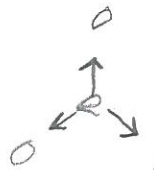
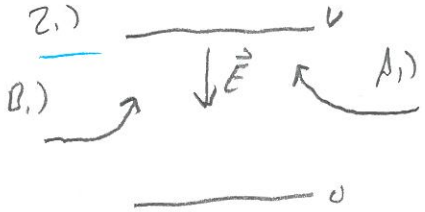
1.)

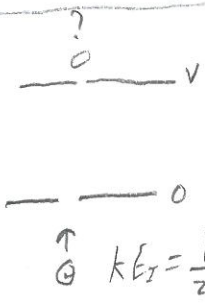


A) It doesn't

B.)

2.)





C.)

$W_{done} = -q\Delta V$

$= -|e|V = KE_F - KE_I$

this is negative

So $|e|V = KE_I - KE_F$

need $KE_I > KE_F + e|V|$

or $KE_I > e|V|$

For V_F just $= 0$

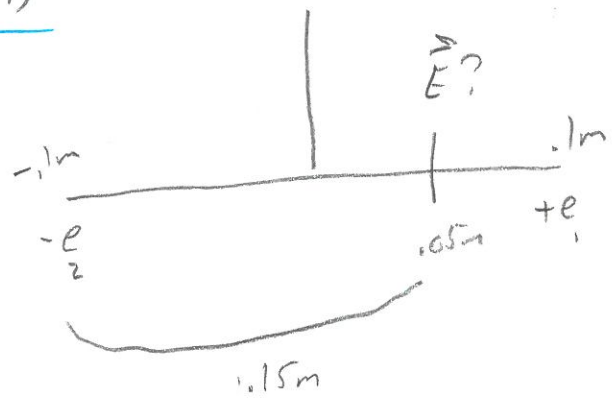
or $-|e|V = eE\Delta x = \Delta KE$

$eE\Delta x = KE_F - KE_I$

$|KE_I| > eE\Delta x$

3.) $\rho = \rho_0(1 + \alpha\Delta T)$ $R = \rho\frac{L}{A}$ $\frac{L}{A}$ changes

#1.)



$|\vec{E}_1| = \left|\frac{ke}{(.05m)^2}\right| = \left(5.76\cdot10^{-7}\frac{N}{C}\right)$

$\vec{E}_1 = 5_0\left(-5.76\cdot10^{-7}\frac{N}{C}\right)_x$

$|\vec{E}_2| = \left|\frac{ke}{(.15m)^2}\right| = \left(6.4\cdot10^{-8}\frac{N}{C}\right)$

$\vec{E}_2 = \left(-6.4\cdot10^{-8}\frac{N}{C}\right)_x$

A.) $\vec{E} = \vec{E}_1 + \vec{E}_2 = \left(-6.4\cdot10^{-7}\frac{N}{C}\right)_x$

To the left

B.) $\vec{F} = m\vec{a} = -e\vec{E} = (1.024 \cdot 10^{-25}\ N)_x$ To the right $\quad \vec{a} = \frac{\vec{F}}{m_e} = 1.1 \cdot 10^5 \frac{m}{s^2}$

C.) $\vec{F} = m\vec{a} = 2e\vec{E} = (-2.05 \cdot 10^{-25}\ N)_x$ To the left $\quad \vec{a} = \frac{\vec{F}}{2m_p} = 61.3 \frac{m}{s^2}$

#7.) A.) $C = \frac{Q}{V} = \epsilon_0 \frac{A}{d} = 1.1 \cdot 10^{-8}\ F$

B.) $CV = Q \quad \frac{\epsilon}{\Delta x} = V \rightarrow V = \epsilon \Delta x = 2.4 \cdot 10^{19}\ V$

$= 26.6\ C$

3.) $\Delta KE = -q\Delta V \quad V_i = \frac{k(2\mu C)}{1m} \quad V_F = \frac{k(2\mu C)}{.01m}$

$V_F - V_i = k \cdot 2\mu C \left[\frac{1}{.5} - \frac{1}{1} \right] Volts = 18{,}000\ Volts$

A.) $\Delta KE = \frac{1}{2}mv_F^2 = -(-e)\Delta V = 2.88 \cdot 10^{-15}\ J$

B.) $v_F = 8 \cdot 10^7 \frac{m}{s} \rightarrow \frac{1}{2}mv^2 = 2.88 \cdot 10^{-15}\ J$

4.) $R = \rho \frac{L}{A} = \frac{1.7 \cdot 10^{-8} \cdot 100 \cdot 10^3}{8 \cdot 10^{-5}}\ \Omega = 21.25\ \Omega$ R_{old} $\quad \Delta V = IR = 21250\ Volts$

A.) $V_F = 500kV - 21250V = 478750\ Volts$

B.) $P_{lost} = I^2R = I\Delta V = 2.125 \cdot 10^7 \frac{J}{s}$

C.) $R_F = R_0(1 + \alpha\Delta T) = 21.2\ \Omega (1 + 3.9 \cdot 10^{-3} \cdot 20) = 22.9\ \Omega$

$P_{lost} = I^2R = 2.29 \cdot 10^7 \frac{J}{s}$