

2002 SCHEME

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EC65

Sixth Semester B.E. Degree Examination, December 2010 Antennas & Propagation

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Define the following with respect to antenna:
i) Radiation intensity ii) Gain iii) Efficiency iv) Directivity. (06 Marks)
b. Derive the expression for effective height of the transmitting antenna. (07 Marks)
c. Find the directivity and draw the radiation pattern of an antenna whose radiation intensity is given by, $u = u_m, 0 < \theta < \frac{\pi}{2}$
 $0 < \phi < 2\pi$ (07 Marks)
- 2 a. Draw and explain the field and pattern of a directional antenna. (06 Marks)
b. Derive the expression for magnetic vector potential of a thin linear antenna. (10 Marks)
c. A thin dipole antenna is $\left(\frac{\lambda}{10}\right)$ long. If its loss resistance is 2.5Ω , find the radiation resistance and efficiency. (04 Marks)
- 3 a. Derive the expression for electric field intensity of an array of two point sources of equal amplitude and inphase currents. Reference point is at the centre of the array. Draw the radiation pattern. (10 Marks)
b. Draw the radiation pattern of an array of 4 isotropic sources separated by distance of $\frac{\lambda}{2}$ m and having inphase currents. Derive the equation required. (10 Marks)
- 4 a. Derive the expression for electric field intensity of a loop antenna. (08 Marks)
b. Find the radiation efficiency of 1 m diameter loop ($C = \pi$ m) of 10 mm diameter copper wire at, i) 1 MHz ii) 10 MHz. (06 Marks)
c. Explain helical geometry. (06 Marks)
- 5 a. Explain the important parameters of the monofilar axial mode helical antenna. (08 Marks)
b. Explain with a neat diagram, Yagiuda array antenna. (06 Marks)
c. Write the diagram of log periodic antenna and explain. (06 Marks)
- 6 a. Explain different types of horn antennas. (08 Marks)
b. Give the comparison between parabolic and corner reflectors. (06 Marks)
c. Explain embedded and plasma antennas. (06 Marks)
- 7 a. Explain line of sight propagation. Derive the expression for maximum line of sight distance. (08 Marks)
b. Derive the expression for electric field intensity of tropospheric waves. (07 Marks)
c. A VHF communication has to be established with 35 W transmitter at 90 MHz. Find the distance, up to which, line of sight communication may be possible, if the height of the transmitting and receiving antennas are 40 m and 25 m respectively. Also determine the field strength at the receiving end. (05 Marks)
- 8 a. Explain the structure of the atmosphere, with a neat diagram. (10 Marks)
b. What is the effect of earth's magnetic field on wave propagation? (05 Marks)
c. Calculate the critical frequencies for F1, F2 and E layers, for which, the maximum ionic densities are 2.3×10^6 , 3.5×10^6 and 1.7×10^6 electrons per cm^3 respectively. (05 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

