

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-2 EXAMINATION APR-2023

B. Tech 8th Semester (ECE)

COURSE CODE (CREDITS): 18B1WEC852 (3)

MAX. MARKS: 25

COURSE NAME: Design of Modern Antennas

COURSE INSTRUCTOR: Dr. Naveen Jaglan

MAX. TIME: 1 Hr. 30 Min.

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

1. Derive the expressions for the near and far field components of Hertz dipole? Calculate the radiation resistance and total power radiated by this antenna. [CO-1,2; 3 Marks]
2. What is the need of antenna arrays? How distance among antenna elements, relative amplitude and phase can control the radiation pattern of hertz dipole antenna array. [CO-3, 4; 5 Marks]
3. Obtain the radiation patterns plots for:
 - (i) Array of two elements with equal amplitude and same phase.
 - (i) Array of two elements with equal amplitude and opposite phase. [CO-1, 4; 5 Marks]
4. Find the direction of nulls and thereafter plot the radiation patterns of $\frac{\lambda}{2}$, λ , $\frac{3\lambda}{2}$, 2λ length dipole antennas. [CO-3, 4; 5 Marks]
5. Define antenna directive gain and power gain. What is the significance of power gain? [CO-1, 2; 2 Marks]
6. 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. [CO-3,4; 3 Marks]
7. 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. [CO-3,4; 2 Marks]