Code No: 156AF

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, August - 2022
ANTENNAS AND PROPAGATION
(Electronics and Communication Engineering)

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks

1.a) Obtain the relations between the potentials and their sources.
b) Write a short note on loop antennas. [8+7]

2.a) Obtain the relationship between directivity and effective aperture.
b) Define radiation intensity? If the radiation intensity $U = A_0 Cos\theta$, determine directivity. [8+7]

3.a) In a linear array of 4 isotropic elements spaced $\lambda/2$ apart and with equal currents fed in phase, plot the radiation pattern in polar coordinates.
b) Derive the Fourier Transform method of synthesis. [7+8]

4.a) Describe a method of measurement of radiation pattern with neat measurement setup.
b) What is polarization and describe polarization measurement by power measurement approach. [7+8]

5.a) Design log periodic antenna to operate over a frequency range of 125MHz to 500MHz to obtain a gain of 9 dB.
b) Derive an expression for the radiation resistance of a folded dipole. [8+7]

6.a) Find the directivity, beam width and effective area of a paraboloidal reflector antenna for which the reflector diameter is 6 cm and the illumination efficiency is 65%. The frequency of operation is 10GHz.
b) Draw the diagram of pyramidal horn antenna and explain its operation, characteristics and applications. [7+8]

7.a) With the help of diagrams and equivalent circuits, explain feeding mechanisms of micro strip antenna.
b) Design a rectangular micro strip antenna using a substrate with dielectric constant of 2.2, h=0.1588 cm so as to resonate at 10 GHz. [8+7]

8.a) Derive an expression for effective dielectric constant and critical frequency of ionosphere layer.
b) Compute the effective dielectric constant of the E layer with $N=5\times10^5$ electrons/sec, if the frequency of the wave is 25 MHZ. [8+7]

---oo0oo---