

R13

Code No: 115DQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, March - 2024

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) Define antenna gain and directivity. [2]
- b) Compare fields of small loop and short dipole. [3]
- c) List out the advantages horn antennas. [2]
- d) Give the applications of helical antennas. [3]
- e) Describe the drawbacks of lens antenna? [2]
- f) Give the advantages and limitations of micro strip antennas. [3]
- g) What are the sources of error while measuring the antenna parameters? [2]
- h) Define point sources and uniform linear array. [3]
- i) Define Sky wave and Ground Wave. [2]
- j) What are the factors that affect the propagation of radio waves? [3]

PART - B

(50 Marks)

- 2.a) With the help of neat diagrams, explain the principle of radiation in antennas.
- b) Explain the Effective Height of an Antenna and Antenna Temperature. [5+5]

OR

- 3.a) Define dipole antenna. Derive the radiation field and radiation resistance from a half wave dipole.
- b) Derive the expression for radiation resistance of small loop antenna. [5+5]

- 4.a) Explain about the construction and characteristics of helical antenna.
- b) Discuss about the horn antenna types and its characteristics. [5+5]

OR

- 5.a) Explain about construction and operation of Yagi-Uda antenna.
- b) Design Yagi-Uda antenna of six elements to provide a gain of 12db if the operating frequency is 200 MHz. [5+5]

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6.a) Explain about flat sheet, corner and paraboloidal reflectors.

b) Explain about Zoned Lens antenna.

[5+5]

OR

7.a) Describe the feed methods of a rectangular micro strip patch antennas.

b) Explain the impact of different parameters on characteristics of micro strip patch antennas.

[5+5]

8.a) Write short notes on broad side and end fire arrays.

b) Derive the expression for far field pattern of an array of two isotropic points Sources at equal amplitude and opposite phase.

[5+5]

OR

9.a) A linear broad side array consists of four equal isotropic in phase point sources with $\lambda/3$ spacing (overall length of array= λ). Find the directivity and the beam width.

b) Write short notes on i) Linear array ii) binomial Array.

[5+5]

10.a) Explain ground wave propagation.

b) Explain about scattering phenomenon and Super refraction.

[5+5]

OR

11.a) Discuss the field strength variation with skip distance and virtual height.

b) Explain the refraction and reflection mechanisms in sky wave propagation.

[5+5]

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