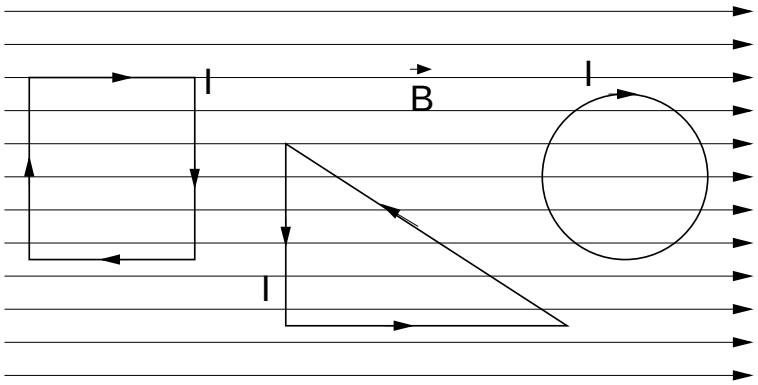
1. Suppose a very long straight wire of linear mass density 20g/m is immersed in a uniform magnetic field B = 3 T. The magnetic field is in the horizontal plane and it is perpendicular to the wire. What current I would be required so that the wire will be suspended?

2. There are three current loops in uniform magnetic field as it is shown by the figure. Find the torque on each loops. $B = 1\ T \quad I = 15\ A$



3. A square loop with sides w carries a current I. The loop lies in the horizontal plane a distance d from the y-axis. There is vertical magnetic field whose magnitude varies linearly in the x-direction according to the expression: $B(x) = ax + b$.

$$w = 0.1\ m \quad I = 12\ A \quad d = 0.5\ m \quad a = 1.5\ T/m \quad b = 1\ T$$

a.) Determine the force on each side of the loop and the resulting net force on the loop!

b.) Find the torque on the loop!

4. There are two ceramic plates with a small hole as it is shown by the figure. How large is the velocity of a charged particle if it can get through the holes? The magnetic and the electric field between the plates are perpendicular to each other.

$$B = 0.5\ T \quad E = 100\ N/C$$