Pradeep Kumar

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T-2 EXAMINATION-2016
B.Tech (ECE) VIII Semester

COURSE CODE: 16B1WEC831 MAX. MARKS: 25
COURSE NAME: ANTENNA AND WAVE PROPAGATION
COURSE CREDITS: 03 MAX. TIME: 1.5 HRS

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q1. (a) Using equivalent circuit of receiving mode explain various equivalent areas of the antenna and derive their expressions in terms of circuit parameters assuming maximum power transfer condition. [3]

(b) Determine the maximum directivity and maximum effective aperture area of an infinitesimal dipole antenna whose overall length is $\frac{\lambda}{50}$ and operating at 10 GHz. [2]

Q2. (a) Using field expressions derive the expression of total radiated power for a small circular loop antenna. [4]

(b) Determine the radiation resistance of a ferrite loop, if the radiation resistance of air core loop is 50 Ω and the relative effective permeability of ferrite core is 60. [1]

Q3. Derive the expression of directivity of an N-element uniform array in terms of the total length of the array if the radiation pattern of the array is

(a) broadside,
(b) end-fire. [5]

Q4. Determine the array factor of an MXN planar array assuming that the array is placed in x-y plane. [5]

Q5. Explain the various modes of operation of the Helical antenna. How the linear and circular polarization can be achieved by this antenna. [5]