# Motor Effect worksheet 1

1. What happens to the force on a current-carrying wire if you
   a. double the magnetic field
   b. halve the current in the conductor
   c. triple the length of the conductor in the field
   d. change the angle between the field and the conductor from 90° to 45°?

2. A wire is placed in a magnetic field and experiences a force.
   Draw the graph the shows the relationship between B and I, if the force is to remain constant.

3. A wire carrying a current of 10 A passes at right angles through a magnetic field of 1.0×10^{-3} T; 1.0 cm of the wire is in the field. What is the magnitude and direction of the force on the wire?
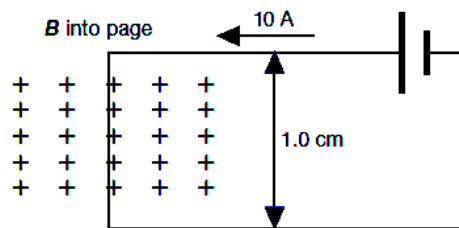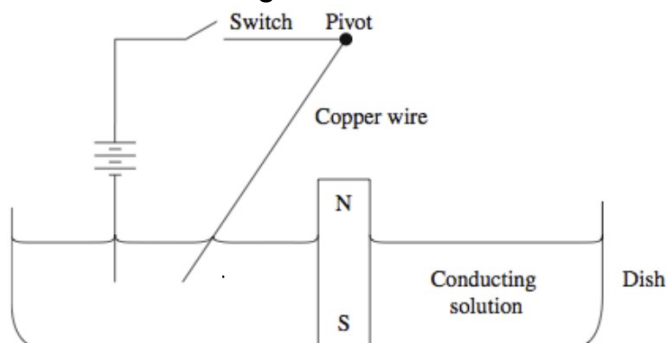

4. A conductor carrying a current of 25 A is centred between the poles of a large permanent magnet of field strength 0.025 T. A 10 cm length of the conductor is in the field of the magnet.
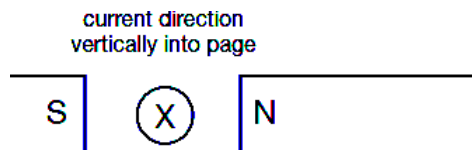
   Determine the force on the wire.

5. A bath of conductive solution has a magnet standing in it. A wire is suspended above it, as shown in the diagram
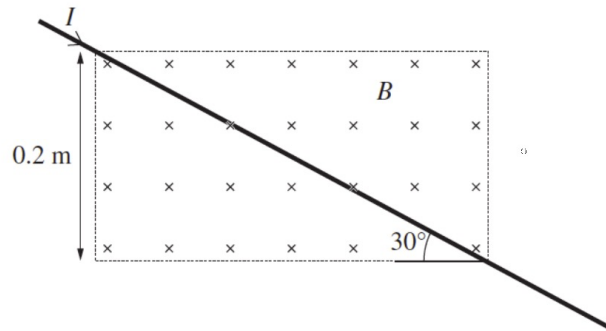

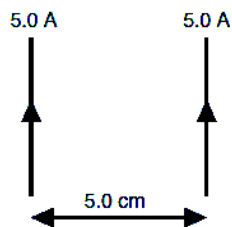   Determine which way does the wire moves and explain.

6. A current bearing wire passes through a magnetic field with magnitude of 0.05 T. It experiences a force of 0.03N.

Determine the current flowing.

Force between two wires

7. Two parallel wires both carry currents of 5.0 A in the same direction. The wires are 5.0 cm apart.

   a. What is the direction and magnitude of the force between a 1.0 m length of the wires?
   b. How would the magnitude of the force change if the separation of the wires was doubled?

8. Two power lines each carrying 10 A DC current are separated by 0.5 m. What force per unit length acts on each cable if:
   a. the currents are in the same direction
   b. the currents are in opposite directions?