11/24/2004. **Due:** Wednesday, Dec. 1, 2004 (in class).

Physics 301/571: Electromagnetic Theory I

Read: Griffiths chapters 6.2-6.4

"**G**" refers to Griffiths' book.
Problems with stars are not for credit and will NOT be graded.

Homework 10

Exercise 1 (G 6.7)

An infinitely long circular cylinder carries a uniform magnetization $\vec{M}$ parallel to its axis. Find the magnetic field (due to $\vec{M}$) inside and outside the cylinder.

Exercise 2 (G 6.8)

A long circular cylinder of radius R carries a magnetization $\vec{M} = ks^2\hat{\phi}$, where k is a constant, s is the distance from the axis, and $\hat{\phi}$ is the usual azimuthal unit vector. Find the magnetic field due to $\vec{M}$, for points inside and outside the cylinder.

Exercise 3

A conducting slab, parallel to the xy plane and extending from $z = -a$ to $z = a$, carries a uniform free current density $\vec{J}_f = J_0\hat{x}$. The magnetic susceptibility is 0 in the slab and χ_m outside. Determine the magnetic field and the bound current distribution.

*Exercise 4 (G 6.20)

How would you go about demagnetizing a permanent magnet? That is, how could you restore it to its original state, with $M = 0$ at $I = 0$.