Magnetism WS MS

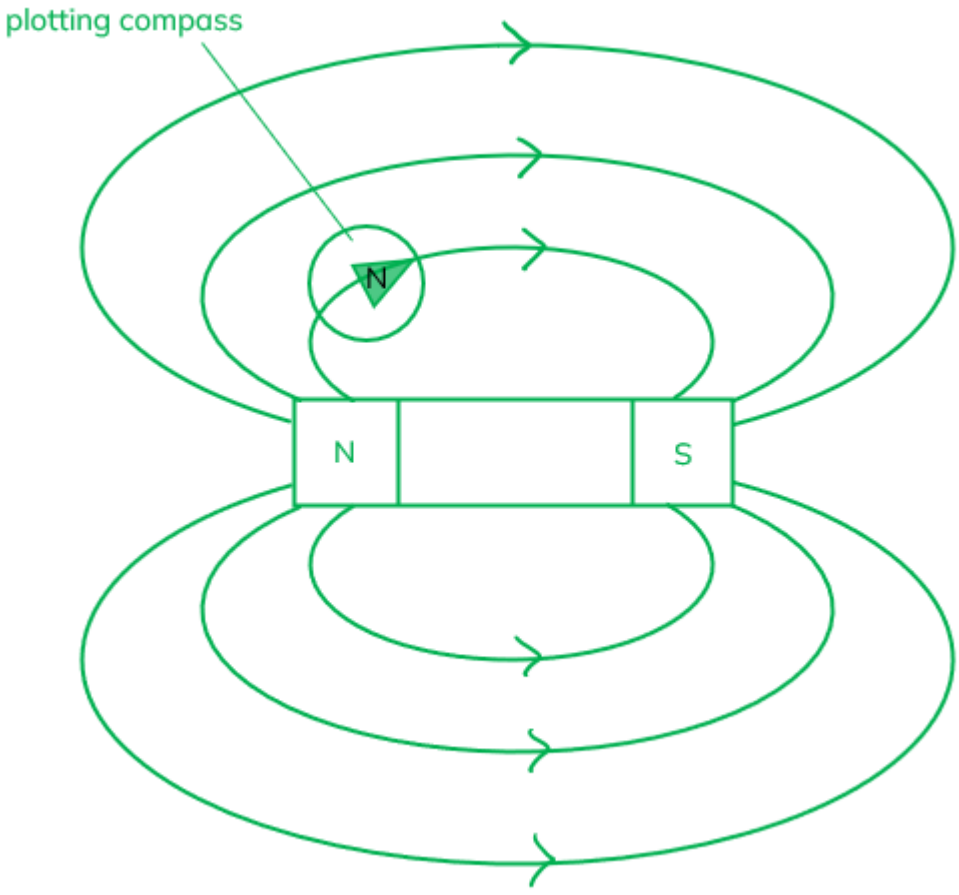
Question 1a

(a) To describe how to use the apparatus to show the pattern of magnetic field lines:

Any **three** from:

- Use a plotting compass next to magnet; [1 mark]
- Mark the point of the compass needle; [1 mark]
- Move the compass to the other side of the dot; [1 mark]
- Align the needle with the dot, then put a dot the other side of needle and repeat; [1 mark]
- Start again from another position next to magnet; [1 mark]

A diagram that would show this might look like:



[Total: 3 marks]

It is important that you learn the key methods involved in the core practicals.

Question 1b

(b) A diagram which would score three marks would look like:

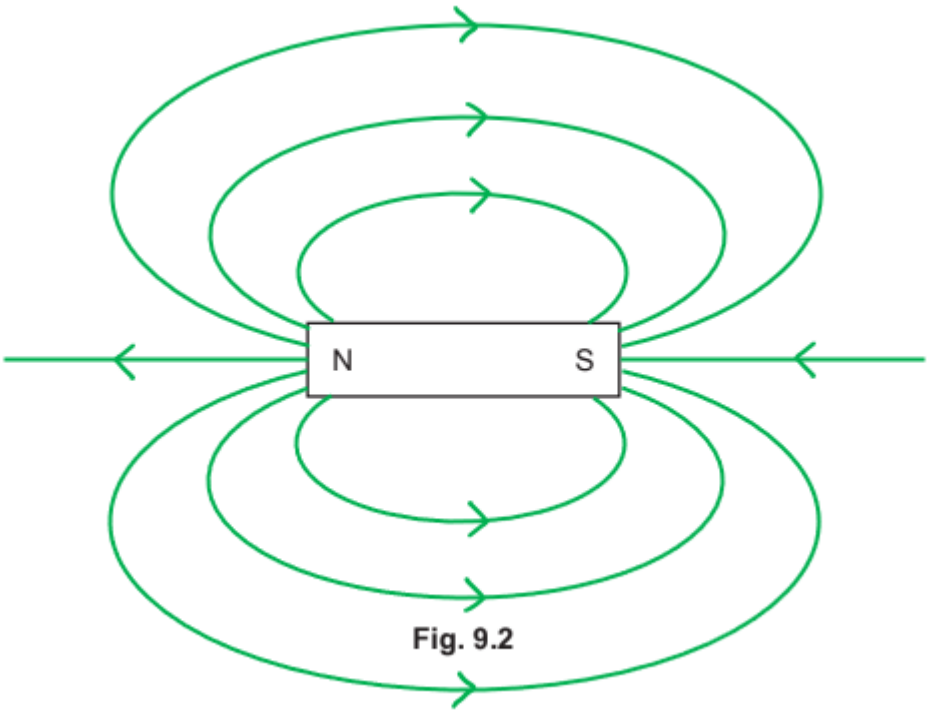


Fig. 9.2

Any **two** from:

- No field lines should cross; [1 mark]
- Field lines loop from the north pole to the south pole away from the ends; [1 mark]
- Field lines shown as straight lines out of the north pole and into the south pole at the ends of the magnet; [1 mark]

And for the final mark:

- Arrow(s) shown on the field lines pointing from the north pole to the south pole; [1 mark]

[Total: 3 marks]

Knowing the field lines around a bar magnet is a key point. Don't forget to add arrows, and that these should point from north to south.

Question 2a

(a) Complete the table by writing attract or repel in the effect column:

One mark for each correct answer:

Orientation of bar magnets	Effect
N S S N	repel
S N S N	attract
N S N S	attract
S N N S	repel

[Total: 4 marks]

Question 2b

(b)

(i) When a magnetic material is brought close to the north pole of a magnet:

- The magnetic material will be attracted to the magnet; [1 mark]

(ii) When a magnetic material is brought close to the south pole of a magnet:

- The magnetic material will be attracted to the magnet; [1 mark]

[Total: 2 marks]

Remember that a magnetic material (this is **not** the same as a magnet, that produces its own magnetic field) will never be **repelled** from a magnet, only attracted.

Question 2c

(c) One use of a permanent magnet is:

Any **one** from:

- Compass; [1 mark]
- Fridge magnets; [1 mark]
- Fridge door seal; [1 mark]
- Motor; [1 mark]
- Generator; [1 mark]
- Clasps on jewellery / toys / purses / bags; [1 mark]

[Total: 1 mark]

Any reasonable suggestion would gain the mark.

Question 2d

(d) Four magnetic materials that would be attracted to a magnet are:

- Iron; [1 mark]
- Nickel; [1 mark]
- Cobalt; [1 mark]
- Steel; [1 mark]

[Total: 4 marks]

Question 3a

(a) Describe a method for drawing the magnetic field around a bar magnet using iron filings:

- Place a piece of paper on top of the bar magnet; [1 mark]
- Sprinkle iron fillings onto the piece of paper; [1 mark]
- Tap the paper to shift the iron fillings along the field lines; [1 mark]

- Sketch the pattern (on a separate piece of paper); [1 mark]

[Total: 4 marks]

Question 3b

(b) The definition of a magnetic field is:

- A region in which a magnetic pole / magnet experiences a force; [1 mark]

[Total: 1 mark]

Question 3c

(c) The direction of magnetic field lines are:

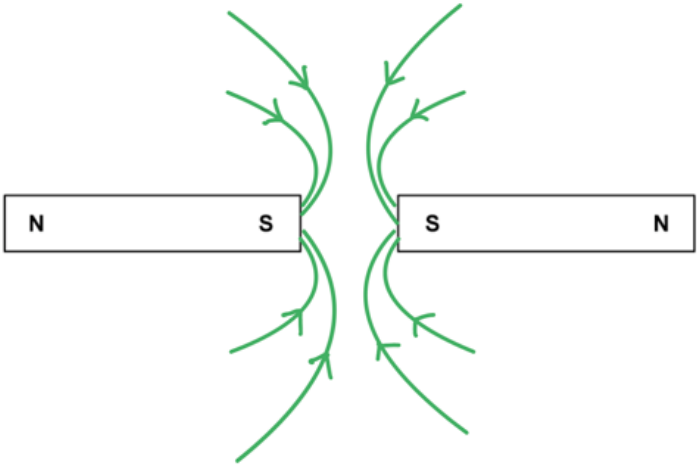
- From north (pole) to south (pole); [1 mark]

[Total: 1 mark]

Question 3d

(d) Sketch the magnetic field lines for the two bar magnets shown in Fig. 1.1:

A diagram scoring 2 marks:



- Magnetic field lines show south poles repelling; [1 mark]
- At least 4 field lines drawn with arrows pointing from north to south; [1 mark]
- No field lines in the region directly between the south poles; [1 mark]

[Total: 3 marks]

Make sure not to miss out on the arrows indicating the direction of the magnetic field lines! These are always from **north** to **south**.

Question 4a

(a) The effect that produces a temporary magnet is:

- Induced magnetism; [1 mark]

[Total: 1 mark]

Question 4b

(b) The magnetic materials from the list are:

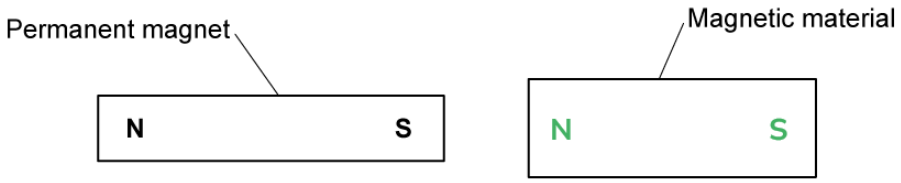
- Iron **AND** steel; [1 mark]

[Total: 1 mark]

Question 4c

(c) Draw, on Fig. 1.1, the temporary poles that will be induced in the magnetic material:

A diagram scoring 1 mark:



- Induced north pole shown closest to the south pole of the permanent magnet **AND** induced south pole drawn on opposite end of magnetic material; [1 mark]

[Total: 1 mark]

Question 4d

(d) Complete the paragraph using words from the list:

- The paperclips are made of steel which is a **magnetic** material; [1 mark]
- The paperclips are **attracted** to the permanent magnet; [1 mark]
- The magnetic field induces temporary **poles** in the paperclips; [1 mark]
- And they become **temporary** magnets; [1 mark]

[Total: 4 marks]

Question 5a

(a) A *uniform* magnetic field is:

- A magnetic field that has the same strength; [1 mark]
- And direction at all points; [1 mark]

[Total: 2 marks]

Question 5b

(b) Sketch the uniform field lines between the poles:

A diagram scoring 2 marks:

- At least 3 field lines drawn equally spaced; [1 mark]
- Arrows indicating direction from north to south pole; [1 mark]

[Total: 2 marks]

Question 5c

(c) State and explain the relative strengths of magnetic fields A and B:

- B is stronger than A **OR** A is weaker than B; [1 mark]
- Because the field lines of B are closer together / more compact; [1 mark]

[Total: 2 marks]