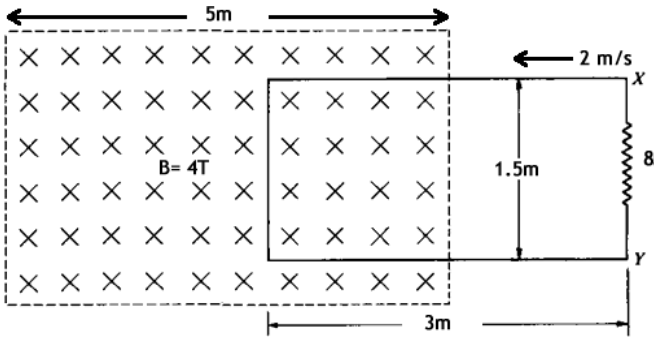


A wire loop, 1.5 meters by 3 meters, of negligible resistance is in the plane of the page with its left end in a uniform 4-tesla magnetic field directed into the page, as shown to the left. An 8-ohm resistor is connected between points X and Y. The field is zero outside the region enclosed by the dashed lines. The loop is being pushed to the left with a constant velocity of 2 meters per second. Make all determinations for the time that the right end of the loop is still out the field.

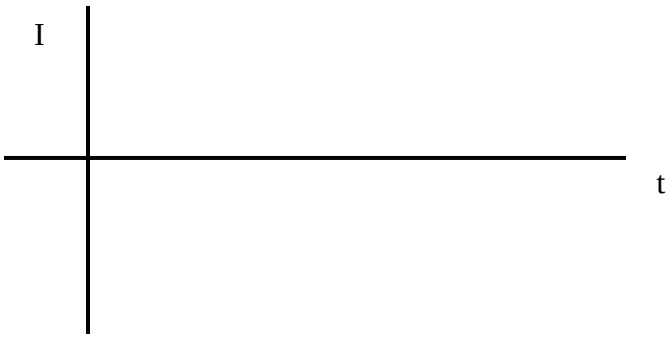
a. Determine the potential difference induced between points X and Y.

b. On the figure above show the direction of the current induced in the resistor.

c. Determine the force required to keep the loop moving at 2 meters per second.

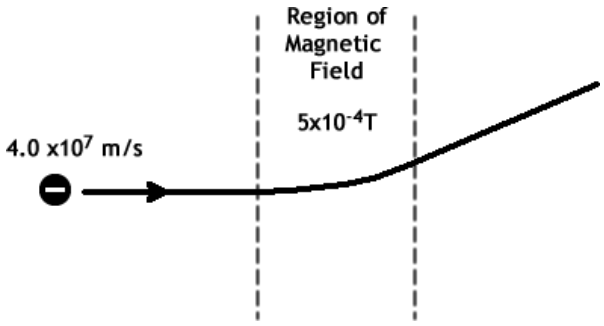
d. Determine the rate at which work must be done to keep the loop moving at 3 meters per second.

e. Sketch a graph of the current as a function of time from the time the loop was completely OUT of the field. End your graph when the loop completely exits the field. Clockwise current will be positive.



Physics
Magnetism

Name:_____
Period: 2-3A 3B-4 5-6A 6B-7



An electron moves horizontally to the right at a speed of 4.0 x 10^7 meters per second. The electron is deflected upward by a magnetic field that has a field strength of 5.0 x 10^{-4} tesla.

a. What is the direction of the magnetic field?

b. Determine the magnitude of the magnetic force acting on the electron.

c. Determine the radius of curvature of the path followed by the electron while it is in the magnetic field.

An electric field is later established in the same region as the magnetic field such that the electron now passes through the magnetic and electric fields without deflection.

d. Determine the magnitude of the electric field.

e. What is the direction of the electric field?