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8010

Reg. No. :

Name :

Sixth Semester B.Tech. Degree Examination, December 2009
(2003 Scheme)
Electronics and Communication
03-605 ANTENNA AND WAVE PROPAGATION (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. (4 marks each).

1. Define and derive directivity of an antenna in terms of beam solid angle.
2. Find the maximum effective aperture of an antenna which is operating at a wavelength of 1.75 meters and has a directivity of 75.
3. What is cross polarization ? Explain.
4. Explain the principle of operation of a linear antenna array.
5. What are the advantages and disadvantages of binomial arrays ?
6. Explain the geometry of a microwave dish antenna.
7. What are the general characteristics of a logperiodic antenna ?
8. Explain the mechanism of radio wave -bending by the ionosphere.
9. Define and explain skip distance.
10. Write short notes on ELF propagation into sea water. (4×10=40 Marks)

P.T.O.



PART – B

Answer **any two** questions from **each** Module.

Module – 1

11. For a centre-fed dipole $\frac{\lambda}{10}$ long, find
- Radiation resistance
 - Directivity
 - Gain
 - Beam solid angle and
 - Effective aperture.
12. What are the antenna field zones ? Illustrate and explain the energy flow and radiation pattern near a dipole antenna.
13. Derive far - field H_ϕ and E_θ of a symmetrical, centre-fed, thin layer antenna of length L .

Module – 2

14. Find the total electric field E at a distant point from arrays of two point sources with equal amplitude and phase.
15. For an end fire array of 4 isotropic sources of equal amplitude and equal spacing, derive field pattern. Assume $\alpha = -\pi$.
16. Explain the procedure of measurement of gain by direct comparison method.

Module – 3

17. What are the different layers of atmosphere ? Explain the structure.
18. What are the factors which limit the radio transmission over large distance ? Explain ionospheric absorption.
19. a) In a VHF mobile radio system, the base station transmits 100 W at 200 MHz and the antenna is 20 m above ground. The transmitting antenna is a $\frac{\lambda}{2}$ dipole for which the gain is 1.6. Calculate the field strength at a receiving antenna of height 2 m.
- b) Explain briefly the concept of duct propagation. **(10×6=60 Marks)**
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