Ch 17 #11-12

These problems are just KE problems, like good old $\frac{1}{2}mv^2$, with the slight twist that you must convert the KE values from eV to Joules before you begin.

Ch 17 #16

Since you're calculating work, you know that the easiest way with charge arrangements tends to be $W=q\Delta V$. This means you need to calculate the value of V initially and finally. When you do these, you should arrive at V_i=3.938E6V, and V_f=9.0E6V. (Keep in mind that both values involve adding the potential due to both charges.)

Once you've got these values, the rest of the problem shouldn't be too rough.

Ch 17 #19

Calculate the values for potential due to each of the three charges, in terms of k,Q, and L. Then total up these values. Be careful to remember that potential isn't a vector (Yay!), but that it still matters whether it's positive or negative.

Ch 17 #20

If you’re going to eventually calculate speed, which is associated with KE, you need to know the potential difference through which the electron will be accelerated. Begin by finding the potential at its initial location, and then assume that $V_f = 0$, since it will be “very far away”.

Once you know the potential difference, you should be able to calculate final speed.

Ch 17 #21

This one's a little weird. It's easiest if you think of energy conservation, which is a little different than the way you've been thinking. Instead of thinking $W=q\Delta V$, think that the energy initially in the system is all in the form of electric potential energy, calculated $U_E=qV$, where either charge can be thought of as the 'source' of the potential, and the other charge is being affected by that potential. (You should get 23.21J for this value.)

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Ch 17 #21 (cont.)

Since energy must remain constant, and since both charges should move the same as they repel each other, and since U_E will eventually equal zero (when the charges get really, really far apart), you can just set your previously-calculated value for U_E equal to the KE that <u>both</u> charges gain. This will lead to the correct answer for speed of both particles.

Ch 17 #22

Part A is very similar to the equilibrium problems we worked last chapter with forces. Just make sure you start by thinking through the general region where the E-field would be zero, where the two values could 'cancel' each other directionally.

Part B is similar, but with the twist that you're talking about potential instead of E-field, so no vectors (but still ±) to consider. A trick is that there are <u>two</u> locations, closest to the smaller charge, where the V values would add up to be zero.