

Worksheet - Magnetism - $F=BIL$

Name: _____

1. Compare $F = BIL$

$$2B \rightarrow ___ F$$

$$\frac{1}{3}L \rightarrow ___ F$$

$$3B, 2I, 12L \rightarrow ___ F$$

$$10I \rightarrow ___ F$$

$$6F \rightarrow ___ I$$

$$4F, 2B, 6L \rightarrow ___ I$$

$$3I, \frac{1}{3}L \rightarrow ___ F$$

$$2B, \frac{1}{4}I \rightarrow ___ F$$

$$2F, 3I, \frac{1}{6}L \rightarrow ___ B$$

2. Compute

$$B = 4 \times 10^{-4} \text{ T}$$

$$B = 1 \times 10^{-5} \text{ T}$$

RHR:

$$I = 3 \times 10^{-4} \text{ A}$$

$$I = ______$$

B right, I up, F _____

$$L = 10 \text{ cm}$$

$$L = 1 \text{ cm}$$

B out, I left, F _____

$$F = ______$$

$$F = 2 \times 10^{-6} \text{ N}$$

B into, I _____, F up

B _____, I up, F out

$$B = ______ \text{ T}$$

$$B = 0.5 \text{ T}$$

$$I = 10 \text{ A}$$

$$I = 6 \text{ A}$$

$$L = 2 \text{ m}$$

$$L = ______$$

$$F = 1.5 \text{ N}$$

$$F = 0.3 \text{ N}$$

3. In order for a wire to experience a magnetic force it must (circle all that apply)

- a. have a current flowing in it.
- b. be charged.
- c. be in a magnetic field.
- d. must be, at least partly, perpendicular to the magnetic field.

4. A length of wire 0.5 m carrying a current of 2 A is placed at a right angle to a magnetic field of 0.2 T.

Calculate the force on the wire.

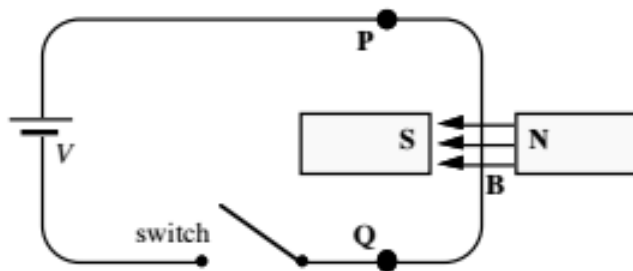
5. A magnetic field exerts a force of 0.25 N on an 8.0 cm length of wire carrying a current of 3.0 A. What force would be exerted on a wire 24 cm long carrying the same current?
6. A 2 m long wire with a resistance of $0.020\ \Omega$ is connected to a 24 V battery and placed in a 0.001 T magnetic field. What is the magnetic force on the wire?

A long, straight wire carries a 6.0-A current that is directed in the positive x direction. When a uniform magnetic field is applied perpendicular to a 3.0-m segment of the wire, the magnetic force on the segment is 0.36 N, directed in the negative y direction, as shown. What are the magnitude and direction of the magnetic field?



- (a) 0.020 T, out of the paper (c) 0.060 T, out of the paper (e) 0.65 T, out of the paper
 (b) 0.020 T, into the paper (d) 0.060 T, into the paper

A long straight vertical segment of wire traverses a magnetic field of magnitude 2.0 T in the direction shown in the diagram. The length of the wire that lies in the magnetic field is 0.060 m. When the switch is closed, a current of 4.0 A flows through the wire from point P to point Q.



Which one of the following statements concerning the effect of the magnetic force on the wire is true?

- (a) The wire will be pushed to the left.
 (b) The wire will be pushed to the right.
 (c) The wire will have no net force acting on it.
 (d) The wire will be pushed into the plane of the paper.
 (e) The wire will be pushed out of the plane of the paper.

What is the magnitude of the magnetic force acting on the wire?

- (a) 0.12 N (c) 0.48 N (e) zero newtons
 (b) 0.24 N (d) 67 N