

22- Masses of Ions

$$p = qBR$$

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

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

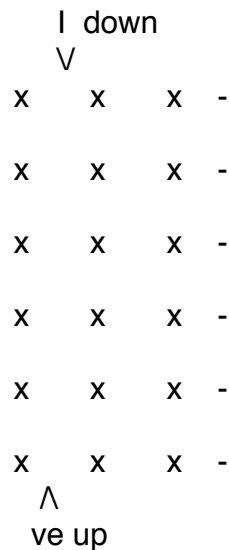
$$2mE = q^2 B^2 x^2 / 4$$

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

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.



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