pe 20 Power Drift Velocity Version A

① $P = IV$ $\quad V = 4$ volts

$$I = \frac{\Delta Q}{\Delta t} = \frac{27 \text{ Coul}}{2.6 \text{ hrs}} \frac{1 \text{ hr}}{60 \text{ min}} \frac{1 \text{ min}}{60 \text{ sec}} = 2.885E-3$$

$$P = (4)(2.885)E-3 = \boxed{11.5 \text{ mW} = 1.15 \times 10^{-2} \text{ watts}}$$

② $\text{Area} = A = \pi r^2 = \pi\left(\frac{d}{2}\right)^2 = \frac{\pi d^2}{4}$

$$= \frac{\pi}{4}(5.5E-3)^2 = \boxed{2.38E-5 \text{ meter}^2 = A}$$

$$I = nqvA \rightarrow v = \frac{I}{nqA} \qquad I = 76 \text{ amps}$$

$$n = \frac{8.8E3}{1} \frac{\text{kg}}{\text{m}^3} \frac{1 \text{ mole}}{63.54 \text{ gm}} \frac{6.02E23}{1 \text{ mole}} \frac{1000 \text{ gm}}{\text{kg}}$$

$n = 8.337E28$ atoms/m^3 (1 atom = 1 carrier)

$q = e = 1.602E-19$ Coul.

$$v = \frac{76}{(8.34E28)(1.6E-19)(2.38E-5)}$$

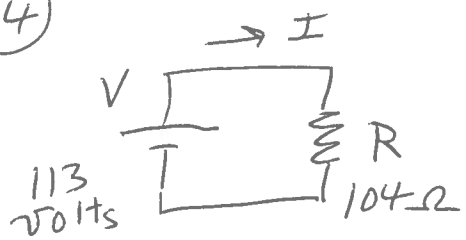
$\boxed{v = 2.39 \times 10^{-4} \text{ m/s} \quad \text{slower than a snail}}$

(3) $P = IV = I^2R = \frac{V^2}{R}$

use this ↑ $\longrightarrow R = \frac{P}{I^2} = \frac{168}{(.3)^2} =$

$R = 1867 = 1.867\ k\Omega$

(4)



$P = 113$ watts

$P = IV = I^2R = \frac{V^2}{R}$

$V^2 = PR \rightarrow V = \sqrt{PR}$

$V = \sqrt{(113)(104)} =$ 108 volts