Name_____

Physics 111 Quiz #4, October 15, 2021

Please show all work, thoughts and/or reasoning in order to receive partial credit. The quiz is worth 10 points total.

I affirm that I have carried out my academic endeavors with full academic honesty.

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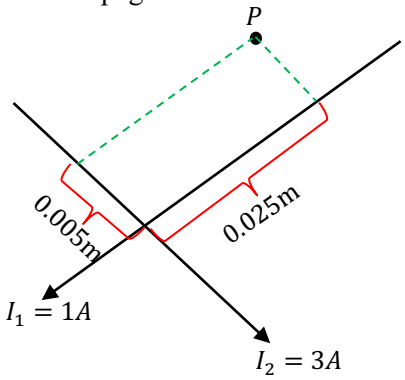
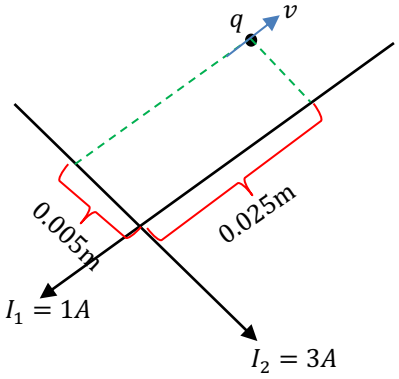
1. Suppose that you have two long straight wires that lie in the plane of the page as shown below. What is the net magnetic field at point P?

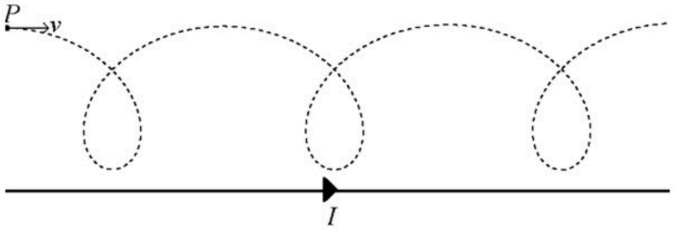


2. Suppose that you accelerate an iodine ion ($^{127}_{53}I^{-1}$) from rest through a potential difference of $\Delta V = 1000V$. What is the speed of the iodine ion after it has been accelerated through this potential difference?

3. Suppose that the iodine ion was directed as shown below. Assuming that the net magnetic field was uniform in the vicinity of point P, what would be the direction (clockwise or counterclockwise) and radius of the iodine ion's orbit? Hint: Assume $\vec{v} \perp \vec{B}$.



4. Suppose instead you had the following situation. An unknown charge is moving horizontally above a wire with no current initially flowing. When the charge reaches point P, a current is turned on and the unknown charge moves in the plane of the page along the dotted line as shown below. Explain fully, what the sign (positive or negative) of the unknown charge must be to produce the motion shown below?



5. Explain fully the motion of the unknown charge through the magnetic field shown above. This question involves no calculations but does involve your use of formulas to explain the motion. Be sure to explain in complete detail the motion of the charge and why it moves as it does.