PHYSICS 110A – HOMEWORK SET 6

Due Monday 3/15/10. Ten points per problem. Answers provided where appropriate.

Reading: Griffiths, Chapter 6.

1.) 6.1

$$\vec{N} = -\frac{\mu_0}{4}\frac{(abI)^2}{r^3}\hat{x}$$

2.) 6.8; field inside is $\mu_0 k s^2 \hat{\phi}$.

3.) 6.12; field inside is $\mu_0 k s \hat{z}$.

4.) 6.13; consider limit that the radius approaches zero for b) and that the height approaches zero for c). Answers for magnetic fields $\vec{B}$ are $\vec{B}_0 - 2\mu_0\vec{M}/3$, $\vec{B}_0 - \mu_0\vec{M}$, and $\vec{B}_0$.

5.) 6.17; answer for magnetic field is

$$\frac{\mu_0(1+\chi_m)Is}{2\pi a^2} \quad (s < a)$$

$$\frac{\mu_0 I}{2\pi s} \quad (s > a)$$

6.) 6.23; answer to b)

$$\frac{1+\chi_m}{1+\chi_m/3}\vec{B}_0$$

7.) 6.25