JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION-JUNE-2016

B.TECH. VIII SEMESTER (ECE)
COURSE CODE:16B1WEC831   MAX. MARKS: 35
COURSE NAME: ANTENNA AND WAVE PROPAGATION
COURSE CREDITS: 03   MAX. TIME: 2 HRS

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

Q1. (a) Derive the radar range equation for polarization matched antennas. [3]
    (b) A lossless half-wave dipole antenna with input impedance of 73 ohms, is to be connected to a transmission line whose characteristic impedance is 50 ohms. Assuming that the pattern of the antenna is given by $U = B_0 sin^3\theta$, find the overall maximum gain of the antenna. [2]

Q2. (a) Derive the expression of the phase difference between the elements for an N-elements uniform array so that the directivity along the axis of the array is maximum. [3]
    (b) A constant current circular loop of radius $a = \frac{5\lambda}{4}$ is placed on the $x - y$ plane. Find the two smallest angles (excluding $\theta = 0^o$) where a null is formed in the far-field pattern. [2]

Q3. (a) Design a rectangular microstrip antenna using a substrate with dielectric constant of 2.2 and thickness $h = 0.1588\ cm$, so as to resonate at 10 GHz. [3]
    (b) What is fringing effect in microstrip antenna? [2]

Q4. (a) Derive the expression for resonant frequency of the TM_{mn} modes for circular patch antenna. [3]
    (b) Write the advantages and disadvantages of the microstrip antennas. [2]

Q5. (a) Using diagrams explain various feeding techniques for microstrip patch antennas. [3]
    (b) Define skip zone and skip distance. [2]

Q6. (a) Explain various atmospheric effects in wave propagation. [3]
    (b) Using diagram, explain duct propagation. [2]

Q7 Explain various types of fading in wave propagation. [5]