the magnetic field. ☐

The wire is at 45° to the direction of the magnetic field. ☐

The wire is parallel to the direction of the magnetic field. ☐

5

4.7.1.2 Magnetic fields

Question 09

June 2016 | PH2FP | Original Q9 | Legacy

9 Alpha particles, beta particles and gamma rays are types of nuclear radiation.

9 (a) Describe the structure of an alpha particle.

[1 mark]

_____

_____

9 (b) Nuclear radiation can change atoms into ions by the process of ionisation.

9 (b) (i) Which type of nuclear radiation is the least ionising?

[1 mark]

Tick (✓) **one** box.

alpha particles ☐ beta particles ☐ gamma rays ☐

9 (b) (ii) What happens to the structure of an atom when the atom is ionised?

[1 mark]

_____

_____

9 (c) People working with sources of nuclear radiation risk damaging their health.

State **one** precaution these people should take to reduce the risk to their health.

[1 mark]

_____

_____

4.7.1.2 Magnetic fields

Question 09 · continued

9 (d) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

The type of radiation emitted from a radioactive source can be identified by comparing the properties of the radiation to the properties of alpha, beta and gamma radiation.

Describe the properties of alpha, beta and gamma radiation in terms of their:

- penetration through materials
- range in air
- deflection in a magnetic field.

[6 marks]

Extra space

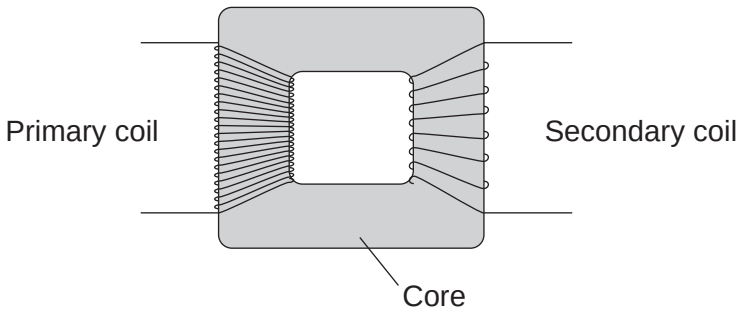
10

4.7.1.2 Magnetic fields

Question 10

2 **Figure 3** shows a traditional transformer.

Figure 3



2 (a) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

greater than	**equal to**	**less than**

The potential difference across the secondary coil is _____

the potential difference across the primary coil.

2 (a) (ii) Give a reason for your answer to part **2 (a) (i)**.

[1 mark]

_____

_____

2 (b) What is the core of the transformer made from?

[1 mark]

_____

4.7.1.2 Magnetic fields

Question 10 · continued

2 (c) What happens as the magnetic field in the core of the transformer changes?

[1 mark]

Tick (✓) **one** box.

The mass of the core increases. ☐

A potential difference is induced across the secondary coil. ☐

The temperature of the core decreases. ☐

2 (d) The power supply to the transformer is connected to the mains electricity supply.

What is the frequency of the mains electricity supply?

[1 mark]

Tick (✓) **one** box.

25 hertz ☐

50 hertz ☐

100 hertz ☐

2 (e) The power input of the transformer is 2 W. The transformer is 100% efficient.

State the power output of the transformer.

[1 mark]

_____

6

4.7.1.2 Magnetic fields

Question 11

June 2018 | 8463/2F | Original Q4

0 4 **Figure 3** shows two paper clips hanging from a bar magnet.

Figure 3



The paper clips have become magnetised.

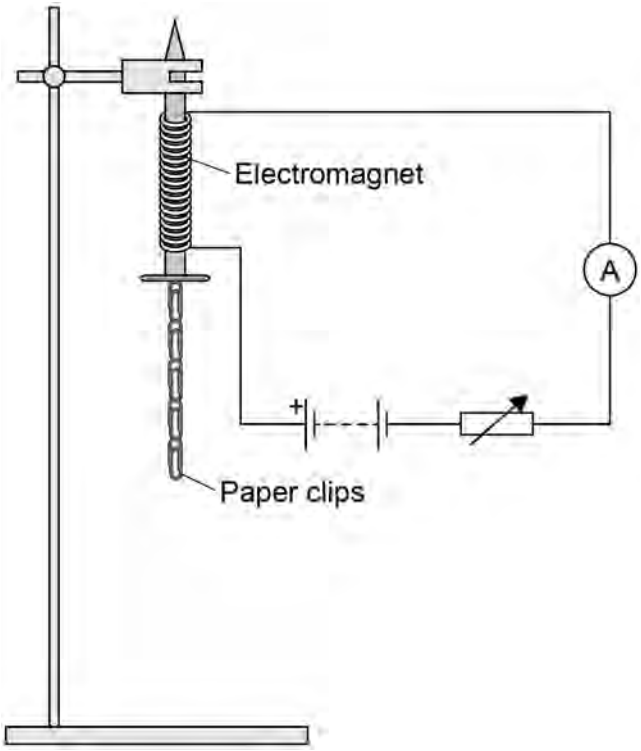
0 4 . 1 Label the north and south poles of both paper clips.

[1 mark]

A student investigated how the number of turns of wire on an electromagnet affects the strength of the electromagnet.

Figure 4 shows the equipment used by the student. Throughout the investigation the student kept the current through the wire constant.

Figure 4



Question 11 · continued

0 4 . 2 The student measured the strength of the electromagnet by counting the number of paper clips the electromagnet could hold.

Explain why it was important that the paper clips were all the same size.

[2 marks]

Table 2 shows the student's results.

Table 2

Number of turns of wire on the electromagnet	Number of paper clips held
10	3
20	6
30	9
40	12

0 4 . 3 Describe the pattern shown in **Table 2**.

[2 marks]

Question 4 continues on the next page

4.7.1.2 Magnetic fields

Question 11 · continued

0 4 . 4 The student then used 50 turns of wire on the electromagnet.

The electromagnet picked up 18 paper clips. This was more paper clips than the student had expected.

Which **one** is the most likely cause of this result?

Tick **one** box.

[1 mark]

The paper clips used with 50 turns were larger than the others. ☐

There were less than 50 turns of wire on the electromagnet. ☐

Some of the paper clips were already magnetised. ☐

0 4 . 5 The student repeated the measurement for 50 turns of wire three more times.

This gave her the following set of results.

18 16 14 15

Explain what the student should now do with the **four** results for 50 turns of wire.

[3 marks]

4.7.1.2 Magnetic fields

Question 11 · continued

0 4 . 6 The student wrote the hypothesis:

'Increasing the current through the wire will make the electromagnet stronger.'

Describe how the student should change the investigation to test this hypothesis.

[3 marks]

12

4.7.1.2 Magnetic fields

Question 12

0 3 . 1 **Figure 5** shows a bar magnet.

Each circle represents a compass.

Figure 5



Draw an arrow inside each circle to show the direction that each compass would point.

[1 mark]

0 3 . 2 **Figure 6** shows part of a coat.

The coat has two magnets hidden inside the material.

Figure 7 shows how the magnets are used to fasten the coat.

Figure 6

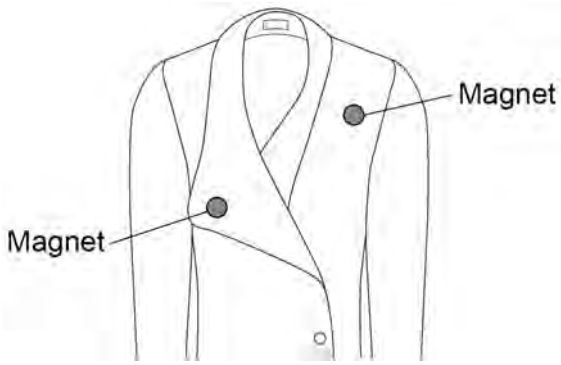


Figure 7



Explain why the magnets inside the coat must **not** have two south poles facing each other.

[2 marks]

Question 12 · continued

A coil of wire is connected to a battery.

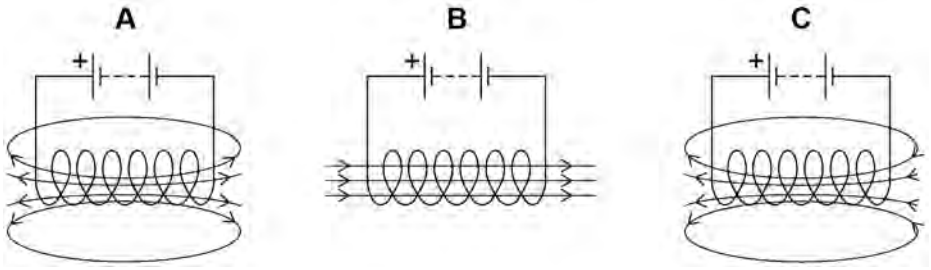
The current in the coil produces a magnetic field.

0 3 . 3 Which diagram in **Figure 8** shows the magnetic field produced by the current in the coil?

[1 mark]

Tick (✓) **one** box.

Figure 8



A ☐ B ☐ C ☐

0 3 . 4 A solid rod is placed inside the coil.

Which type of rod would make the magnetic field of the coil stronger?

[1 mark]

Tick (✓) **one** box.

Glass rod ☐

Plastic rod ☐

Steel rod ☐

Wooden rod ☐

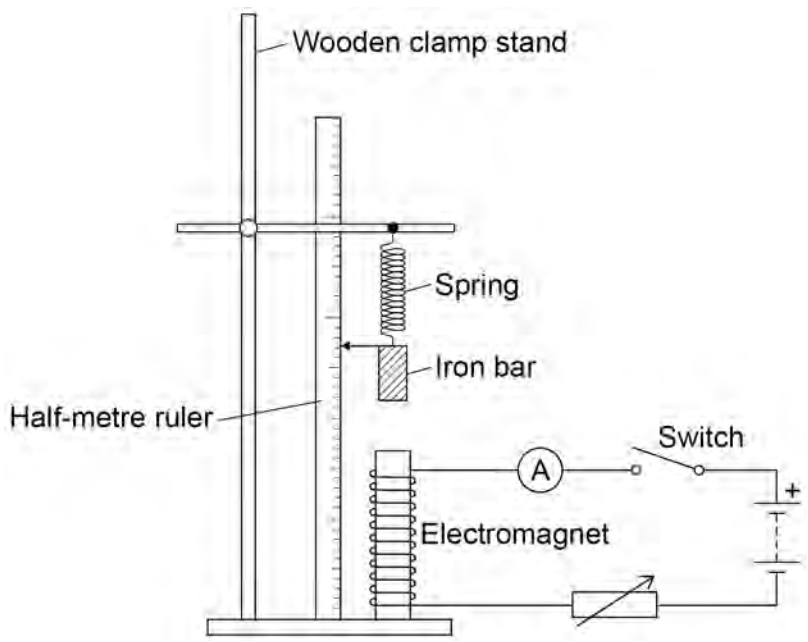
4.7.1.2 Magnetic fields

Question 12 · continued

A student investigated how the strength of an electromagnet varies with the current in the coil of the electromagnet.

Figure 9 shows the equipment the student used.

Figure 9



0 3 . 5 Why does the spring get longer when the electromagnet is switched on?

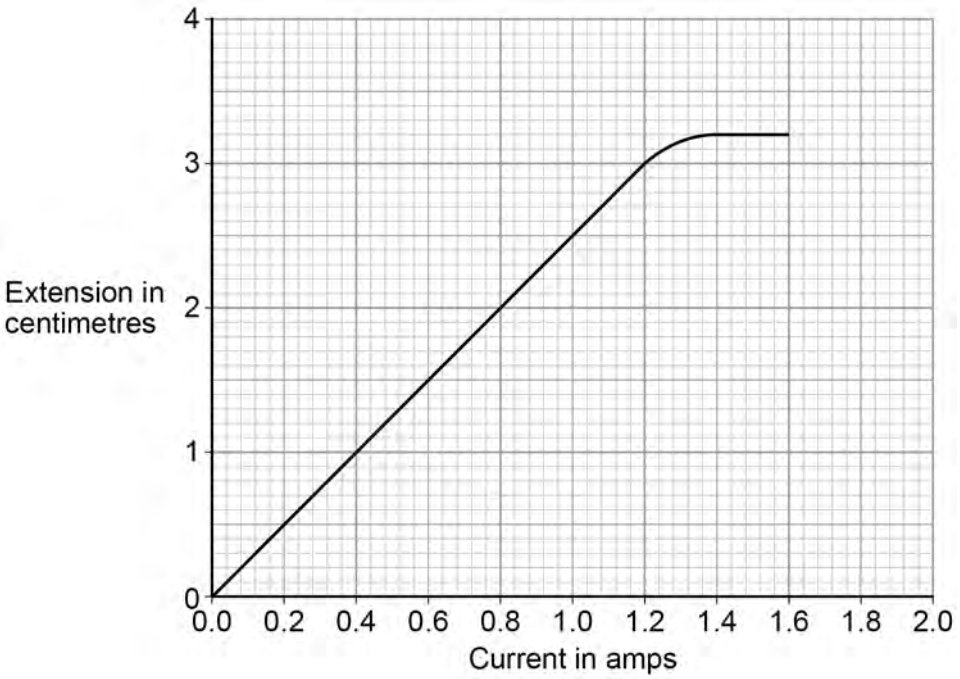
[1 mark]

Question 12 · continued

The student measured how much further the spring extended with different values of current in the coil.

Figure 10 shows the results.

Figure 10



0 3 . 6 The current in the coil is increased from 0.6 A to 1.2 A

Determine the increase in the extension of the spring.

[1 mark]

Increase in the extension = _____ cm

0 3 . 7 Calculate the increase in the force on the spring when the current in the coil increased from 0.6 A to 1.2 A

Spring constant = 0.18 N/cm

Use the equation:

force = spring constant × extension

[2 marks]

Increase in the force = _____ N

4.7.1.2 Magnetic fields

Question 12 · continued

0 3 . 8 Describe what happened to the strength of the electromagnet as the current in the coil increased from 1.2 A to 1.6 A

[2 marks]

11

4.7.1.2 Magnetic fields

Question 13

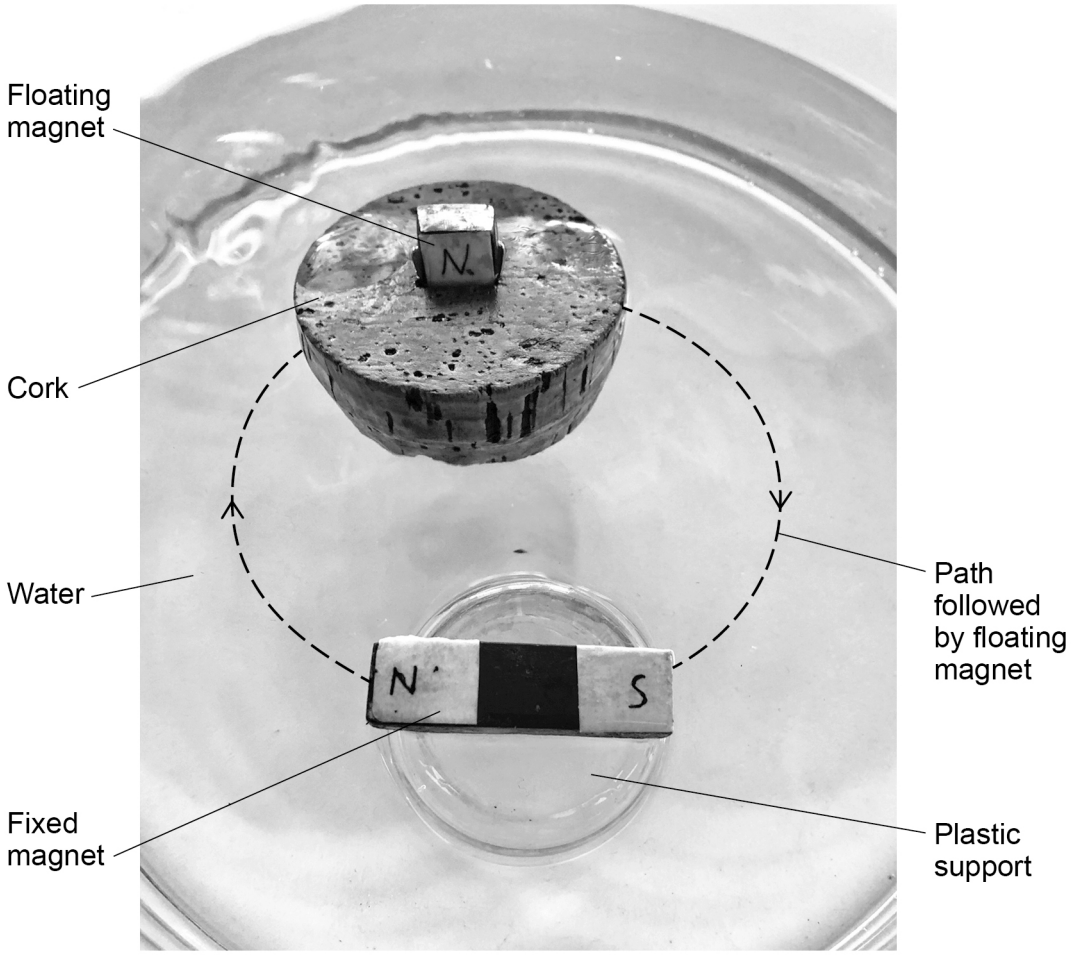
November 2020 | 8463/2F | Original Q5

0 5 A student placed a magnet on top of a plastic support in a bowl of water. This magnet was fixed in position and above the surface of the water.

The student put a second magnet into a piece of cork so that the magnet floated on the water. Only the north pole of the floating magnet was above the surface of the water.

Figure 6 shows the arrangement of the magnets.

Figure 6



0 5 . 1 The floating magnet was placed near to the north pole of the fixed magnet. The floating magnet then moved along the path shown in **Figure 6**.

Explain why.

[2 marks]

Question 13 · continued

0 5 . 2 The student replaced the floating magnet with a piece of iron.

What happened to the piece of iron?

[1 mark]

0 5 . 3 Describe how to use a compass to plot the magnetic field pattern around a bar magnet.

Use **Figure 7** to help you.

[4 marks]

Figure 7

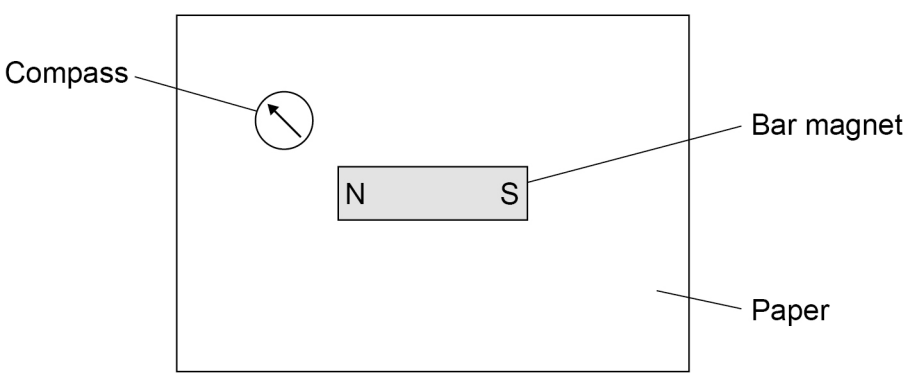
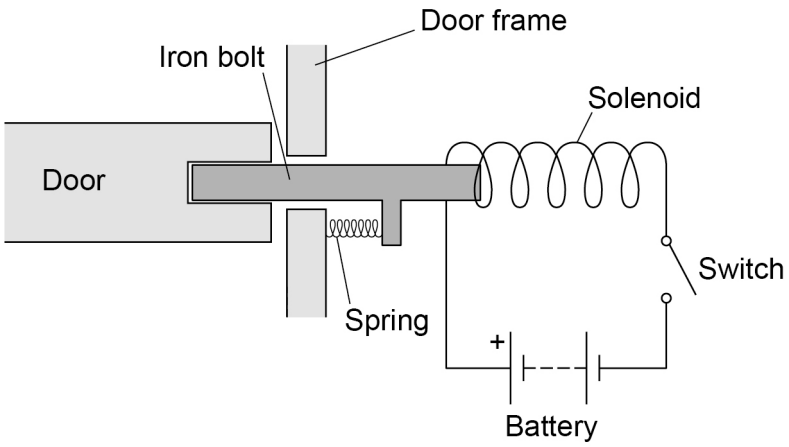


Figure 8 shows a diagram of an electromagnetic lock used to secure a door.

Figure 8



0 5 . 4 **Figure 9** shows an incomplete sequence of how the door unlocks.

Figure 9



Write **one** letter in each box to show the correct sequence.

[2 marks]

A The iron bolt moves.

B A magnetic field is created around the solenoid.

C There is a current in the circuit.

Question 5 continues on the next page

4.7.1.2 Magnetic fields

Question 13 · continued

0 5 . 5 The electromagnetic lock contains a spring.

When the door is unlocked the extension of the spring is 0.040 m.

spring constant = 200 N/m

Calculate the elastic potential energy of the spring when the door is unlocked.

Use the equation:

$$\text{elastic potential energy} = 0.5 \times \text{spring constant} \times (\text{extension})^2$$

[2 marks]

Elastic potential energy = _____ J

11

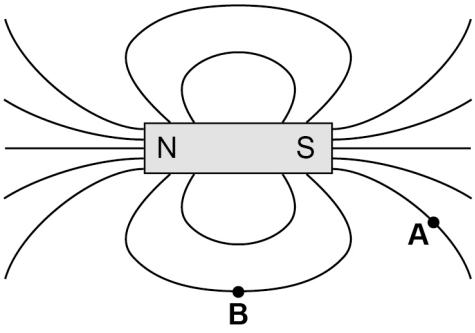
4.7.1.2 Magnetic fields

Question 14

November 2021 | 8463/2F | Original Q7

0 7 **Figure 16** shows the magnetic field pattern around a bar magnet.

Figure 16



0 7 . 1 Draw an arrow at point **A** and point **B** to show the direction of the magnetic field at each point.

[1 mark]

0 7 . 2 A bar magnet produces its own magnetic field.

Complete the sentence.

Choose the answer from the box.

[1 mark]

an electromagnet	**an induced magnet**	**a permanent magnet**

A bar magnet is an example of _____ .

4.7.1.2 Magnetic fields

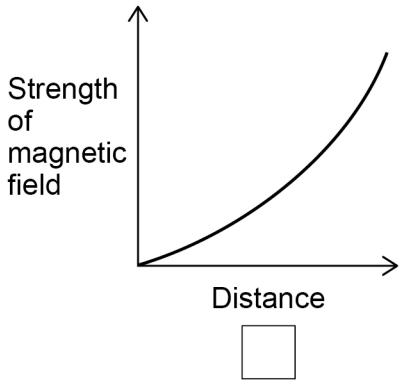
Question 14 · continued

0 7 . 3 Which graph shows how the strength of the magnetic field varies with distance from the bar magnet?

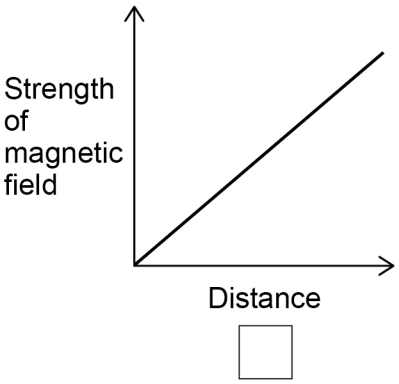
Give a reason for your answer.

[2 marks]

Tick (✓) **one** box.



☐



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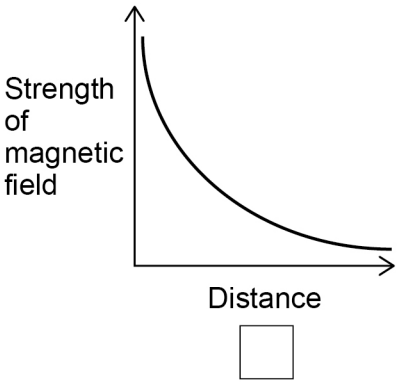


☐

Reason _____

_____

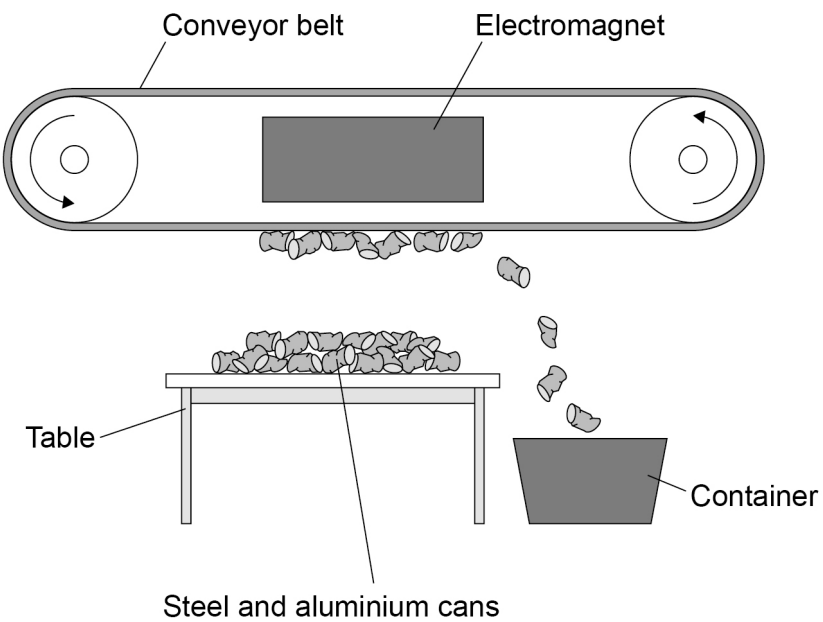
Question 7 continues on the next page

4.7.1.2 Magnetic fields

Question 14 · continued

Figure 17 shows an electromagnet being used to separate aluminium cans from steel cans.

Figure 17



0 7 . 4 Explain how the electromagnet and conveyor belt are used to separate the steel cans from the aluminium cans.

[2 marks]

4.7.1.2 Magnetic fields

Question 14 · continued

0 7 . 5 At the top of the table the strength of the magnetic field is only just enough to pick the cans up.

Describe **two** ways to increase the strength of magnetic field at the top of the table.

[2 marks]

1 _____

_____

2 _____

_____

0 7 . 6 Write down the equation which links distance travelled (*s*), speed (*v*) and time (*t*).

[1 mark]

_____

0 7 . 7 The conveyor belt moves a can at a speed of 1.7 m/s.

Calculate the time taken to move the can 3.3 m at this speed.

Give your answer to 2 significant figures.

[4 marks]

_____

_____

_____

_____

_____

Time taken (2 significant figures) = _____ s

13

4.7.1.2 Magnetic fields

Question 15

June 2022 | 8463/2F | Original Q1

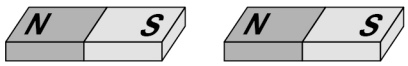
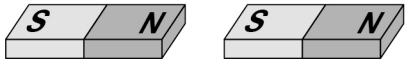
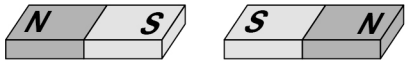
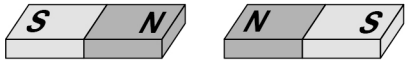
0 1 When two magnets are close together they exert a force on each other.

0 1 . 1 Complete **Table 1** to show if the magnets would attract or repel.

[2 marks]

Tick (✓) **one** box in **each** row.

Table 1

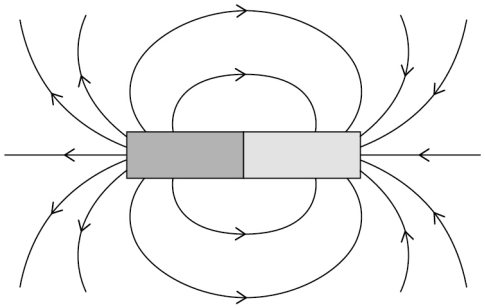
	Attract	Repel
		
		
		
		

4.7.1.2 Magnetic fields

Question 15 · continued

0 1 . 2 **Figure 1** shows the magnetic field around a bar magnet.

Figure 1



Which statements are true for the magnetic field shown in **Figure 1**?

[2 marks]

Tick (✓) **two** boxes.

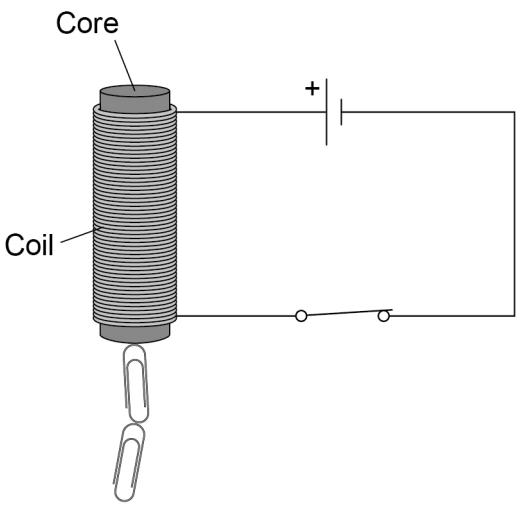
- The magnetic field gets weaker further from the magnet. ☐
- The magnetic field is strongest at the poles. ☐
- The magnetic field is uniform away from the poles. ☐
- The magnetic field lines all meet at a single point. ☐
- The magnetic field lines point from south to north. ☐

Question 1 continues on the next page

Question 15 · continued

Figure 2 includes an electromagnet.

Figure 2



0 1 . 3 Which metal is used to make the core of the electromagnet?

[1 mark]

Tick (✓) **one** box.

- Aluminium ☐
- Copper ☐
- Iron ☐
- Magnesium ☐

0 1 . 4 Complete the sentence.

Choose the answer from the box.

[1 mark]

coil	metal core	paper clip

The switch is closed. There is a current in the _____.

4.7.1.2 Magnetic fields

Question 15 · continued

0 1 . 5 The number of turns on the coil is increased. The current remains the same.

How does this affect the strength of the magnetic field around the electromagnet?

[1 mark]

Tick (✓) **one** box.

- The magnetic field would be stronger. ☐
- The magnetic field would stay the same. ☐
- The magnetic field would be weaker. ☐

0 1 . 6 The metal core was removed. The current remains the same.

How does this affect the strength of the magnetic field around the electromagnet?

[1 mark]

Tick (✓) **one** box.

- The magnetic field would be stronger. ☐
- The magnetic field would stay the same. ☐
- The magnetic field would be weaker. ☐

8

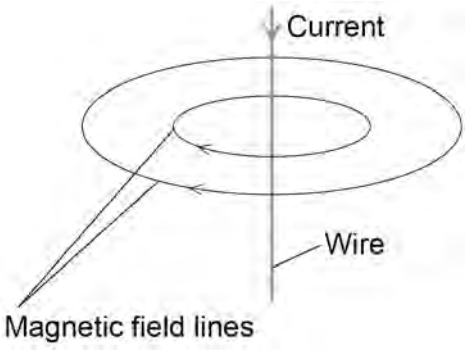
4.7.1.2 Magnetic fields

Question 16

June 2023 | 8463/2F | Original Q3

0 3 **Figure 5** shows the magnetic field pattern produced when there is a current in a wire.

Figure 5



0 3 . 1 What do the arrows on the magnetic field lines represent?

[1 mark]

0 3 . 2 How could the strength of the magnetic field be increased?

[1 mark]

Tick (✓) **one** box.

Change the direction of the current in the wire ☐

Increase the current in the wire ☐

Increase the temperature of the wire ☐

4.7.1.2 Magnetic fields

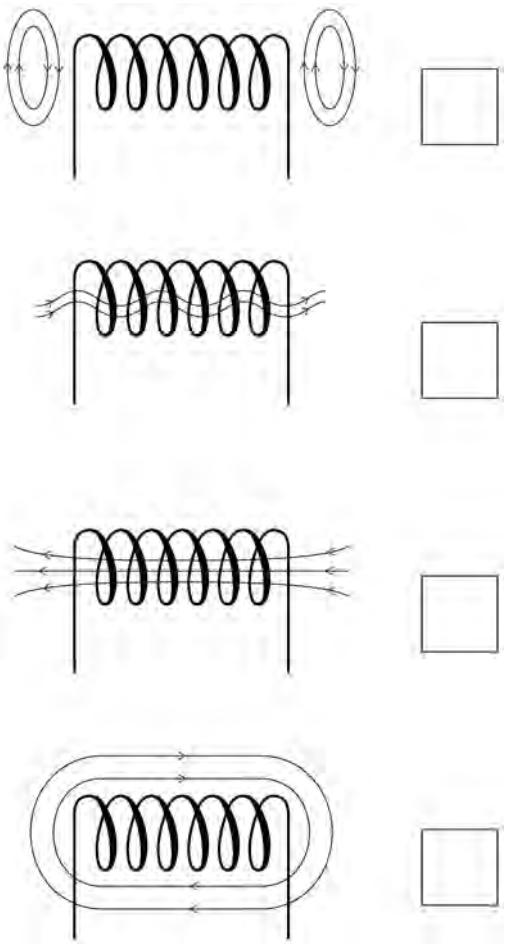
Question 16 · continued

0 3 . 3 The wire is coiled to make a solenoid.

Which diagram in **Figure 6** shows the magnetic field pattern produced when there is a current in the solenoid?

[1 mark]

Figure 6



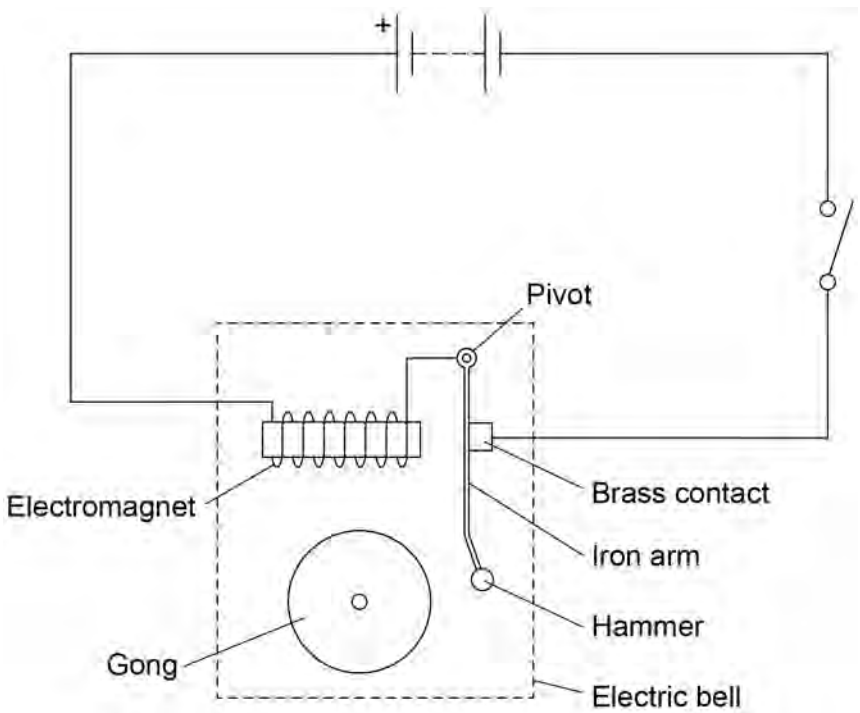
Question 3 continues on the next page

4.7.1.2 Magnetic fields

Question 16 · continued

Figure 7 shows the parts of an electric bell.

Figure 7

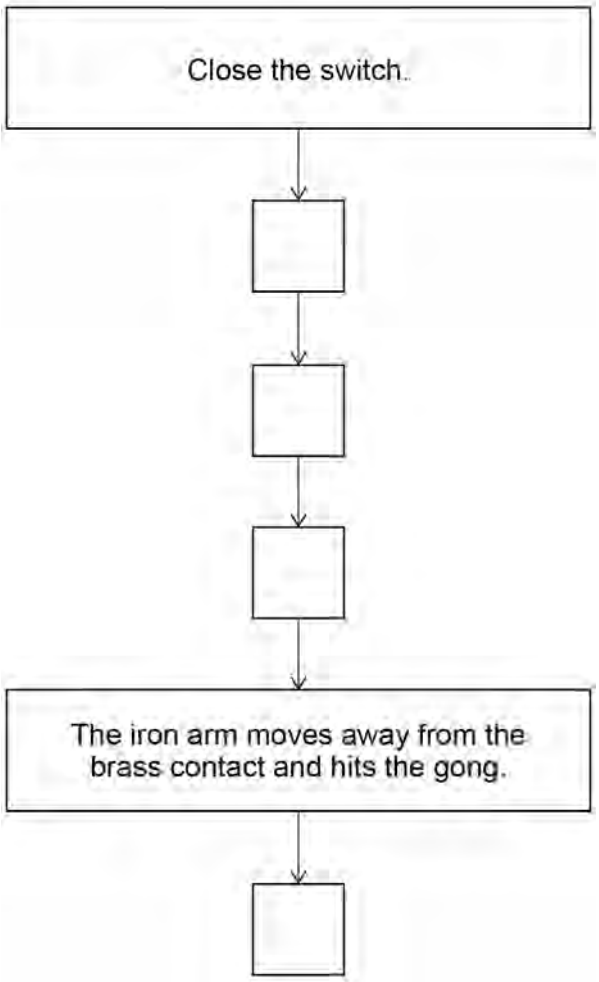


4.7.1.2 Magnetic fields

Question 16 · continued

0 3 . 4 **Figure 8** shows an incomplete sequence of how the bell works.

Figure 8



Write **one** letter in each box to show the correct sequence.

Use each letter once.

[2 marks]

A A magnetic field is created around the electromagnet.

B A resultant force acts on the iron arm causing it to move towards the electromagnet.

C The iron arm returns to its original position.

D There is a current in the circuit.

4.7.1.2 Magnetic fields

Question 16 · continued

0 3 . 5 Which of the following would increase the resultant force on the iron arm?

[1 mark]

Tick (✓) **one** box.

Decrease the distance between the electromagnet and the iron arm ☐

Decrease the number of cells in the circuit ☐

Decrease the number of turns on the electromagnet ☐

0 3 . 6 The iron arm of the bell vibrates with a frequency of 6.25 Hz.

Calculate the period of the iron arm.

Use the equation:

$$\text{period} = \frac{1}{\text{frequency}}$$

[2 marks]

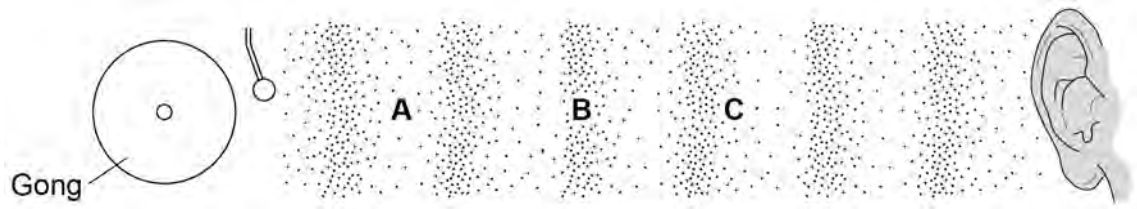
Period = _____ s

Question 16 · continued

0 3 . 7 The sound waves produced by the bell are longitudinal waves.

Figure 9 shows the position of the air particles at one point in time as the sound waves travel through the air.

Figure 9



Which letter represents an area of compression?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐

9

Turn over for the next question

4.7.1.2 Magnetic fields

Question 17

June 2024 | 8463/2F | Original Q2

0 2 Some metals are magnetic and others are non-magnetic.

0 2 . 1 Which of the following metals is magnetic?

[1 mark]

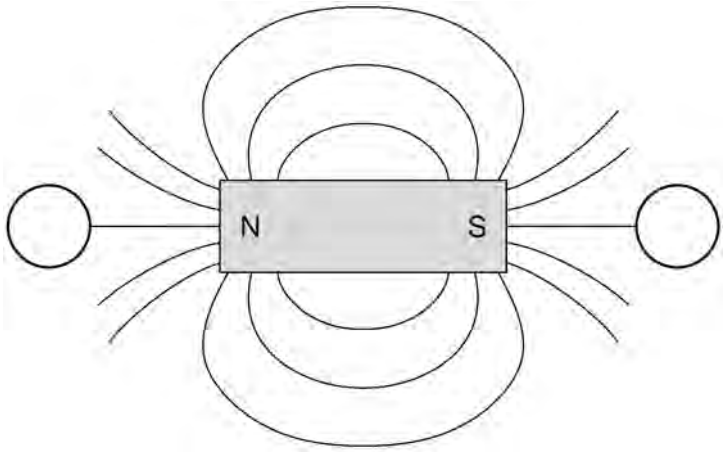
Tick (✓) **one** box.

- Aluminium ☐
- Cobalt ☐
- Copper ☐
- Zinc ☐

0 2 . 2 **Figure 1** shows magnetic field lines around a bar magnet.

The circles represent plotting compasses.

Figure 1



Draw **one** arrow in each circle on **Figure 1** to show the direction of the magnetic field at each place.

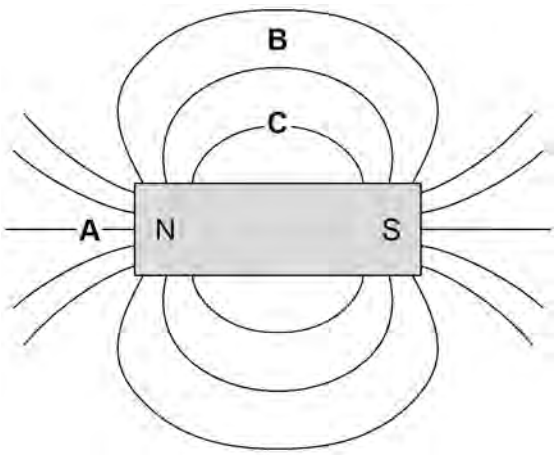
[2 marks]

4.7.1.2 Magnetic fields

Question 17 · continued

0 2 . 3 **Figure 2** shows magnetic field lines around a bar magnet.

Figure 2



Which letter shows where the magnetic field is strongest?

[1 mark]

Tick (✓) **one** box.

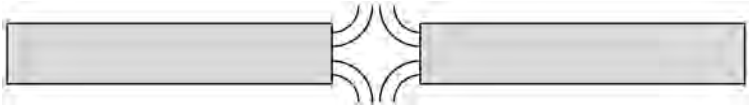
A ☐ **B** ☐ **C** ☐

4.7.1.2 Magnetic fields

Question 17 · continued

0 2 . 4 **Figure 3** shows the magnetic field lines between two bar magnets.

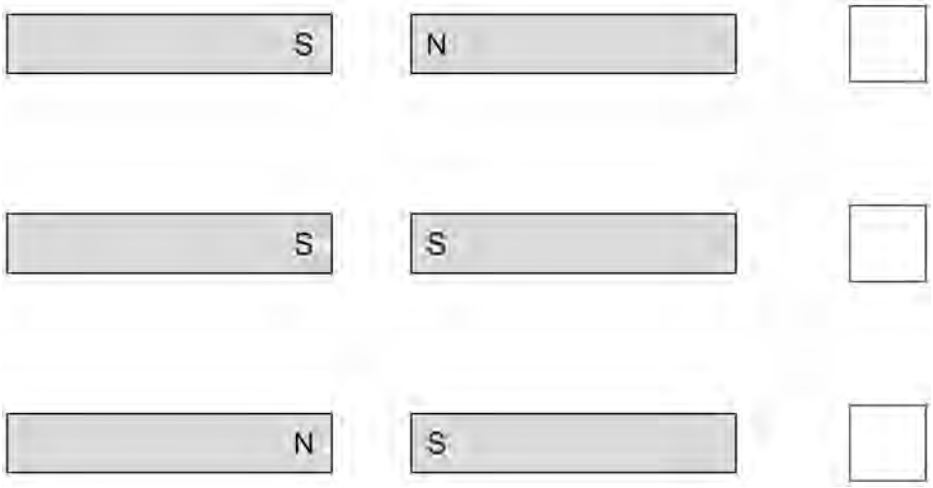
Figure 3



Which diagram shows how the magnets are arranged in **Figure 3**?

[1 mark]

Tick (✓) **one** box.



Question 2 continues on the next page

4.7.1.2 Magnetic fields

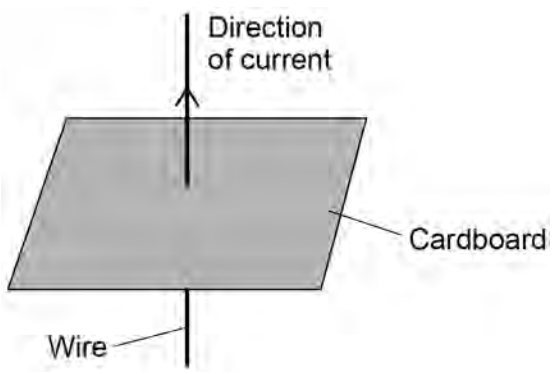
Question 17 · continued

A teacher demonstrates how a current in a wire creates a magnetic field around the wire.

Figure 4 shows the wire passing through a piece of cardboard.

The current can be switched on and off.

Figure 4



0 2 . 5 Describe how the teacher can use a plotting compass to demonstrate the magnetic effect of the current in the wire.

[2 marks]

4.7.1.2 Magnetic fields

Question 17 · continued

0 2 . 6 The teacher decreases the current in the wire.

How does the strength of the magnetic field around the wire change?

[1 mark]

Tick (✓) **one** box.

Decreases ☐

Stays the same ☐

Increases ☐

0 2 . 7 The teacher reverses the direction of the current in the wire.

What happens to the magnetic field around the wire?

[1 mark]

9

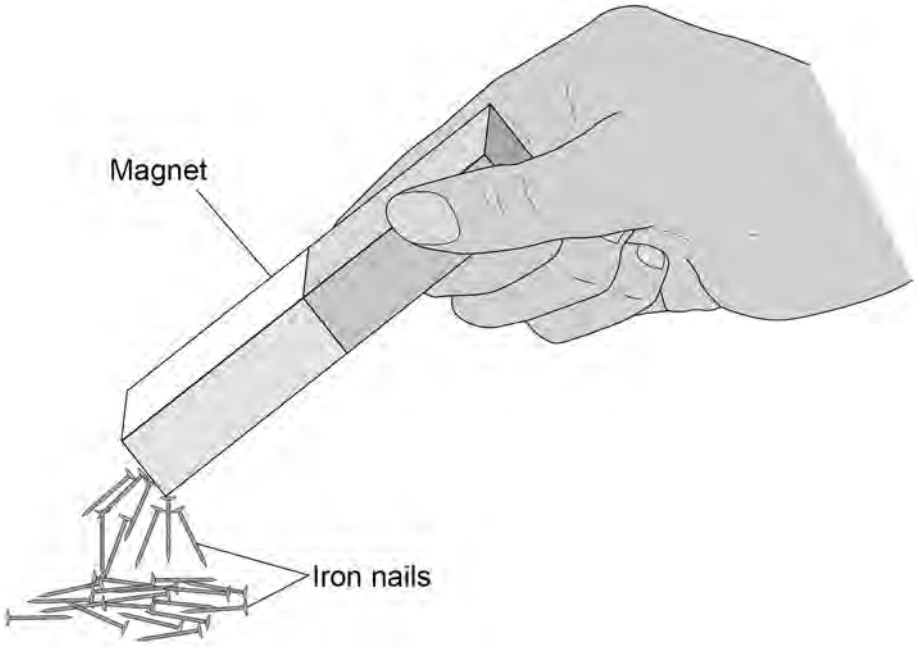
4.7.1.2 Magnetic fields

Question 18

June 2025 | 8463/2F | Original Q6

0 6 **Figure 8** shows iron nails being attracted to a magnet.

Figure 8



0 6 . 1 Iron is a magnetic material.

Which **two** of the following are also magnetic materials?

[2 marks]

Tick (✓) **two** boxes.

- Cobalt ☐
- Copper ☐
- Gold ☐
- Steel ☐
- Zinc ☐

Question 18 · continued

0 6 . 2 The iron nails become magnets when they are attracted to the bar magnet.

Complete the sentence.

Choose the answer from the box.

[1 mark]

electromagnets	**induced magnets**	**permanent magnets**

The iron nails become _____.

0 6 . 3 **Figure 9** shows two bar magnets next to each other.

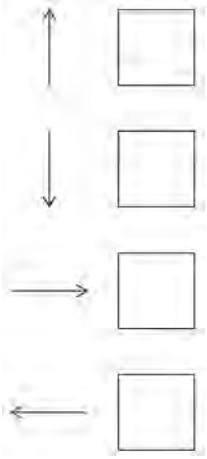
Figure 9



Which arrow shows the direction of the magnetic field between the magnets?

[1 mark]

Tick (✓) **one** box.



4.7.1.2 Magnetic fields

Question 18 · continued

Figure 10 shows the direction of the current in a wire.

The current causes a magnetic field around the wire.

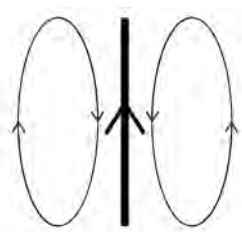
Figure 10



0 6 . 4 Which of the following shows the magnetic field pattern around the wire?

[1 mark]

Tick (✓) **one** box.



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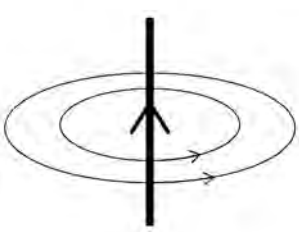

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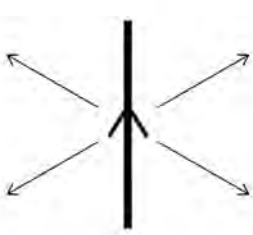

☐

4.7.1.2 Magnetic fields

Question 18 · continued

0 6 . 5 What **two** changes would increase the strength of the magnetic field around the wire?

[2 marks]

1 _____

_____

2 _____

_____

7

Turn over for the next question