

### Answer on Question #46010, Physics, Electromagnetism

A rectangular coil of dimensions 20cm by 15cm lies with its plane parallel to a magnetic field of 05Wm<sup>2</sup>. The coil, carrying a current of 10A experiences a torque of 4.5Nm in the field. How many loops has the coil?

Torque on N rectangular loops:

$$\tau = NIAB \sin \theta$$

Where  $I$  – current in a coil,  $A$  – rectangular area,  $B$  – magnetic field,  $\theta = \frac{\pi}{2}$  – angle between normal and magnetic field.

Then, the number of loops in the coil is (suppose that in the task magnetic field is  $B = 0.5 \frac{Wb}{m^2}$ ):

$$N = \frac{\tau}{IAB} = \frac{4.5Nm}{10A \cdot 0.20m \cdot 0.15m \cdot 0.5 \frac{Wb}{m^2}} = 30$$

**Answer:** the number of loops in the coil is: ***N = 30 loops***