JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 1 EXAMINATION - 2026

B.Tech-VI Semester (ECE)

COURSE CODE(CREDITS): 18B1WEC742(3) MAX. MARKS: 15

COURSE NAME: Antenna and Wave Propagation

COURSE INSTRUCTOR: Salman Raju Talluri MAX. TIME: 1 Hour

Note: (a) All questions are compulsory. (b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems. (c) Use of calculator is not allowed.

Q.No	Question	CO	Marks
Q.1	Find the half-power beamwidth (HPBW) and first-null beamwidth (FNBW), in radians and degrees, for the normalized radiation intensity $U(\theta) = \cos(2\theta)\cos(3\theta)$ for $0 \leq \theta \leq 90°$ and $0 \leq \phi \leq 360°$	CO-1	3
Q.2	What are the principle cuts for an antenna radiation pattern? Specify the omni directional, non-omnidirectional and isotopic antenna patterns with respect to these principle cuts.	CO-1	3
Q.3	The radial component of the radiated power density of an infinitesimal linear dipole of length $l << \lambda$ is given by $$W_{av} = a_r W_r = a_r A_0 \frac{\sin^2\theta}{r^2}\ W/m^2$$ where A_0 is the peak value of the power density, θ is the usual spherical coordinate, and a_r is the radial unit vector. Determine the maximum directivity of the antenna.	CO-1	3
Q.4	An incident electromagnetic wave is represented as $E_i = (2a_x + 3a_y)E_0(x,y)e^{-jkz}$. Identify the polarization of this incident wave. What are the other polarizations that are possible in EMW propagation?	CO-2	2
Q.5	Derive the Friis Transmission equation considering all practical losses that happen in EMW transmission and reception.	CO-2	4

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