

**B.E Degree Examination, CEG, Anna University, Chennai-25**  
**Electronics and communication Engineering**  
**PTEC 431/PTEC 474/PTEC 9354 Antennas and wave propagation(R2002/2005/2009)**  
**V Semester**

Duration :3 hours

Max Marks:100

Answer all questions

**Part A(10x2=20 Marks)**

1. Give the significance of effective aperture of antennas
2. What is the advantage of using a folded dipole in Yagi array
3. What is meant by aperture blockage? How can it be avoided?
4. Define phase centre of a horn antenna
5. Outline the principle of working of a phased array?
6. What is need for an antenna array? Distinguish: Broadside and End fire array
7. When can an antenna be termed Frequency independent
8. Define Polarization
9. What is meant by virtual height in radio wave propagation.
10. Define maximum usable frequency

**Part B(5x16=80 Marks)**

11. Derive the expression for radiated field from an Oscillating dipole and hence deduce the expression for radiation resistance.

- 12a i) Discuss the different types of feed systems used in conjunction with parabolic reflectors (8)
- ii) Give the design Yagi Uda antenna in VHF range (Choose currently used frequencies for television broadcast) (8)

(OR)

- 12b i) Show that the directivity of a half wave dipole is 1.644. (8)
- ii) Find the radiation resistance of hertzian dipole of length  $\lambda/40$ ,  $\lambda/60$ ,  $\lambda/80$ . Compare and Comment (8)

13a) Obtain the expression for the normalized field strength  $E$  of an  $N$  element uniform linear array and sketch the variation of  $E$  with respect to angle between the axis of the array and line of observation

**(OR)**

13 b)i) Explain - Pattern Multiplication and show that it can be used to find the resultant pattern of a linear array. Specify the limitations of this method **(8)**

ii) Obtain the excitation coefficients of a nine element binomial array **(8)**

14a) Obtain the expressions for the radiated fields of a Helical Antenna (normal mode) and comment on the properties of the field quantities

**(OR)**

14b) Give the geometry and discuss the performance of a Log periodic antenna. Derive the associated design equations

15a.i) Discuss in detail the effects of earth's magnetic field on ionospheric radio waves. **(8)**

ii) Describe the structure of ionosphere **(8)**

**(OR)**

15b) Describe the following with respect to the propagation of radio waves

i) Super refraction

ii) Critical frequency

iii) Skip distance

iv) Line of sight link