ECE 18-316 INTRO TO DATA STORAGE FALL 98 <u>PROBLEM SET #2</u> Due Friday, 9/11/98 In Class or To Jie Zou Before Start of Lab Section (1:30 PM) Late submissions will not get credit

- 1. Power lines carry currents of the order of 500 amperes. What is the magnetic induction, B, at the ground under a power line 10 m high? How does this compare with the earth's magnetic induction?
- 2. Consider a hot plate with a spiral configuration. Let the outer radius be 10 cm, and assume that the coil carries 10 amps. What is the magnetic induction 10 cm above the center of the hot plate? (You can assume that the spiral coil is equivalent to 4 concentric coils of radii 10, 8, 6 and 4 cm). How would you design a hot plate that produced less magnetic induction?
- 3. Consider a current loop of radius 0.1 nm consisting of an electron circulating at the speed of light. Calculate the magnetic field, H, in A/m at a distance 0.2 nm above the center of the plane of the loop. What is the magnetic moment, in A-m²?