

Answer on question #59312, Physics / Electric Circuits

Question A rectangular wire loop of width 4.0cm is being pulled out of a magnetic field at a constant speed of 2.0m/s. The magnetic field is 0.30T and is uniform in the region, perpendicular and into the plane of the loop. What is the induced emf in the loop?

0.056V

0.012V

0.024V

0.087V

Solution First let us find rate of the change of the magnetic flux:

$$\frac{d\Phi}{dt} = B \frac{dS}{dt} = Blv$$

where $B = 0.3$ T is magnetic field $l = 0.04$ m is width of loop and $v = 2$ m/s is speed. The emf then is

$$\varepsilon = \frac{d\Phi}{dt} = 0.3 \cdot 0.04 \cdot 2 = 0.024 \text{ V}$$