PHYS 212 Homework Assignment

Chapters 11

Problem 1 You have a cathode ray tube (CRT) monitor for which the controls have been adjusted such that the electron beam *should* travel horizontally and make a single spot of light at the exact center of the screen. You observe, however, that the spot is deflected to the right. It is possible that the CRT is broken. But as a clever scientist, you realize that your room might be in either an electric field or a magnetic field. Assuming you have no tools except the CRT monitor, how can you determine whether the CRT is broken, in an electric field, or in a magnetic field?

Problem 2 In practice magnetic fields can be measured by finding the potential difference across a conductor as it moves through the field. If you detect a potential difference of 0.050 V across a wire of length 10 cm as it moves through a magnetic field at 10 m/s, what is the strength of the magnetic field? (Assume that the magnetic field vector, the direction of motion and the orientation of the voltage measurement are all perpendicular)

Problem 3 A metal bar of length l rotates with angular velocity ω about a pivot at the center of the bar. A uniform magnetic field $\vec{B}$ is perpendicular to the plane of rotation. What is the potential difference between the ends of the bar?

Problem 4 One book problem of your choice from chapter 28. (Make it interesting!)