

Note:

Crosses are used for field lines or current to indicate that the direction is directly away – ie into the page. Dots are used (less commonly) to show that direction to be out of the page. Sometimes larger crosses are used, or even a large single cross.

Magnetic Field Strength

Magnetic strength has the symbol, B and the unit, Tesla (T). I have already mentioned the way that field lines can be used to indicate relative field strength. It is also possible to calculate the magnitude () of the force.

Definition:

Magnetic field strength is defined to be the per unit per unit on a current carrying conductor at right angles (90°) to the field lines.

Equation:

$$F = \text{on wire at right angles to field lines}$$

$$B = \frac{F}{IL} \text{ where, } I = \text{ of wire}$$

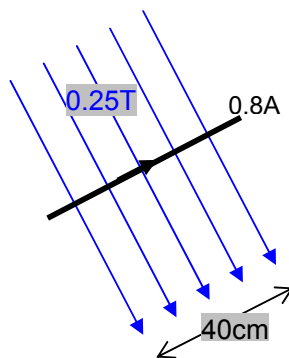
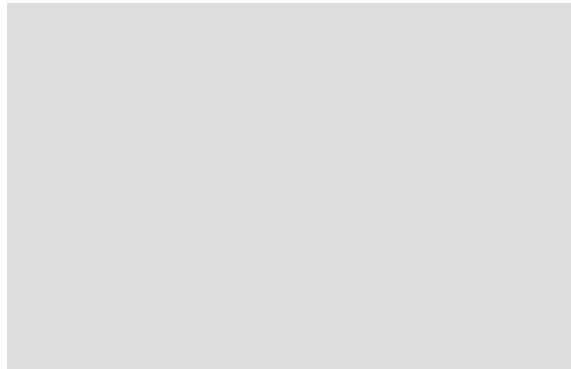
$$L = \text{ of wire}$$

$$B = \text{ of wire}$$

This equation can obviously be used to find the 4th variable if the other 3 are known.

Example T5.18

A wire carrying 0.8A is placed at 90° to a field (shown in blue on diagram), of strength 0.25T. The length of wire exposed to the field is 40cm. Find the magnitude and direction of the force acting on the wire.

**Solution:****Force on a charge**

The force on a charge moving through a magnetic field can be found using a similar equation: