

Magnetics and Electromagnetics

1. Calculate the size of the vector of magnetic induction in the distance of 1 cm from a long straight conductor, which transmits a direct current 10 A (magnetic permeability of vacuum = $\mu_0 = 4\pi \cdot 10^{-7} \text{ H} \cdot \text{m}^{-1}$).
2. Proton is moving with a velocity of $1.106 \cdot 10^7 \text{ m/s}$ in a homogeneous magnetic field with the value of magnetic induction $B = 1 \text{ T}$. What size of a force will act on its movement? ($q_p = +1,602 \cdot 10^{-19} \text{ C}$).
3. Calculate the speed of light, using the values of electric permittivity of vacuum and magnetic permeability of vacuum ($\epsilon_0 = 8.854 \cdot 10^{-12} \text{ F} \cdot \text{m}^{-1}$, $\mu_0 = 4\pi \cdot 10^{-7} \text{ H} \cdot \text{m}^{-1}$).

HW: A proton enters a magnetic field of 1.5 T with a velocity of $2 \cdot 10^7 \text{ m} \cdot \text{s}^{-1}$ at an angle of 30° with the field. Calculate the force, which will be created on the proton.