

READING WEEK PHYSICS WORKSHEET

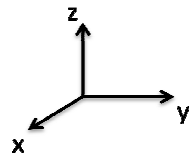
Read 32.1, 32.2, 32.3, and 32.7 (up to and including cyclotron motion) and answer the following:

1) Explain one way to determine whether there is a magnetic field at some location and to determine what direction the magnetic field is pointing in.

2) If we find a magnetic field at some location, list a few possible sources for this magnetic field.

3) How could we demonstrate that magnetic fields are not the same thing as electric fields?

4) Using the definition of vector cross product in section 32.3, find the magnitude and direction of the following vector cross products $\mathbf{A} \times \mathbf{B}$:



a) \mathbf{A} = unit vector along x, \mathbf{B} = unit vector along z

b) \mathbf{A} = vector of length 3 along y, \mathbf{B} = vector of length 4 vector along z

c) \mathbf{A} = vector of length 2 at a 45 degree angle between x and y, \mathbf{B} = vector of length 2 vector along y

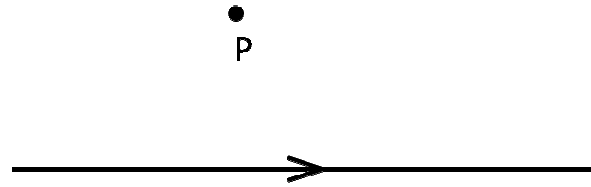
d) \mathbf{A} = unit vector along z, \mathbf{B} = vector of length 3 along $-z$

5) For each of the following situations, give the direction of the magnetic field at the point P, or say "none" if there is no magnetic field.

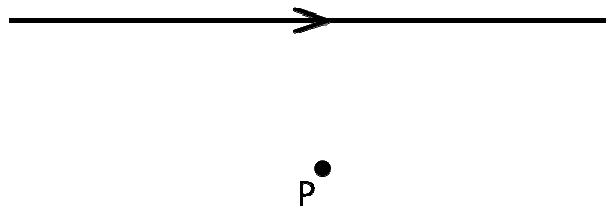
a) A stationary positive charge:



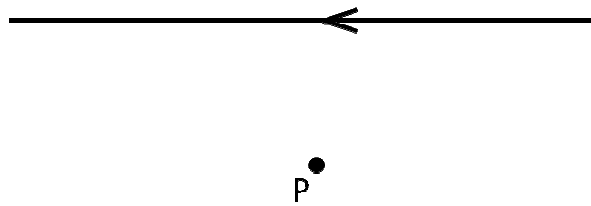
b) A wire carrying current as shown:



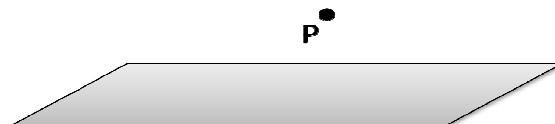
c) A wire carrying current as shown:



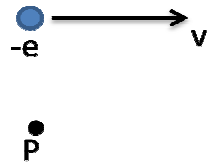
d) A wire carrying current as shown:



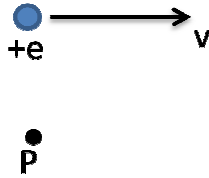
e) Above an infinite plane of charge:



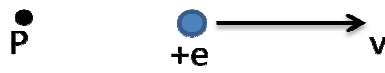
f) Near a moving electron:



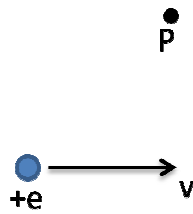
g) Near a moving proton:



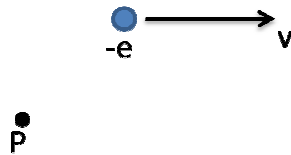
h) Near a moving proton (on the axis of motion):



i) Near a moving proton:



j) Near a moving electron:

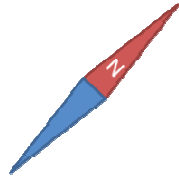


k) Near a magnet:



4) Imagine there is a constant magnetic field pointing directly into this page. Describe the effects of this magnetic field on:

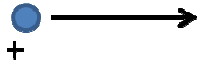
a) A small magnetic dipole oriented as shown but free to rotate in all directions:



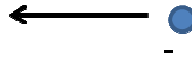
b) A stationary electron:



c) A proton moving to the right:



d) An electron moving to the left:



d) An proton moving upwards:



d) A wire carrying a current to the right:

