Code No: 125DQ **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November/December - 2017
ANTENNAS AND WAVE PROPAGATION
(Common to ECE, ETM)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)	What is quarter wave monopole?	[2]
b)	Write the relation between effective aperture and Directivity.	[3]
c)	Draw the structure of helical antenna with a coaxial line feed.	[2]
d)	What is the spacing between elements of Yagi - Uda antenna	[3]
e)	What are the disadvantages of lens antennas?	[2]
f)	Write short notes on horn antenna.	[3]
g)	What is the main disadvantage of binomial array?	[2]
h)	Draw uniform linear array.	[3]
i)	Derive the expression for refractive index of ionosphere.	[2]
j)	Explain the concept of super refraction.	[3]

PART - B

(50 Marks)

2.a) Derive an expression for the radiation resistance of a Half wave dipole antenna.
b) What is meant by the effective area of an antenna? How is it related to the gain? [5+5]

OR

3. Discuss about loop antenna. What are the disadvantages of loop antenna? What are applications loop antennas? [10]

4.a) Write short notes on Yagi-Uda array Antenna and its applications, advantages and drawbacks.
b) Discuss different types of horn antennas with neat sketches. [7+3]

OR

5. With neat sketch, explain the operation of helical antenna. [10]

6.a) Explain the geometry of paraboloidal reflector with neat diagram.
b) Calculate the 3dB beam width and power gain of a parabolic antenna at a frequency of 1.6GHz with 2.4 meter diameter and 48% antenna efficiency? [6+4]

OR

7.a) Compare UHF and VHF antennas.
b) What are the various feeds used in reflectors? [7+3]

8.a) Discuss broadside array and end fire array with neat diagrams.
b) Derive expression for antenna array factor. [7+3]

OR

9.a) An end fire array consisting of several half wave length long isotropic radiators having directive gain of 30. Find the length of array for broad side antenna?
b) A broadside array of identical antennas consists 8 isotropic radiators separated by distance $\lambda/2$. Find radiation field in a plane containing the line of array showing directions of maxima and null. [7+3]

10. Briefly describe the following terms connected with sky-wave propagation:
a) Virtual height
b) Critical frequency
c) Maximum usable frequency
d) Skip distance. [10]

OR

11.a) Describe the troposphere and explain how ducts can be used for microwave Propagation.
b) Write a short note on Multi-hop propagation. [6+4]

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