Set No. 1

III B.Tech I Semester Regular Examinations, November 2007
ANTENNAS AND WAVE PROPAGATION
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours
Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Draw the Dual characteristics of an antenna.

   (b) Explain the Radiation from Two wire. [8+8]

2. (a) Derive the expressions for electric field in case of short current element and hence obtain the conditions for the field to be in Franhofer region.

   (b) Find the distance from a radiating element with 60Hz current such that radiation and induction fields are equal. [10+6]

3. (a) A linear broadside array consist of 4 identical equal in phase point source with $\lambda/3$ spacing. Calculate and plot the field pattern. Also find the directivity and beam width.

   (b) What is optimum spacing used in parasitic array? Why. [12+4]

4. (a) Write short notes on "Helical Antenna".

   (b) Derive an expression for radiated electric field strength of a traveling wave radiation of length 'l'. [8+8]

5. (a) Sketch the current distribution of folded dipole and find out input impedance when two legs have unequal diameters.

   (b) A Parabolic dish provides a power gain of 50dB at 10GHz, with 70% efficiency. Find out
      i. HPBW.
      ii. BWFN, diameter. [8+8]

6. (a) Describe the method of measuring the gain and radiation pattern of an antenna.

   (b) A standard gain horn antenna with a power gain of 12.5, is used to measure the gain of a large directional antenna by comparison method. The test antenna is connected to the receiver and an attenuator adjusted to 23dB in order to have the same receiver output. Find out the gain of the large antenna. [8+8]

7. (a) Describe the following:
      i. Space wave propagation.
      ii. Duct propagation.

(b) VHF communication is to be established with a 50watt transmitter at 100MHz. Calculate the LOS distance if the heights of transmitting and receiving antennas are respectively 50m and 10m. Assuming the capture area of the transmitting antenna is 25sqmts, calculate the field strength at the receiving neglecting ground reflected wave. [8+8]

8. (a) Discuss the characteristics of F_1 and F_2 layers.

(b) Discuss the reasons for reduction of field strength in sky wave propagation. [8+8]

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