Magnetism and magnetic fields – 2021/20 GCSE Gateway Physics Combined Science A

1. Nov/2021/Paper_J250/05/No.1

This question is about forces.

Which diagram shows attraction?

A

B

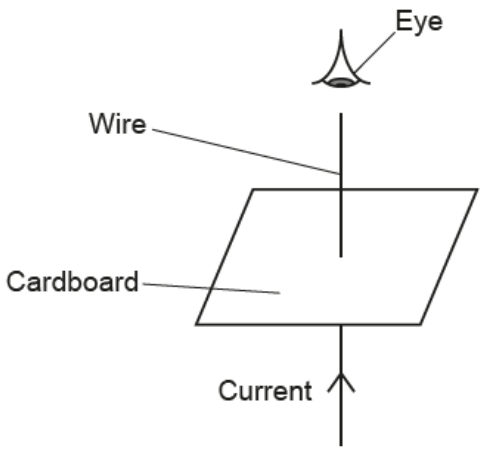
C

D

Your answer ☐ **[1]**

2. Nov/2021/Paper_J250/05/No.10

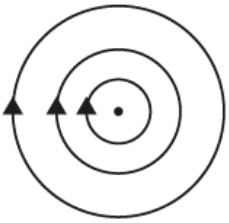
A magnetic field is produced around a current-carrying wire.



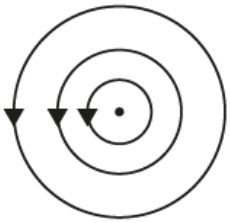
A student views the magnetic field from above, as shown by the eye in the diagram.

Which diagram shows the magnetic field around the wire?

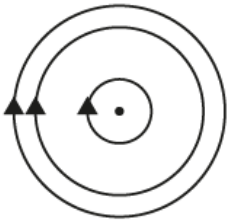
A



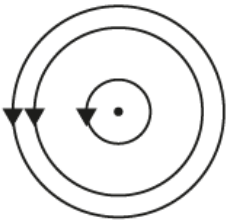
B



C



D



Your answer ☐ **[1]**

3. Nov/2020/Paper_J250/05/No.1

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]**

4. Nov/2020/Paper_J250/05/No.17

This question is about magnetic fields.

(a) **Fig. 17.1** is a diagram of the magnetic field around a bar magnet.

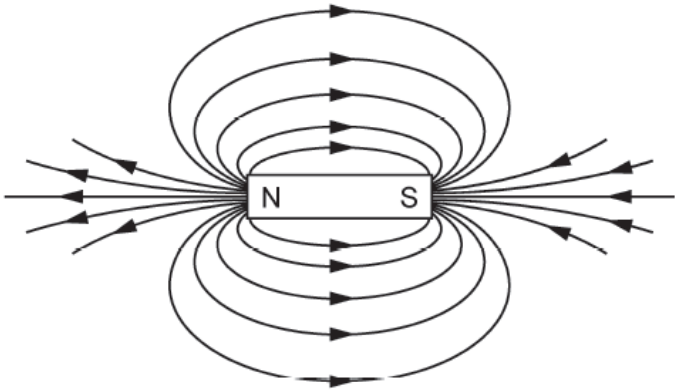


Fig. 17.1

The field lines give information about magnetic forces.

State **two** pieces of information **Fig. 17.1** gives you.

1.....

.....

2.....

.....

[2]

(b) A student has a permanent magnet and three metal blocks marked **A**, **B** and **C**, as shown in **Fig. 17.2**.

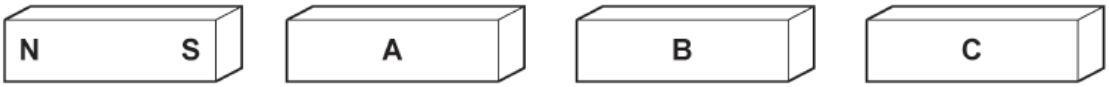


Fig. 17.2

- One block is a permanent magnet.
- One block is a piece of copper.
- One block is a piece of iron.

Explain how the student can use the permanent magnet to identify block **A**, **B** and **C**.

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..... **[3]**

(c) **Fig. 17.3** is a picture of a dipping compass.

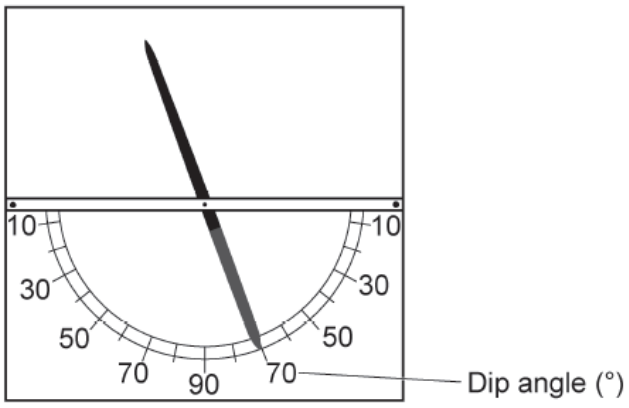

Fig. 17.3

The dip angle can be measured at different distances from the Earth's North pole.

The graph in **Fig. 17.4** shows how the dip angle varies with distance from the Earth's North pole.

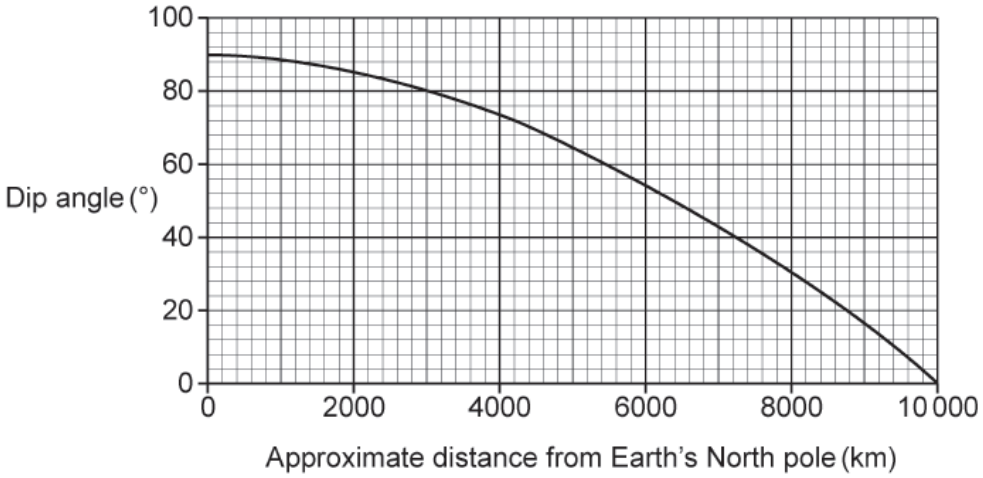

Fig. 17.4

(i) Describe the relationship shown in the graph in **Fig. 17.4**.

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..... **[2]**

(ii) London is approximately 4200 km from the North pole.

Use the graph in **Fig. 17.4** to estimate the dip angle in London.

Dip angle = ...° **[1]**

(iii) The actual value of the dip angle in London is 66°, with an uncertainty of +/– 3°.

Is the value you obtained in part **(c)(ii)** accurate? Explain your answer.

.....

..... **[1]**

(iv) The dipping compass gives important information about the Earth.

Describe what the dipping compass tells us about the Earth.

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..... **[1]**

(d) The graph in **Fig. 17.5** shows how the magnetic field strength around a straight wire decreases with distance from the wire.

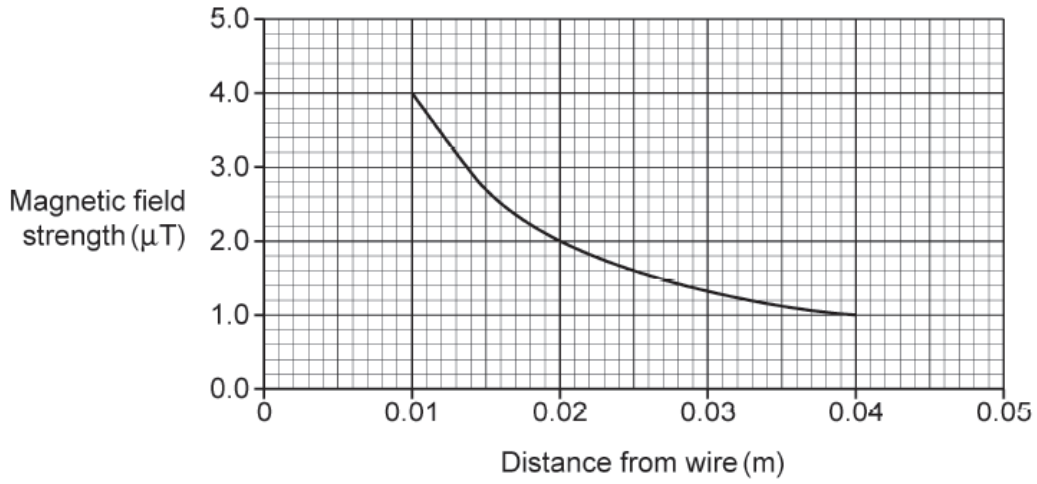

Fig. 17.5

Two students are discussing the graph in **Fig. 17.5**. This is what they say:

Student **X**: 'As distance doubles, field strength is multiplied by 0.25.'

Student **Y**: 'As distance doubles, field strength is multiplied by 0.75.'

Use the graph in **Fig. 17.5** to evaluate each statement.

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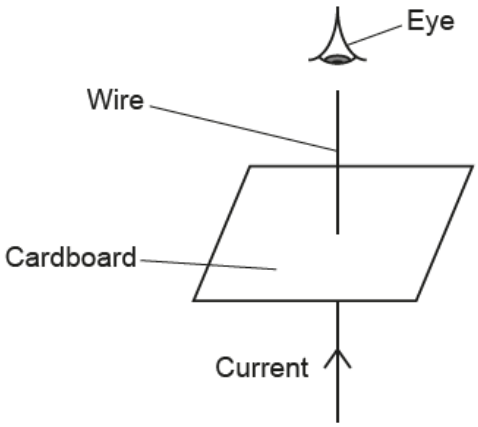
.....

..... **[2]**

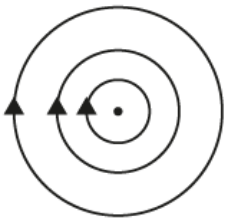
5. Nov/2021/Paper_J250/11/No.2

A magnetic field is produced around a current-carrying wire.

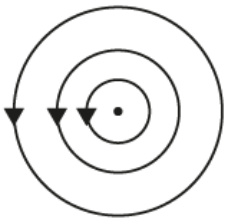


A student views the magnetic field from above, as shown by the eye in the diagram.
Which diagram shows the magnetic field around the wire?

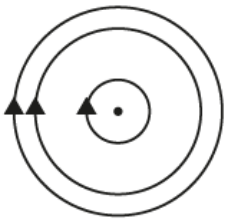
A



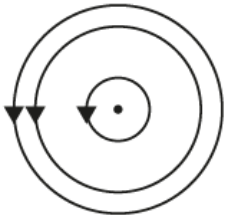
B



C



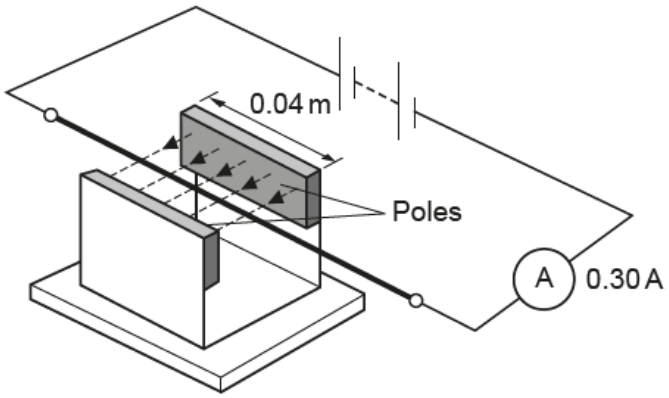
D



Your answer ☐ **[1]**

6. Nov/2021/Paper_J250/11/No.8

A current-carrying wire is placed in a magnetic field.



The magnetic flux density between the poles is 0.08 T.

Calculate the force acting on the wire.

Use values from the diagram and an equation from the Data Sheet to help you.

A 9.6×10^{-5} N

B 9.6×10^{-4} N

C 9.6×10^{-3} N

D 9.6×10^{-2} N

Your answer ☐ **[1]**

7. Nov/2020/Paper_J250/11/No.11

This question is about magnetic fields.

(a) **Fig. 11.1** is a diagram of the magnetic field around a bar magnet.

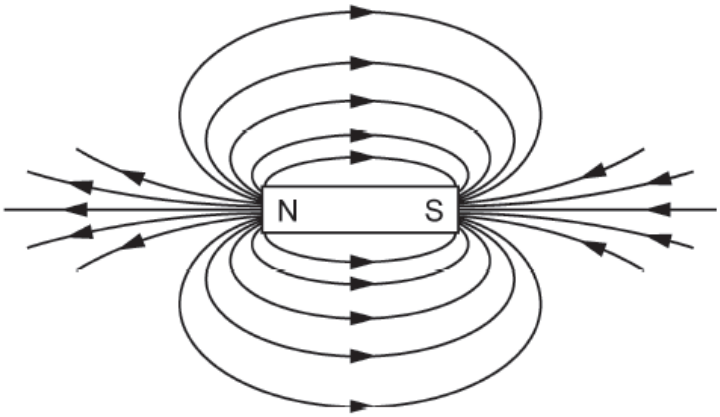


Fig. 11.1

The field lines give information about magnetic forces.

State **two** pieces of information **Fig. 11.1** gives you.

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.....

2 .....

.....

[2]

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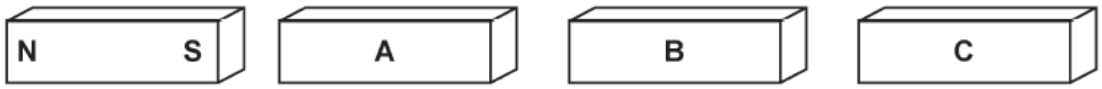

Fig. 11.2

- One block is a permanent magnet.
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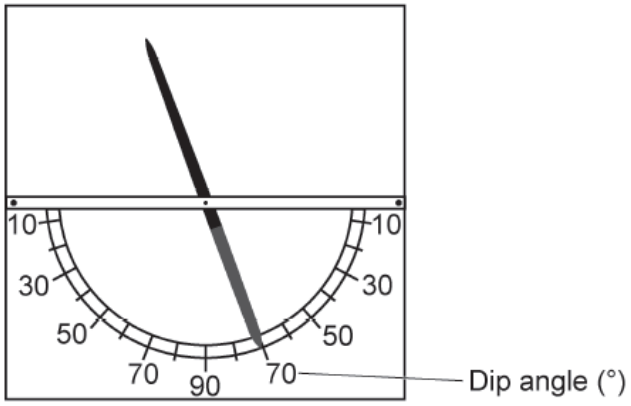
..... **[3]**

(c) **Fig. 11.3** is a picture of a dipping compass.



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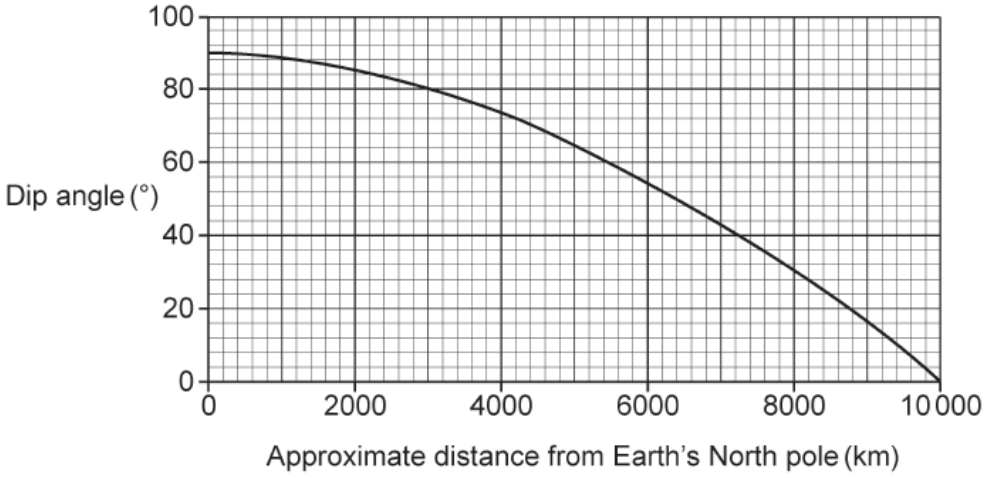

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Use the graph in **Fig. 11.4** to estimate the dip angle in London.

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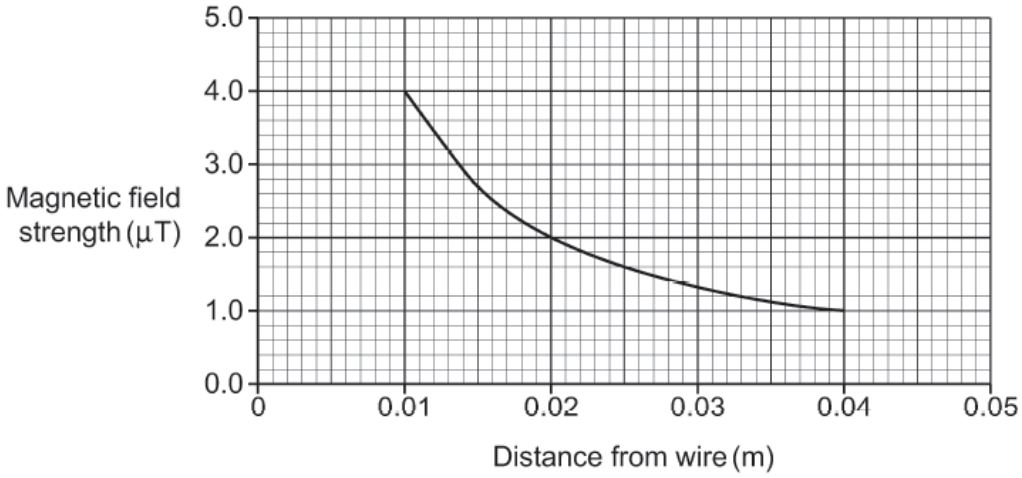

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