

Question #74559, Physics / Electromagnetism |

An electron is moving in a uniform magnetic field B in a circular orbit of radius r . Suddenly the field is reduced to $B/2$. The radius of the path now becomes (1) $2r$ (2) $r/2$ (3) r (4) $4r$

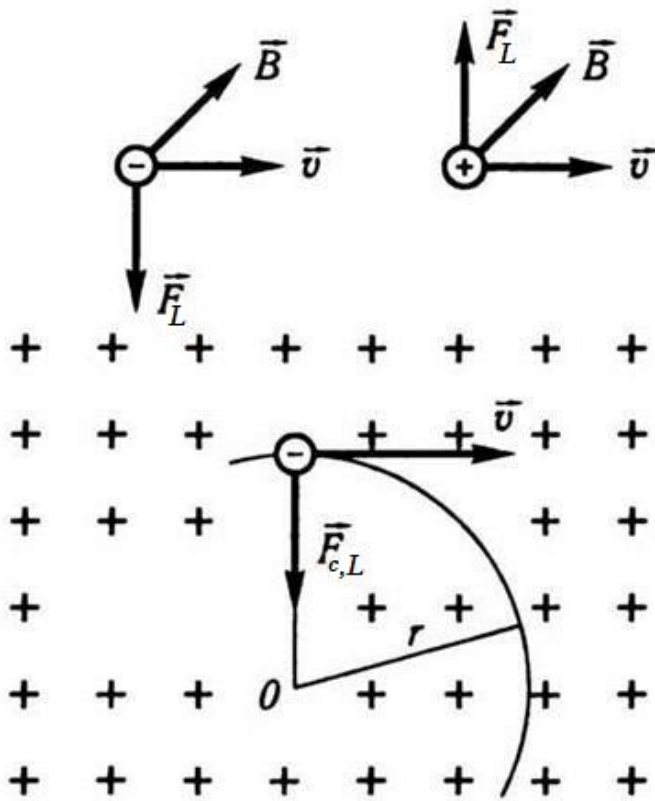
Need to find – r_1

Solution:

Lorentz force $F_L = evB$, from picture can be seen, that $F_L = F_c$.

Then, $m \frac{v^2}{r} = evB \rightarrow r = \frac{mv}{eB}$. If $B_1 = \frac{1}{2}B \rightarrow r_1 = \frac{mv}{e \frac{B}{2}} = 2 \frac{mv}{eB} \rightarrow r_1 = 2r$.

Answer: (1) - $2r$.



Answer provided by <https://www.AssignmentExpert.com>