Homework-Chapter 5

1) (a) Find the direction of the force on a proton moving through the magnetic fields in this figure. (b) Repeat part (a), assuming the moving particle is an electron.
2) Find the direction of the magnetic field acting on the positively charged particle which is moving as shown in these figures.
3) Determine the initial direction of the deflection of these charged particles as they enter the magnetic fields shown in this figure.
4) At the equator, near the surface of Earth, the magnetic field is approximately 50.0 $\mu$T northward, and the electric field is about 100 N/C downward (ie. towards the ground) in fair weather. Find the gravitational, electric, and magnetic forces on an electron with an instantaneous velocity of $6.00 \times 10^6$ m/s directed to the east in this environment.
5) Determine the direction of the force on the current-carrying wires shown in this figure.
6) A wire carries a current of 10.0 A in a direction that makes an angle of 30.0° with the direction of a magnetic field of strength 0.300 T. Find the magnetic force on a 5.00-m length of the wire.
7) A current of 17.0 mA is maintained in a single circular loop with a circumference of 2.00 m. A magnetic field of 0.800 T is directed parallel to the plane of the loop. What is the magnitude of the torque exerted by the magnetic field on the loop?
8) A proton moves freely in a circular path perpendicular to a constant magnetic field. The proton takes 2.00 µs to complete 1 revolution. Determine the magnitude of the magnetic field.
9) Find the direction of the current in the wire that would produce a magnetic field directed as shown.
10) A high voltage power line carries about 100 A. What is the magnetic field 100m from the line? How does this compare to the earth’s magnetic field, which is a few µT?
11) Two parallel wires are 2.2 cm apart, and each carries a current of 35 A. (a) If the currents are in the same direction, find the force per unit length exerted on one of the wires by the other. Are the wires attracted to or repelled by each other? (b) Repeat the problem with the currents in opposite directions.