given that $l = 1000\,ft = 1000 \times 12 \times 2.54\,cm = 1000 \times 12 \times 2.54 \times 10^{-2}$

$n = 8.4 \times 10^{28}$, $r = \frac{1.03\,mm}{2} = 0.515\,mm$, $\frac{R}{l} = \frac{6.51}{1000 \times 12 \times 2.54\,cm}$

$r = 0.515 \times 10^{-3}\,m$

$A = \pi r^2 = 3.14(0.515 \times 10^{-3})^2 = 0.832 \times 10^{-6}$ $\frac{R}{l} = \frac{6.51}{1000 \times 12 \times 2.54 \times 10^{-2}\,m}$

$= 8.32 \times 10^{-7}$ $= \frac{6.51}{304.8}$, $I = 2\,Amp$

(i) Conductivity:

We know that

$$R = \frac{\rho l}{A}$$

$$\rho = \frac{R}{l} A = \frac{6.51 \times 8.32 \times 10^{-7}}{304.8}$$

$$\rho = 0.1778 \times 10^{-7} = 1.778 \times 10^{-8}\ ohm/m$$

$$\sigma = \frac{1}{\rho} = \frac{1 \times 10^{8}}{1.778} = \frac{10 \times 10^{7}}{1.778} = 5.62 \times 10^{7}\ mho/m.$$

(ii) Mobility:

$$\sigma = n e \mu$$

$$\mu = \frac{\sigma}{ne} = \frac{5.62 \times 10^{7}}{8.4 \times 10^{28} \times 1.6 \times 10^{-19}}$$

$$\mu = \frac{5.62 \times 10^{-2}}{13.44} = 0.418 \times 10^{-2} = 4.18 \times 10^{-3}\ m^2/V.s$$

(iii) Drift Velocity:

$$I = n e A v_d$$

$$v_d = \frac{I}{neA} = \frac{2}{8.4 \times 10^{28} \times 1.6 \times 10^{-19} \times 8.32 \times 10^{-7}} = \frac{2}{111.82 \times 10^{2}}$$

$$v_d = \frac{200 \times 10^{-4}}{111.82} = 1.78 \times 10^{-4}\ m/s.$$