PHYS 621 – HOMEWORK # 10 – DUE FRIDAY, 11/13/2009

Problem 1. Show that the magnetic field B on the axis of a circular solenoid of length L and radius a, carrying a right-handed current I, is

$$B_z = \frac{\mu_0 n I}{2}\left(\frac{1}{\sqrt{1+(a/x)^2}} + \frac{1}{\sqrt{1+[a/(L-x)]^2}}\right)$$

where x is the distance on the axis from the bottom of the solenoid (entry point of the current), and $n >> 1$ is the number of turns per unith length.

Problem 2. A spherical conducting shell of radius a and surface charge σ rotates with constant angular velocity $\overline{\omega} = (0, 0, \omega)$. Compute the magnetic field B inside and outside the spherical shell.

Problem 3. Jackson problem 5.15 parts (a) and (b).