JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- Feb 2023

B. Tech 8th Semester

COURSE CODE(CREDITS): 18B1WEC852(3)   MAX. MARKS: 15

COURSE NAME: Design of Modern Antennas

COURSE INSTRUCTOR: Dr. Naveen Jaglan   MAX. TIME: 1 Hr.

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

1. What is the necessity of magnetic vector potential? A 0.1-meter-long thin wire is carrying 10A peak current at 30 MHz, and is oriented along the z-axis. Find the magnetic vector potential at a distance of (i) 1 meter, (ii) 10 meter and (iii) 100 meter from the wire.

   [CO-1,2; 2 Marks]

2. 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?   [CO-1,2; 2 Marks]

3. What is radiation resistance? How does it vary as a function of dipole length?

   [CO-2; 2 Marks]

4. What is Lorentz gauge condition? What is the reasoning used to choose the Lorentz gauge condition the way it has been choosen?   [CO-2; 2 Marks]

5. Can we have radiation from DC current why? What type of fields are generated due to Hertz dipole? Calculate the distance from the antenna where all the fields generated by the antenna becomes equal?   [CO-1; 2 Marks]

6. 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]

7. Derive the relation between electric field and magnetic field in the far field region of the radiating element.   [CO-1,2; 2 Marks]