0 1

A student is experimenting with a plotting compass. The magnetic north pole of the compass needle located at the tip of the arrow, as shown in the below diagram.

0 1 . 1

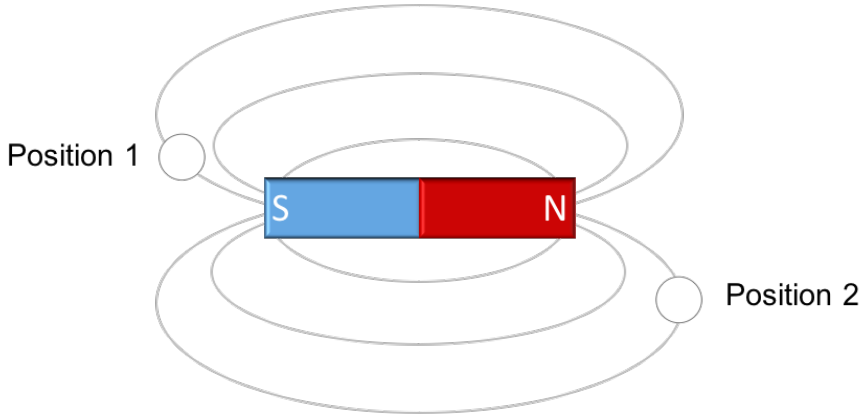
Which **one** of the following statements is correct? Tick **one** box.

- The needle will point towards geographic south ☐
- The needle will point towards magnetic north ☐
- The needle will align itself with the magnetic field of the Earth ☐
- The needle is an induced magnet ☐

[1 mark]

0 1 . 2

The student uses the plotting compass to investigate the magnetic field around a bar magnet.



Draw arrows inside the circles at Position 1 and Position 2 to indicate the direction in which the compass needle will point when placed at these two locations.

Hence add arrows to each of the magnetic field lines in the above diagram.

[3 marks]

0 2 Magnets may be classified as being either permanent or induced.

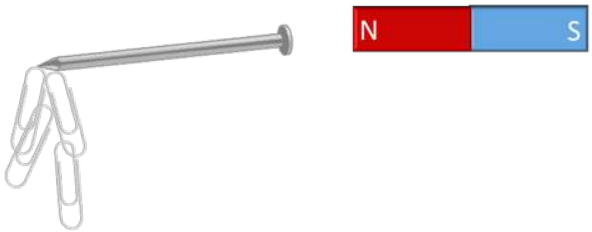
0 2 . 1 Explain the difference between a permanent and an induced magnet.

[2 marks]

0 2 . 2 Explain how you could use the below experimental setup to determine whether a metal bar is a permanent or an induced magnet.

[2 marks]

0 3 A bar magnet and an iron nail are being used to lift some paper clips from a table, as shown below.



0 3 . 1 Label the north and south poles of the iron nail with the letters **N** and **S**, respectively.

[1 mark]