Magnetic Induction: Application (8)

Consider a rectangular loop of width ℓ in a uniform magnetic field $\vec{B}$ directed into the plane. A slide wire of mass m is given an initial velocity $\vec{v}_0$ to the right. There is no friction between the slide wire and the loop. The resistance R of the loop is constant.

(a) Find the magnetic force on the slide wire as a function of its velocity.

(b) Find the velocity of the slide wire as a function of time.

(c) Find the total distance traveled by the slide wire.