

A)

1. Calculate the electric field  $\mathbf{E}$  and magnetic field intensity  $\mathbf{H}$  if it is known that the vector potential  $\vec{A} = A_o e^{j\beta z} \hat{a}_x$  Wb/m, where  $\beta = \omega\sqrt{\mu\epsilon}$ .

2. Two short dipoles (Hertzian dipoles) oriented along the z-axis are separated by a distance d along the x-axis such that dipole 1 is located at (x,z) = (-d/2,0) and dipole 2 is at (x,z) = (d/2,0). The dipoles are fed with currents

$$I_1 = I_o e^{j\delta/2}$$

$$I_2 = I_o e^{-j\delta/2}$$

Determine the following: (i) Total electric field and (ii) Array factor  $A(\theta)$ .

Also sketch the following: (i) Array factor, (ii) Net pattern. Assume  $d = \lambda/2, \delta = 0$

B) Chapter 13 Text book:

Problems: 15, 16, 19, 34, 36