

	EE351 Questions on antenna (Closed notes & book)	
Name: _____	ID #: _____	

- Answer all questions
- Closed books
- Closed notes
- No crib notes
- No headphones, cell phones, or pagers.
- No hats
- No guests or visitors during exam.
- See attached equation sheets.

Signature: \_\_\_\_\_

Problem 1:

The vector potential  $\mathbf{A}$  in free space is given by:

$$\bar{\mathbf{A}} = A_o e^{-j\beta z} \hat{\mathbf{a}}_x$$

Determine the following:

a) Magnetic field  $\mathbf{H}$ :

b) Electric Field  $\mathbf{E}$

c) Time average power density:

Problem 2:

An antenna in free space has a far zone E-field given by:

$$\vec{E} = \frac{\sin 2\theta}{r} e^{-j\beta r} \hat{a}_\theta$$

Determine the following:

a) **H**

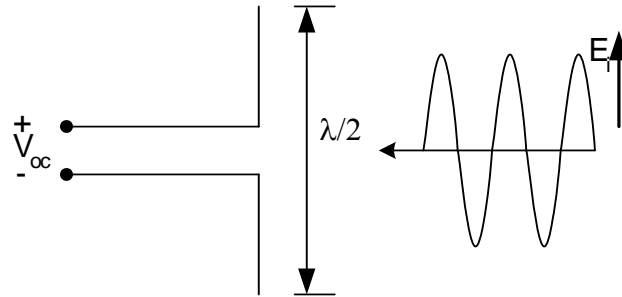
b) Radiation intensity  $U(\theta, \phi)$ :

c) Radiated Power  $P_{\text{rad}}$

d) Directivity  $D$ :

Problem 3:

A plane wave describe by E-field  $\mathbf{E}_i$  is normally incident upon an open circuits  $\lambda/2$  dipole. You are required to find the maximum effective area  $A_e$  of the  $\lambda/2$  dipole antenna shown below (assume the dipole in free space):



Determine the following:

A)  $V_{oc} =$

B) Incident power density

C) Maximum  $A_e$