Answer on Question #74264, Physics / Electric Circuits

Question. At the centre of an air core solenoid, the value of the magnetic field B is $0.40\ mT$. If the current flowing in the solenoid is $0.4\ A$, calculate the number of turns per cm.

Given. $B = 0.40\ mT = 0.40 \cdot 10^{-3}\ T; I = 0.4\ A.$

Find. $n - ?$

Solution.

For an air core solenoid

$$B = \mu_0 n I,$$

where $\mu_0 = 4\pi \cdot 10^{-7}\ H/m$. So,

$$n = \frac{B}{\mu_0 I} = \frac{0.4 \cdot 10^{-3}}{4\pi \cdot 10^{-7} \cdot 0.4} \approx 800 \text{ turns per } meter = 8 \text{ turns per } cm.$$

Answer. $n = 8$ turns per cm.