hw 13

Homework Assignment 13 -- Part 1

13-1. The vector potential of an oscillating electric dipole $\vec{p}(t) = \vec{p}\, e^{-i\omega t}$ is $\vec{A}(\vec{x})\, e^{-i\omega t}$,

$$\vec{A}(\vec{x}) = -\frac{i\,\mu_0\,\omega}{4\pi}\,\vec{p}\,\frac{e^{ikr}}{r}$$

in spherical coordinates (ρ, θ, ϕ).

(A) Derive (9.19) — the magnetic radiation field

(B) Derive (9.19) — the electric radiation field

(C) Derive (9.23) — the differential power (with respect to solid angle) of radiation.

13-2. Jackson Problem 9.16.

Compare the result of (b) to the example of the short center fed linear antenna (Figure 9.1).

Homework Assignment 13 -- Part 2

13-3. Derive Equation (8.92) from the fields of TE and TM modes of oscillation of a cylindrical resonant cavity.

13-4. In one paragraph, what is Mie scattering? Your answer should be complete but concise.