Question 33845

The resistance of the coil of length l and cross-sectional area S is $R=\frac{\rho l}{S}$.

The cross-sectional area in terms of diameter (assuming that coil is of ideal cylinder shape) is $S=\pi r^2=\pi\frac{d^2}{4}$. Hence, resistance is $R=\frac{4\rho l}{\pi d^2}$. Knowing that $d=0.5\,mm=0.05\,cm$, $\rho=2.8\cdot10^{-6}\,Ohm\cdot cm$ and $R=10\,Ohm$, find l from last formula:

$l=\frac{R\pi d^2}{4\rho}=7008.8\,cm\approx70.09\,m$.