

Ch 20 #5:

This one is just worded kind of weird. When you're told that the pole faces are 55.5cm in diameter, you're really being told the length of wire being affected by the B-field.

Ch 20 #8:

Since it's going to float, it's apparent that F_B must balance out F_g . So set up an equation with these two forces equal: $B\ell = mg$. But you should see right away that you don't know the length or the mass. But if you think back to some ideas you used back when you studied fluids, you'll remember that mass can be thought of as density times volume, and volume of a wire (cylinder) is area * length. Since area can be calculated, density can be looked up (Ch 10), and length is on both sides of the equation, you should be good to go!

Ch 20 #14:

You'll be able to calculate radius once you know the proton's speed, and you can get its speed from the KE told to you. Just convert from MeV to eV, and then to Joules, and then use $KE = \frac{1}{2}mv^2$ to find speed.

Ch 20 #16:

This is a really important type of problem, because it ties together old electric field ideas with new magnetic field ideas, in what is ultimately a very simple manner. If the electron isn't deflected by the B-field, it must be because $E\text{-field} = B\text{-field}$, which means you can set up the equation $qE = qvB$, and use this to solve for speed.

Ch 20 #17:

A. Use electric ideas ($W=qV=\Delta KE$) to find speed equals $4.51 \times 10^5 \text{ m/s}$. Then find the radius from B-field ideas.

B. This is really just a $v=d/t$ type of problem, if you think about it.

Ch 20 #25:

A. Doing a good drawing and thinking about symmetry are enough for this part.

B. This part involves some geometry also. Realize that if the proton enters the field at 45° , then it will follow the path of a circular arc, but it won't be a half-circle. So if you solve for $r=0.00246\text{m}$, it's correct, but doesn't answer the question. Once you've got r , look at the diagram on the next page (especially the triangle), and use it with geometry to solve for x ...

Ch 20 #25 (cont.):

