JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

M.Tech-2nd Semester (ECE)

COURSE CODE (CREDITS): 21M1WEC243 (3)

MAX. MARKS: 15

COURSE NAME: Antenna Theory and Techniques

COURSE INSTRUCTORS: Dr. Naveen Jaglan

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.

Q.No	Questions	CO	Marks
Q1	Determine the directions of the nulls and then plot the radiation patterns of dipole antennas of $\frac{\lambda}{2}, \lambda, \frac{3\lambda}{2}$ and 2λ lengths.	1	2
Q2	A Hertzian dipole has a length $L = 0.01\lambda$ and operates at a frequency of 300 MHz. Calculate the radiation resistance of the dipole.	2	2
Q3	Define antenna directive gain and power gain. Explain the significance of power gain.	2	2
Q4	Derive the relationship between antenna directivity and beam solid angle.	1	2
Q5	Derive the mathematical formulation for the electromagnetic field components in the near-field and far-field regions of an antenna, and explain their physical significance.	1	3
Q6	A $1.2\,\lambda$ long dipole has 1-amp peak input current. Find the maximum peak current seen on the dipole if the dipole is oriented along z-axis. Find the radiation electric & magnetic field at a distance of 100 meter along $\theta = 60$ degree.	1	2
Q7	Explain how the Lorenz gauge condition leads to the wave equation for the vector potential A in free-space electromagnetic radiation problems.	2	2