Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 6 shows the magnetic field of a magnet.

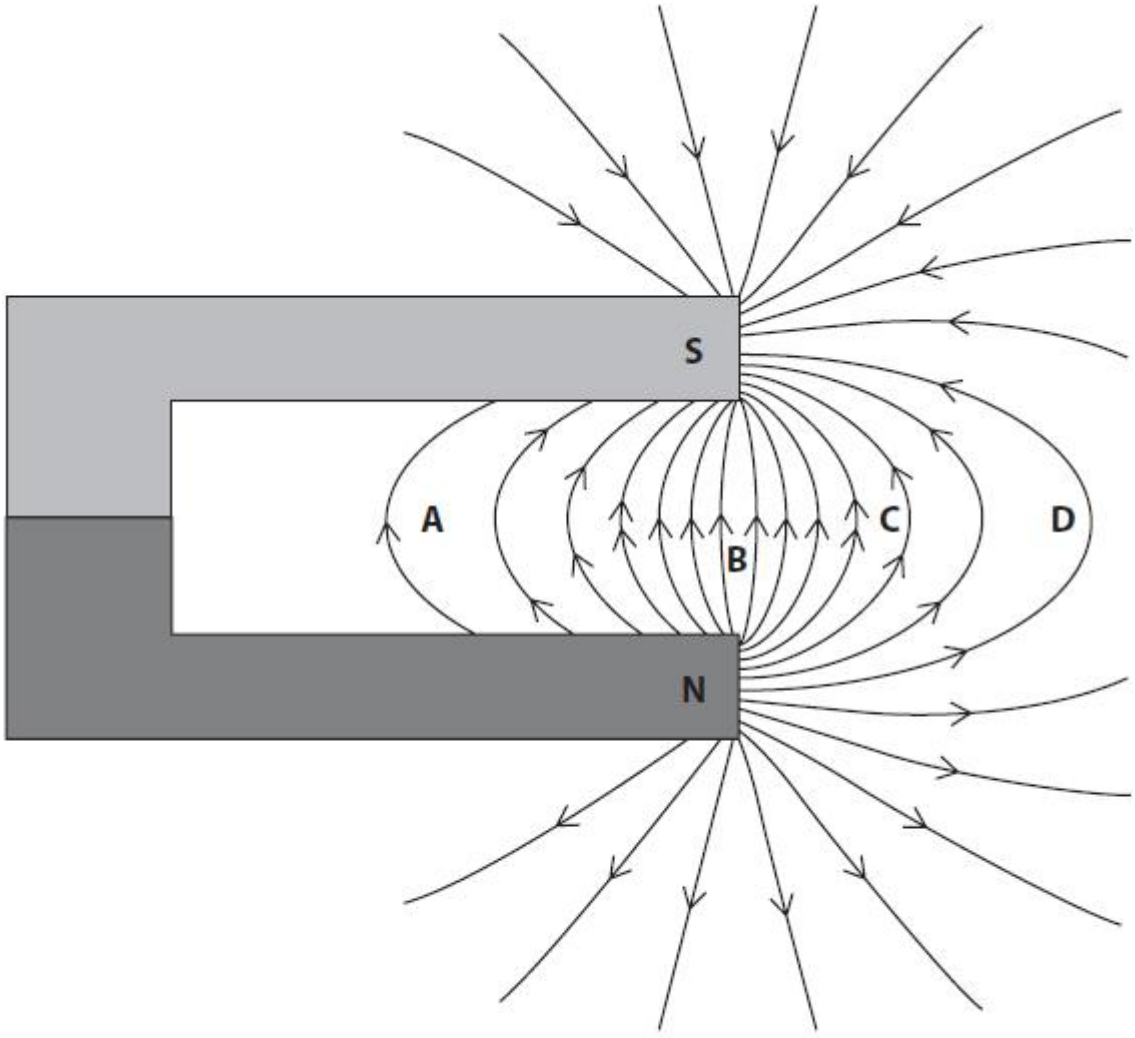


Figure 6

At which point is the magnetic field strongest?

(1)

- ☐ **A**
- ☐ **B**

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☒ **C**
☒ **D**

(Total for question = 1 mark)

Q2.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A student uses a plotting compass to investigate the magnetic field around a wire.

Figure 3 shows the wire going straight through a card.

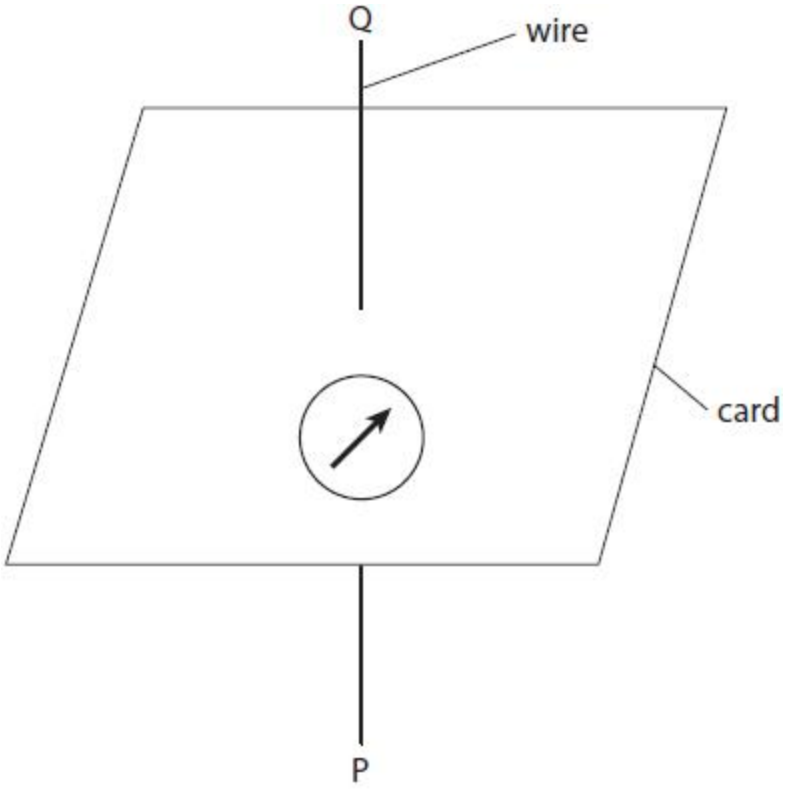


Figure 3

Figure 3 shows the compass needle when there is no current in the wire.

(i) Which of these shows a possible direction of the compass needle when there is a current in the wire going from P to Q?

(1)



☒ **A** ☒ **B** ☒ **C** ☒ **D**

(ii) Describe how the student could develop the investigation to find the shape of the magnetic field produced by the current.

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(3)

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(Total for question = 4 marks)

Q3.

A student uses plotting compasses to investigate the magnetic field between the poles of two bar magnets.

Figure 5 shows **one** of the plotting compasses and **one** of the bar magnets.



Figure 5

The student places the two magnets on a piece of paper with a pole of one magnet a few centimetres away from a pole of the other magnet.

The student places 20 plotting compasses on the paper near the magnets.

Figure 6 shows the direction in which each of the plotting compasses points.

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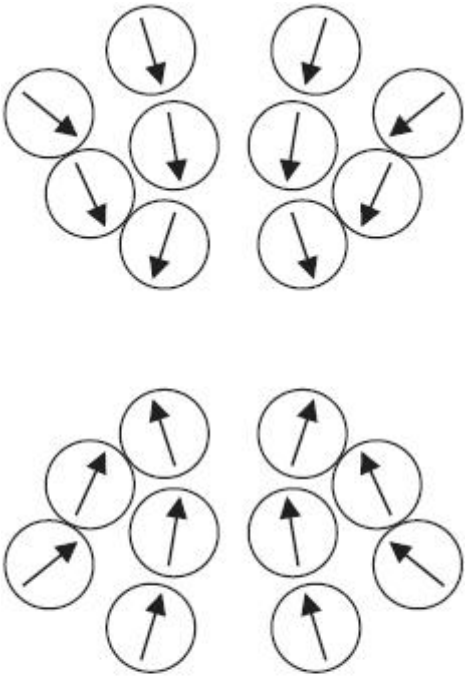


Figure 6

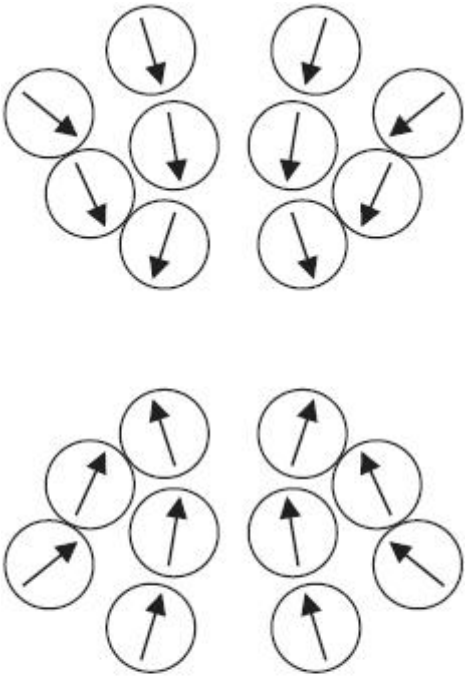


Figure 6

(i) Draw two rectangles on Figure 6 to show the positions of the two bar magnets.
Label the N-pole and the S-pole of each magnet.

(2)

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(ii) The student wants to determine the shape of the magnetic field for a larger area around the magnets.

Describe how the student should continue the investigation using just one plotting compass.

(3)

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(Total for question = 5 marks)

Q4.

Figure 5 shows the directions of some plotting compass needles placed at different points near the Earth's surface.

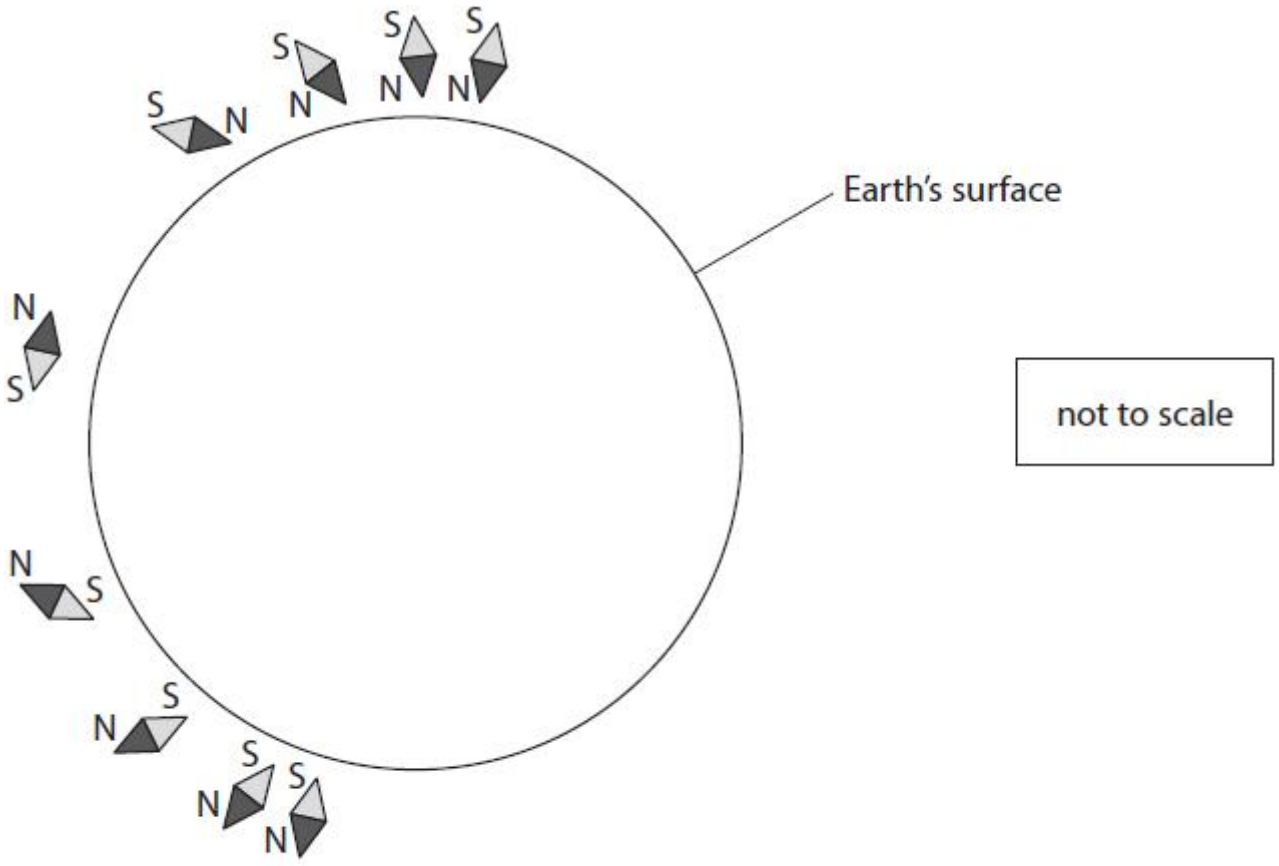


Figure 5

(i) Sketch, on Figure 5, the Earth's magnetic field outside and inside the Earth.

(2)

(ii) State which part of the Earth generates its magnetic field.

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(1)

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(Total for question = 3 marks)

Q5.

Figure 7 shows a wire placed between the poles of a U-shaped magnet.

The wire is connected to a resistor and a battery.

The wire carries a current in the direction shown.

The wire is perpendicular to the magnetic field of the magnet.

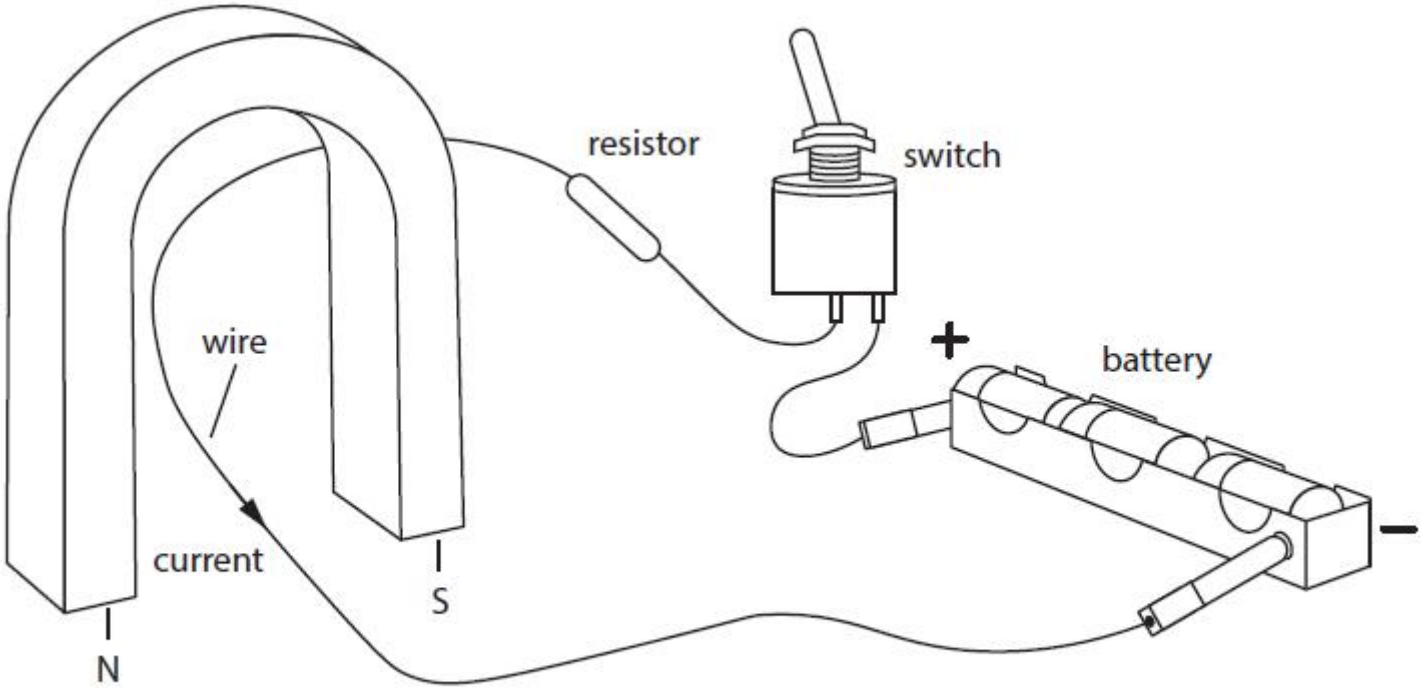


Figure 7

(i) Draw an arrow on Figure 7 to show the direction of the force, F, acting on the wire.
Label this arrow 'F'.

(1)

(ii) State **one** practical way of reversing the direction of force F.

(1)

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(iii) In Figure 7

- current in the wire = 3.2 A
- length of wire in the magnetic field = 0.042 m
- magnitude of the force on the wire = 0.078 N

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Calculate the magnitude of the magnetic flux density between the two poles of the magnet.

(2)

magnetic flux density = ... T

(Total for question = 4 marks)

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