ASG-8

1. Find the Green's fun^{n}. for Helmholtz operator $\nabla^2 + k^2$.

2. A charged conducting ring of radius 'a' may be described by $\rho(r) = \frac{q}{2\pi a^2}\,\delta(r-a)\,\delta(\cos\theta)$. Find the electrostatic potential.

3. A charged particle is moving along a path $\vec{x} = \vec{\xi}(t)$ and the density function is given as

$$\rho(\vec{x}', t') = \delta\left(\vec{x}' - \vec{\xi}(t')\right).$$

The potential satisfies 3D wave eqn^{n},

$$\left(\frac{\partial^2}{\partial t^2} - \nabla^2\right)\Phi(\vec{x}, t) = \frac{\rho(\vec{x}, t)}{\epsilon_0}.$$

The potential & its normal derivative vanishes at the boundary of the space ($r \to \infty$).

Find the Lienard - Wiechert Potential $\Phi(\vec{x}, t)$.