PHYS 703 Test 2

October, 2011

As always, you may use any valid approach, but please explain each step carefully and fully.

1. [10 points] A thin non-conducting spherical surface is maintained at a potential $\Phi(r = R, \theta) = V_0 + V_1 \cos(\theta)$.
   (a) What is the potential inside the sphere?
   (b) What is the electric field inside the sphere?
   (c) What is the charge density and the total charge on the surface of the sphere?

2. [5 points]

   What is the potential due to a dipole $\vec{p}$ at the origin?
   Derive from this the electric field at large distances from the origin.