

PHY131 - Recitation Assignment 12

Problem 1

A square loop of side 10 cm and resistance $1\ \Omega$ is moved towards the right with a constant velocity v_0 , as shown in the figure. The left arm of the loop is in a uniform magnetic field of 2 T. The field is perpendicular to the plane of the drawing and is going into it. The loop is connected to a network of resistors, each of value $3\ \Omega$.

1. **Current in the loop:** With what speed should the loop be moved so that a steady current of 1 mA flows in the loop?
2. **Power dissipation:** Calculate the total power dissipated in the resistor network when the loop is moving with the speed found in part (1).
3. **Force and work:** What is the magnitude of the force required to maintain the constant velocity v_0 , and how much work is done by this force in moving the loop by 5 cm?

