Answer on Question #61359-Physics-Electromagnetism

3) A rod of 5.0m length is held horizontally and with its axis in an east-west direction. It is allowed to fall straight down. What is the emf induced in it when its speed is 3.0m/s if the earth's magnetic field is 0:60Â10À4 T with a dip angle of 53 degrees?

a) 5:4Â10À4 V

b) 3:6Â10À3

c) 2:0Â10À5

d) 4:2Â10À4

Solution

The induced emf in the loop is given by the formula:

$$\varepsilon = Bvl\cos\alpha = (0.6\cdot 10^4)(3)(5)\cos 53 = 5.4\cdot 10^4\ V.$$

4) 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?

a) 0.056V

b) 0.012V

c) 0.024V

d) 0.087V

Solution

The induced emf in the loop is given by the formula:

$$\varepsilon = Bvl = (0.3)(2)(0.04) = 0.024\ V.$$