22- Masses of Ions

$p = qBR$

$T = p^2 / 2m = qE$

$p^2 = 2mqE = q^2B^2R^2 = q^2B^2(x/2)^2$

$2mE = q^2B^2x^2 / 4$

$m = q^2B^2x^2 / 8E$

36- (a) qE =qvB or v= E/B from force balance
V = E w definition of potential
v = V/wB
v = 2.3e-3 m/s

(b) n = i B / e t V = 7.4e28 m-3 Ag (silver)

(c) Negative charge carriers move to the right under the magnetic force.
The electric field and potential difference is right to left.

I down
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x x x -

x x x -

x x x -

x x x -

x x x -

x x x -

/\
ve up

37- qE =qvB force balance
E = v B where j = e n v current density
E = j B / e n
n = j B / e E

39- $qE = qvB = qV/w$ force balance

$v = V/wB = (3.9e\text{-}6 \text{volts})/(0.0088\text{m})(1.2e\text{-}3\text{T}) = 0.37$ m/s