Code No. 6134 / O

FACULTY OF ENGINEERING

B. E. 3/4 (ECE) II-Semester (**Old**) Examination, December 2009 / Jan., 2010

Subject : **Antennes and Propagation**

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part-A and any **Five** questions from Part-B.

Part – A (25 Marks)

1. Find the directivity and HPBN of an antenna having a unidirectional cos θ radiation intensity pattern. 3
2. Write short notes on D-layer. 3
3. What is array facts? Find the array facts of two element array. 3
4. What are principal planes? How the antenna beamwidth are defined in such planes? 3
5. Sketch the far field patterns of loops of 0.1λ, λ and 3λ/2 diameter. 3
6. Define antenna polarization. 2
7. Compare the broadside and an end give arrays. 2
8. Explain the effect of ground on shoribic. antenna. 2
9. What is a frequency independent antenna? 2
10. What is an atmospheric duet? 2

Part – B (5 x 10 = 50 Marks)

11.a) Explain "Directivity of an antenna". How does "directivity" differ from the "maximum power gain" of an antenna? 5

b) The radiation intensity of an antenna is given by $\phi(\theta, \phi) = \phi_{max} \sin^2\theta$. Calculate the directivity of th antenna. 5

12.a) Define Radiation resistance of an antenna. Derive an expression for radiation resistance of an halfwave dipole. 5

b) What do you understand by the terms "Near field" and "far-field" of an antenna? Explain how the far field of an antenna is calculated if the distribution of the elective current on the antenna structure is known. 5

13.a) What is a log periodic antenna? Show that a log periodic antenna is a frequency independent antenna. 5

b) Explain the principle of a metal-plate lens and describe how it is used in horn aerials for phase shift correction. 5

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14.a) Derive expression for radiated electric field of a n-element array with uniform excitation and inter-element spacing $\lambda/2$. 5

b) Consider an array of two identical infinitesimal dipole separated by a distance $\lambda/4$ with same magnitude excitation but a phase excitation difference β between the elements. Find the nulls of the total field for $\beta = 0$, $\beta = \pi/2$. 5

15.a) Describe a method of measurement of antenna impedance. 5

b) Find the range of LOS system, when the receiver and transmitter antennas heights are 10m and 100m respectively. Take the effective earths radius in to consideration. 5

16.a) Distinguish between, sectoral, pyramidal and conical adns, with neat sketches. List out their utility and applications. 5

b) List out the differences between the active and passive corner reflectors. What are retro reflectors? 5

17. Write short notes on the following :
a) Ground wave propagation 3
b) Optimum working frequency and LUHF 3
c) Ionospheric abnormalities 4

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