OCR GCSE GATEWAY PHYSICS A · J249

PHYSICS



EXAM QUESTION PACK

P4.1 MAGNETS AND MAGNETIC FIELDS

SCORE	PERCENTAGE
/43	%

STEMUP

These questions belong to OCR, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by OCR. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with OCR and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. OCR has not endorsed, approved or been involved in the production of it. OCR and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

OCR publishes its past papers, mark schemes and examiner reports. Always check the current specification at ocr.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Gateway Physics A (9-1)

Magnets and magnetic fields

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

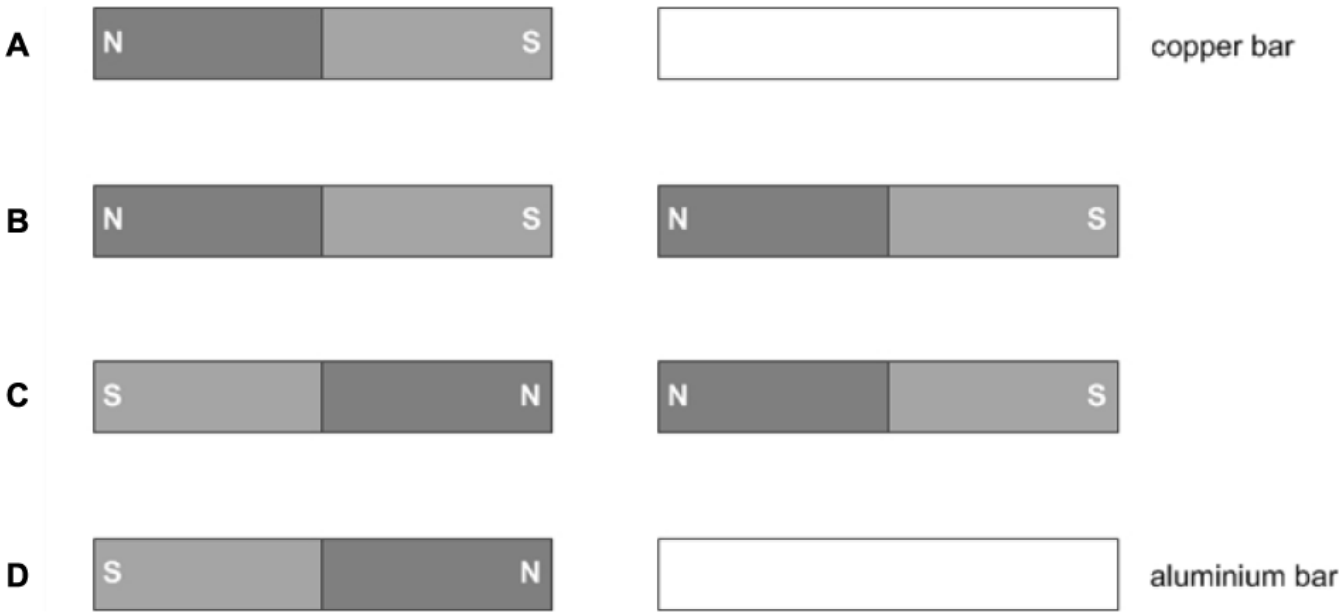
- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **43**.
- The total number of marks may take into account some 'either/or' question choices.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

1 Which of these pairs of objects will attract each other?



Your answer ☐

[1]

2 The strength of the magnetic effect of a solenoid can be changed.

Which of the following rows correctly describes what happens to the strength when the current and number of turns are increased?

	Increased current	Increased number of turns
A	increases	decreases
B	increases	increases
C	decreases	increases
D	decreases	decreases

Your answer ☐

[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

3 Why is an unmagnetised iron object attracted to a magnet?

A The iron has magnetism induced by the magnet.
B The iron has charged particles which attract the protons in the magnet.
C The iron has charged particles which attract the electrons in the magnet.
D The iron is attracted by the Earth's magnetic field.

Your answer ☐

[1]

4(a) Two students, **A** and **B**, use different methods to see magnetic field patterns.

(i) Describe how student **A** can use a compass to plot a magnetic field pattern.

You may draw a diagram to help you answer this question.

---

[3]

(ii) Student **B** uses iron filings to show a magnetic field pattern.

Describe how student **B** uses iron filings to show a magnetic field pattern.

You may draw a diagram to help you answer this question.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

---

[2]

(b) Their teacher prefers students to use the method proposed by student **A**.

Suggest **one** reason why.

---

[1]

(c) Sketch the field pattern the students found around a bar magnet.



[2]

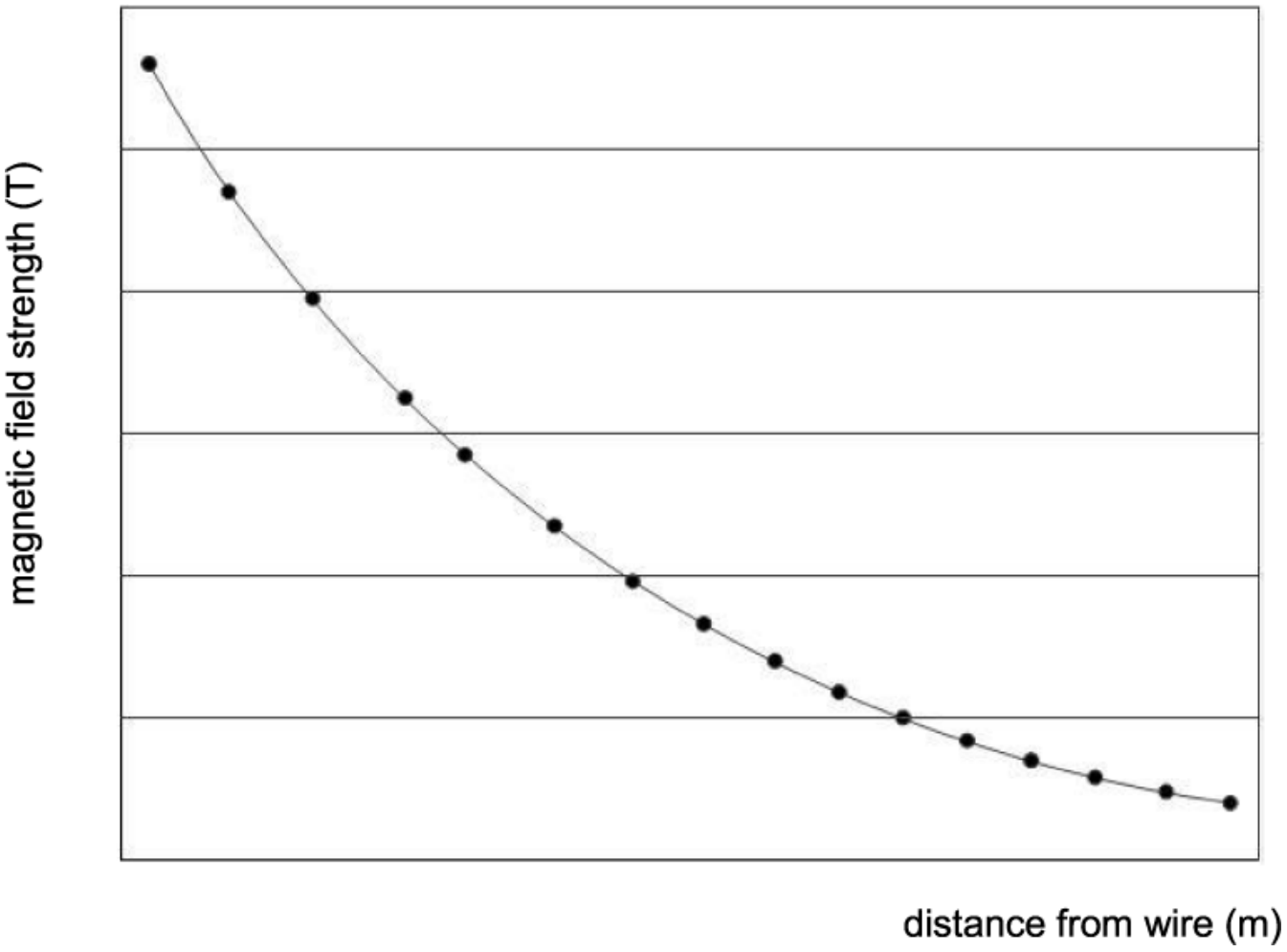
© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

(d) The two students decide to investigate the magnetic effect of a current-carrying wire.

Look at the graph of their results.



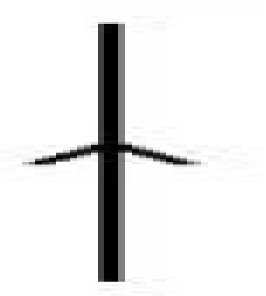
What trend does the graph show?

---

[2]

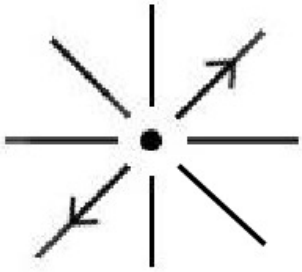
STEMUP.CO.UK

5 The diagram shows a wire carrying an electric current.

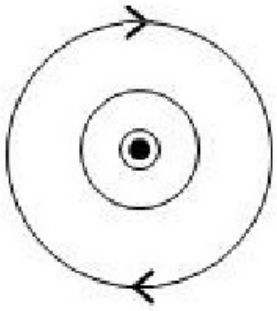


Which diagram shows the magnetic field viewed from above, with the current coming towards you?

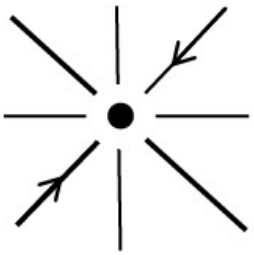
A



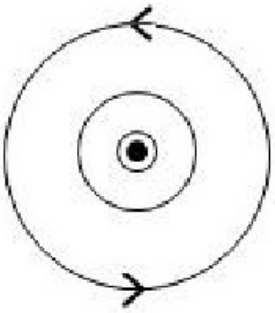
B



C



D



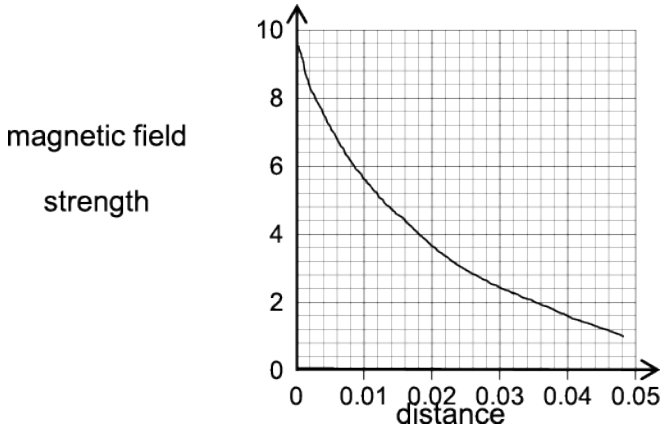
Your answer ☐

[1]

STEMUP.CO.UK

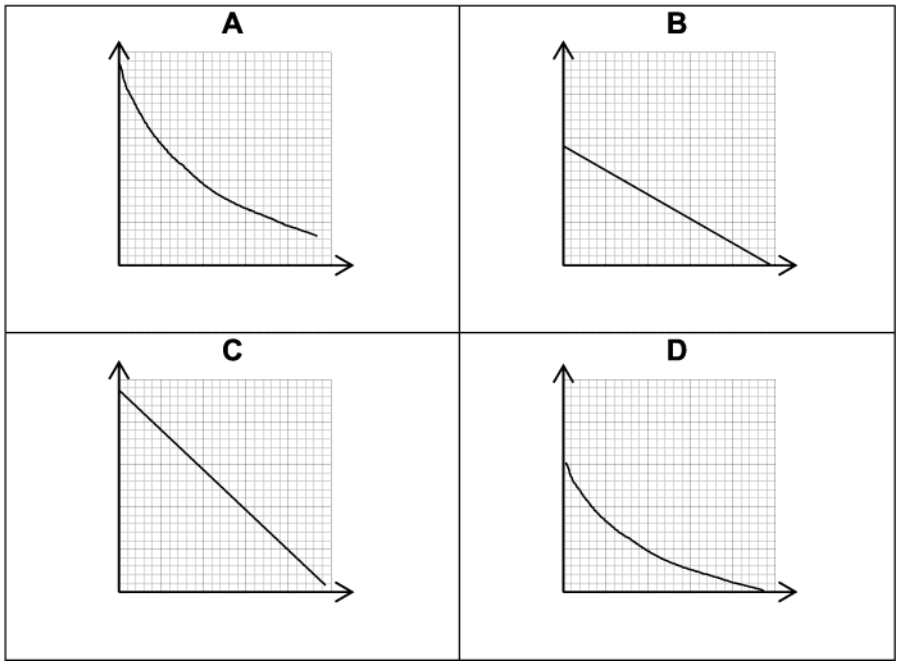
6 A student measures the magnetic field strength around a current carrying conductor at increasing distances from the conductor.

She plots her results.



The current in the conductor is decreased and a new graph plotted.

Which is the correct graph?



Your answer ☐

[1]

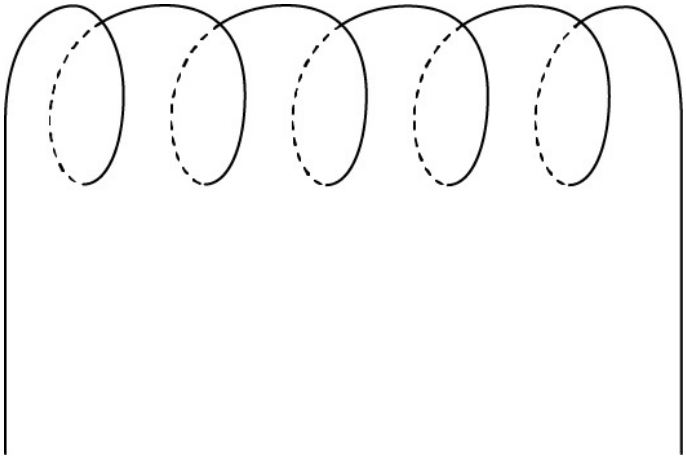
7

(i) Mia investigates electricity and magnetism.

She connects a solenoid to a power supply.

The solenoid produces a magnetic field.

On the **diagram**, sketch the shape of the magnetic field produced.



[2]

(ii) Mia reverses the direction of the current through the solenoid.

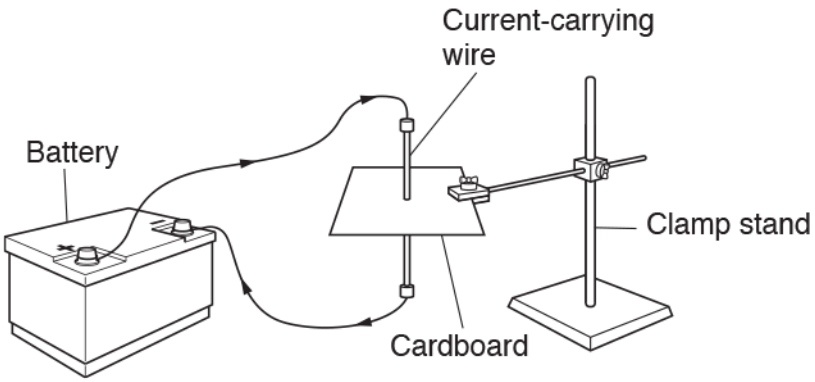
Write down the effect this has on the magnetic field.

---

[1]

8(a) A student sets up an experiment to investigate the magnetic field around a current-carrying wire.

STEMUP.CO.UK



(i) Describe how the student could use this experiment and a compass to investigate the magnetic field produced by the wire.

---

[3]

(ii) Draw the shape of the field which would be found around **this** wire.

[2]

(b) The behaviour of a magnetic compass is evidence that the core of the Earth is magnetic. Explain why.

---

[2]

9 Which does **not** increase the magnetic effect of a solenoid?

A Increasing the cross-sectional area of the solenoid

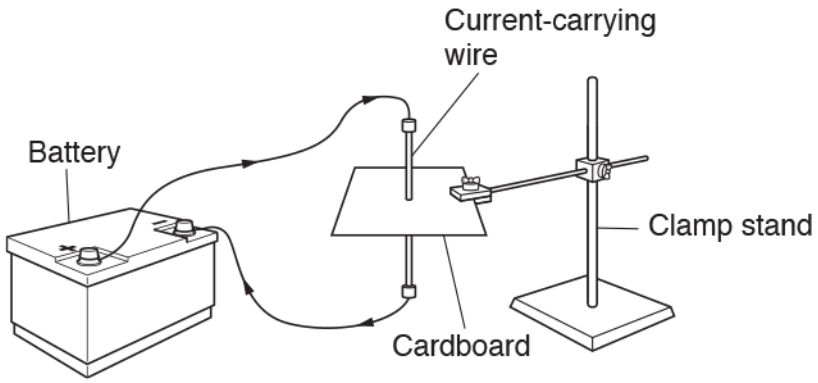
B Increasing the current in the solenoid

C Increasing the number of turns on the solenoid

D Putting a soft iron core in the solenoid

Your answer ☐ [1]

10(a) A student sets up an experiment to investigate the magnetic field around a current-carrying wire.



(i) Describe how the student could use this experiment and a compass to investigate the magnetic field produced by the wire.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

---

[3]

(ii) Draw the shape of the field which would be found around **this** wire.

[2]

(b) The behaviour of a magnetic compass is evidence that the core of the Earth is magnetic. Explain why.

---

[2]

11 Which of these factors affects the strength of the magnetic field around a current-carrying wire?

A Direction of the current only

B Size of the current only

C Distance from the wire only

D Size of the current and distance from the wire

Your answer [ ] [1]

12(a)

Draw the magnetic field pattern between the North and South poles of the magnets.

Include arrows on your field lines.



[3]

(b) Describe **one difference** between a permanent magnet and an induced magnet.

---

[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

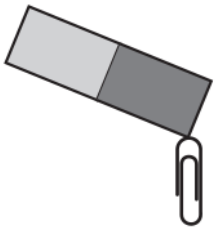
(c) A student investigates solenoids and writes the following:

Solenoids
Solenoids are coils of wire. When a voltage flows through them a magnetic field is created. The magnetic field can be increased by decreasing the number of turns or by increasing the current.

The student makes **two** mistakes.

Put a (ring) around the **two** mistakes in the above box. **[2]**

13 A magnet is used to pick up a paperclip.



Which statement explains why the paperclip is picked up?

A The magnet is a permanent magnet and the opposite pole has been induced at the top of the paperclip.
B The magnet is a permanent magnet and the same pole has been induced at the top of the paperclip.
C The magnet is a temporary magnet and the opposite pole has been induced at the top of the paperclip.
D The magnet is a temporary magnet and the same pole has been induced at the top of the paperclip.

Your answer ☐ **[1]**

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

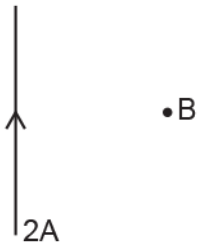
14 Which action **increases** the strength of an electromagnet?

A Decreasing the current
B Decreasing the number of turns of wire
C Increasing the number of turns of wire
D Using a copper core

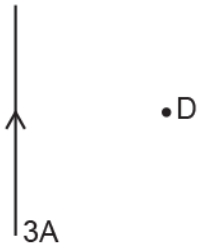
Your answer ☐ **[1]**

15 The different currents in four wires are shown below. The magnetic field is measured at positions **A**, **B**, **C** and **D**.









Which position will experience the strongest magnetic field?

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Your answer

[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

END OF QUESTION PAPER

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK