R15

Code No: 125DQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January - 2025

ANTENNAS AND WAVE PROPAGATION

(Electronics and Communication Engineering)

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

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

1.a)	State Helmholtz theorem.	[2]
b)	Define the antenna parameters: Beam area and Beam efficiency.	[3]
c)	Draw the diagram of a pyramidal horn antenna.	[2]
d)	State Fermat's principle.	[3]
e)	Mention the applications of lens antennas.	[2]
f)	Mention the advantages of microstrip antenna.	[3]
g)	What is a broadside array?	[2]
h)	Mention the Hansen woodyard conditions.	[3]
i)	Mention different modes of wave propagation.	[2]
j)	What is modified refractive index (M)?	[3]

PART - B

(50 Marks)

2.a) Explain the working of loop antenna. Explain how it can be used for direction finding.
b) Obtain the potential functions using Maxwell equations approach. [5+5]

OR

3. Derive the field components and rms power radiated from Quarter wave monopole. Calculate the radiation resistance of a Quarter wave monopole. [10]

4.a) Draw different types of horn antennas. What are the design considerations of pyramidal horn antenna?
b) Distinguish between axial and normal modes of helix radiations, and list out their requirements. [6+4]

OR

5.a) Draw a typical Yagi-Uda antenna. Explain the significance of parasitic elements in Yagi Uda array.
b) Explain the construction and working of helical antenna in axial mode with required equations. [5+5]

6.a) Explain the construction and working of dielectric lens antenna.

b) Explain the Cassegrain feed for parabolic reflectors. [5+5]

OR

7.a) Draw the geometry of microstrip antenna and explain its working.

b) Explain the working of a corner reflector antenna. [5+5]

8.a) Derive the expression for resultant radiation pattern of uniform linear array of N elements.

b) Draw the measurement set-up and explain the directivity measurement procedure of an antenna. [5+5]

OR

9.a) Draw the measurement set-up and explain the pattern measurement procedure of an antenna.

b) Discuss different sources of errors in antenna measurements. [5+5]

10.a) What is the wave tilt and how does it affect the field strength received at a distance from the transmitter?

b) Write a short notes on Critical frequency and Skip distance. [5+5]

OR

11. Discuss the salient features of sky wave propagation. Bring out the various problems associated with this mode of propagation. How are these problems over come? [5+5]

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