

Code No: R15A0416**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****III B.Tech II Semester Supplementary Examinations, April 2023****Antennas and Wave Propagation****(ECE)**

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Time: 3 hours**Max. Marks: 75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

- 1). a Draw current distribution for $3\lambda/2$ antenna. [2M]
- b Define and differentiate Directivity-Gain. [3M]
- c How is zoning done in dielectric lens antenna? [2M]
- d List the limitations of Microstrip antennas. [3M]
- e List the advantages of Binomial arrays. [2M]
- f If the expected directivity of an isotropic array is 100, how many elements required for broadside and end-fire cases. Assume inter-element spacing is $\lambda/4$. [3M]
- g What is mean by Tropospheric Scattering? [2M]
- h Compare ground wave and space wave propagations. [3M]
- i What is mean by sky wave propagation? [2M]
- j Illustrate the layers in the structure of ionosphere. [3M]

PART-B (50 MARKS)**SECTION-I**

- 2 Derive the expression for Electric field and Magnetic field components for half wave dipole Antenna. [10M]

OR

- 3 Define Radiation resistance of an Antenna and show that the radiation resistance of Half wave dipole is 73 ohms. [10M]

SECTION-II

- 4 Explain the working principle of Microstrip patch antenna and the impact of different parameters on characteristics. [10M]

OR

- 5 a) Explain the significance of F/D ratio in parabolic reflectors. [5M]
- b) Design and explain three element Yagi-Uda array. [5M]

SECTION-III

- 6 With a neat sketch, explain Uniform linear array and explain the concept of Linear array with n-isotropic point sources of equal amplitude and spacing. [10M]

OR

- 7 a) Design 2-element array for different cases. [5M]
- b) Explain the gain measurement of antenna by comparison method. [5M]

SECTION-IV

- 8 a) Why ground waves are not received beyond certain range. Explain the phenomenon. [5M]
 b) What is the wave tilt and how does it effect the field strength received at a distance from the transmitter? [5M]

OR

- 9 a) What is the effect of earth's curvature in space wave propagation? [4M]
 b) Explain the effect of the following on tropospheric wave propagation:
 i. radius of curvature of path [3M]
 ii. Earths radius [3M]

SECTION-V

- 10 Explain the wave bending phenomenon and skip distance in sky wave propagation. [10M]

OR

- 11 Explain the following terms w.r.t sky wave propagation:
 i) Ray path [3M]
 ii) OWF [3M]
 iii) MUF [4M]
