Homework 6
Due October 24 2006.

1. Infinite wire carrying current $I$ is positioned in the vacuum parallel to the surface of material with magnetic permeability $\mu$. Find magnetic field inside the material.

2. Infinite wire carrying current $I$ is parallel to the axis of the cylinder with magnetic permeability $\mu$. The distance from the wire to the axis of the cylinder $a > R$ where $R$ is radius of the cylinder. Find the force between the wire and the cylinder.

3. Hollow sphere with magnetic permeability $\mu$ has internal radius $r$ and external radius $R$. It is placed in the constant magnetic field $H$. Find the field inside the hollow. Consider especially the case of a very large permeability $\mu \gg \mu_0$.

4. In ferromagnets magnetic induction is related to the magnetic field by $B = \mu H + M_0$ where $M_0$ is magnetization of the material. Find the magnetic field produced outside of the uniformly magnetized ball with permeability $\mu$ and magnetization $M_0$. 
