EEC-504

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : **131504**

Roll No.

B. Tech.

(SEM. V) (ODD SEM.) THEORY EXAMINATION, 2014-15

ANTENNA AND WAVE PROPAGATION

Time : **2** Hours]   [Total Marks : **50**

Note :   Attempt ALL questions.

1   Answer any four of the following :   **2.5×4=10**

(a)   Calculate the directivity for a unidirectional source whose pattern is $\phi = \phi_m \sin\theta \sin^3\phi$, where ϕ_m is maximum radiation intensity.

(b)   Evaluate the radiation resistance of a $\lambda/2$ antenna element operating at a frequency of 10MHz

(c)   Derive Friis's transmission formula.

(d)   Derive relationship between effective aperture and beam area of an antenna.

(e)   A source has a cosine radiation intensity given by $U=U_m \cos\theta$. The radiation intensity has a value only in upper hemisphere. Find the total power radiated and its directivity.

(f)   Derive the radiation resistance of a short electric dipole.

2   Answer any two of the following :   5×2=10
    (a) Explain principle angular regions of a flat sheet reflector.
    (b) Derive and hence plot the radiation pattern for two isotropic point sources of same amplitude but opposite phase.
    (c) Derive the expression for power radiated by an alternating current element.

3   Answer any two of the following :   5×2=10
    (a) Discuss about the applications of loop antenna and what is 180° ambiguity? How it arises and how is it removed?
    (b) Explain with suitable diagram the working of axial mode of operation of a helical antenna.
    (c) Design log periodic antenna. What are the advantages of microstrip antennas?

4   Answer any two of the following :   5×2=10
    (a) Make a detailed comparison between corner reflector and parabolic reflector.
    (b) What are the various feeding methods used for reflector antenna?
    (c) What are antenna measurement ranges? Explain any two gain measurement techniques.

5   Answer any two of the following :   5×2=10
    (a) Explain MUF, critical frequency and virtual height as applied to sky wave propagation.
    (b) Derive the skip distance for region between transmitter and receiver using sky wave propagation, when curvature of earth is taken into consideration.
    (c) Explain the mechanism of reflection and refraction of sky waves by ionosphere and derive the relevant relationship for same.

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