JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Tech-2nd Semester (ECE)

COURSE CODE (CREDITS): 21M1WEC243 (3) MAX. MARKS: 25

COURSE NAME: Antenna Theory and Techniques

COURSE INSTRUCTORS: Dr. Naveen Jaglan MAX. TIME: 1 Hour 30 Min

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.	2	2
Q2	Derive the expressions for the near and far field components of Hertz dipole? Calculate the radiation resistance and total power radiated by this antenna.	1	3
Q3	What is the purpose of antenna arrays? How do the spacing between antenna elements, relative amplitude, and phase influence the radiation pattern of a Hertzian dipole antenna array?	3	3
Q4	Obtain the radiation patterns plots for: (a) Array of two elements with equal amplitude and same phase. (b) Array of two elements with equal amplitude and opposite phase.	3	4
Q5	Explain the Principle of Pattern Multiplication and plot the radiation pattern for: (a) 4- Isotropic elements fed in phase and spaced and $\frac{\lambda}{2}$ apart. (b) 8- Isotropic elements fed in phase and spaced $\frac{\lambda}{2}$ apart.	2	4
Q6	Determine Dolph-Tchebyscheff current distribution for the maximum beam width of a linear in phase broadside array of eight isotropic	2	5

	sources. The spacing b/w the elements are $\frac{3\lambda}{4}$ and the side lobe level is 40 dB down. What is the half power beam width?		
Q7	A low frequency transmitting antenna has a radiation resistance of 0.5Ω and a total loss resistance of 2.5Ω. Calculate the radiated power, power input and antenna efficiency if the current fed in antenna is 100A.	2	2
Q8	A small dipole of length 0.1 λ is excited with a peak current of 5 Amperes. How much power will be radiated by the antenna?	3	2