Physics 12 Review
Section 20.8

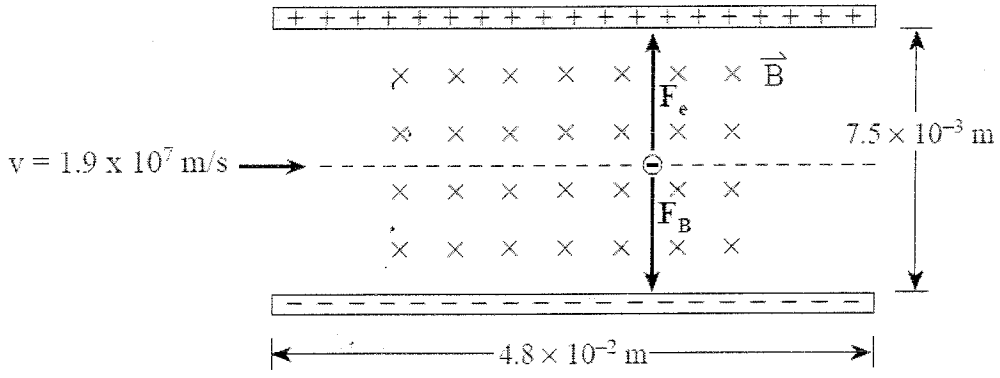
1.

A 0.10 m long solenoid, 3.0×10^{-2} m in diameter, has a total of 550 turns of wire. To produce a 1.2×10^{-2} T magnetic field at the centre of the solenoid, how much current must flow through thewire?

A. 0.26 A
B. 1.7 A
C. 9.5×10^{2} A
D. 1.4×10^{3} A

2.

In the situation below, an electron is moving at 1.9×10^{7} m/s through crossed electric and magnetic fields. When the electric force is equal to the magnetic force, as shown, the electron will travel in a straight line.



If the magnetic field strength is 5.2×10^{-3} T, what must be the potential difference between the plates for the electron to continue in a straight line?

A. 1.9×10^{-7} V
B. 3.9×10^{-5} V
C. 7.4×10^{2} V
D. 4.7×10^{3} V

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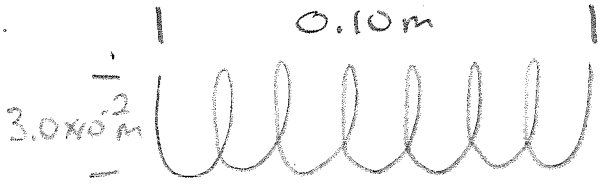

$N = 500$

$\vec{B} = 1.2\times10^{-2}$ T

$n = \frac{550}{0.10}$

$\vec{B} = \mu_0 n I$

$I = \frac{B}{\mu_0 n} \Rightarrow \frac{1.2\times10^{-2}}{4\pi\times10^{-7}\times\frac{550}{0.10}} = 1.7$ A

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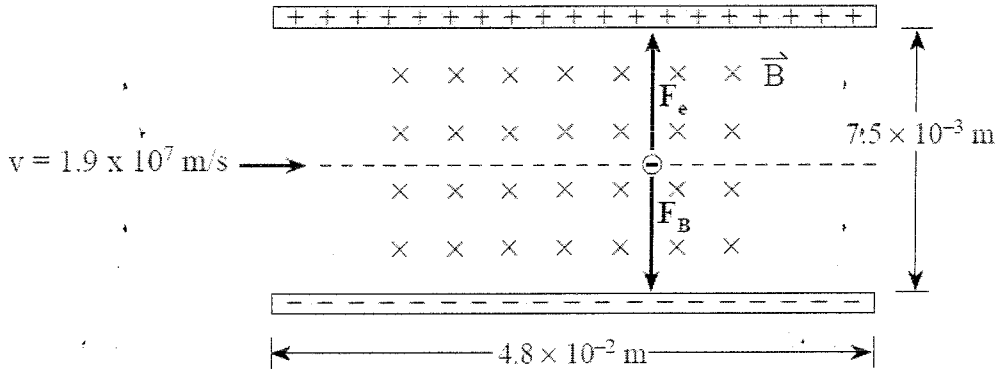

$F_e = EQ$

$\Delta V = Ed$

$\frac{\Delta V}{d} = E$

$F_e = \frac{\Delta V}{d} Q$

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$F_e = F_B$

$\frac{\Delta V}{d} Q = QvB$

$\Delta V = dvB$

$= 7.5\times10^{-3}\times1.9\times10^{7}\times5.2\times10^{-3}$

$\Delta V = 741$ V