6 Diagram 1 shows the magnetic field lines near the south pole of a bar magnet.

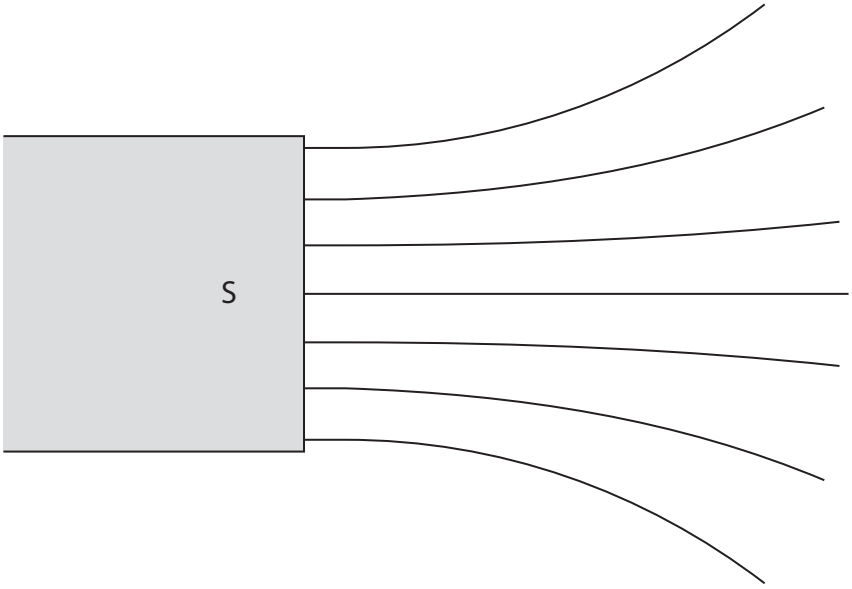

Diagram 1

(a) Draw two arrows on the field lines in diagram 1 to show the direction of the magnetic field lines.

(1)

(b) Which of these is attracted to the bar magnet if placed in the magnetic field?

(1)

- ☒ **A** copper
- ☒ **B** nickel
- ☒ **C** plastic
- ☒ **D** zinc

(c) The strength of the magnetic field changes as the distance from the south pole increases.

Explain how the magnetic field lines show this.

(2)

(d) Diagram 2 shows a small piece of iron that has been placed in the magnetic field.

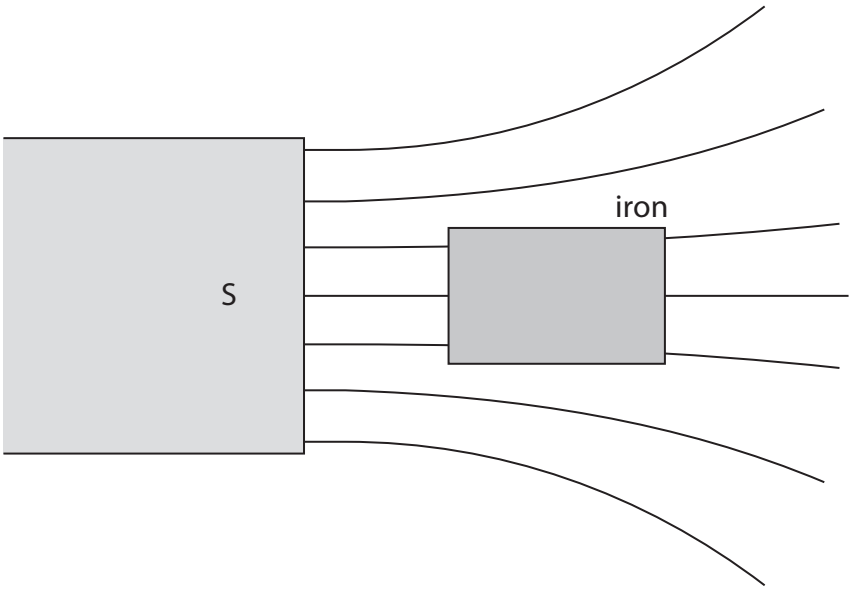

Diagram 2

The piece of iron becomes magnetised when placed in the magnetic field.

(i) Explain why the piece of iron experiences a force towards the south pole of the bar magnet.

You may add to diagram 2 to help your answer.

(2)

(ii) A student suggests that the piece of iron is now a permanent magnet.

Explain why the student is incorrect.

(2)

(Total for Question 6 = 8 marks)