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# B.Tech. (Sem. - 5th)

## ANTENNA AND WAVE PROPAGATION

**SUBJECT CODE : EC - 303**

**Paper ID : [A0312]**

**[Note : Please fill subject code and paper ID on OMR]**

**Time : 03 Hours** **Maximum Marks : 60**

**Instruction to Candidates:**

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

### Section - A

*Q1)* *(10 x 2 = 20)*

a) What is the difference between isotropic and non isotropic source?

b) How are radiations created from a short dipole?

c) Antenna measurements are done in far field region. Give reasons.

d) What is meant by effective height?

e) Define antenna efficiency.

f) What is the principle of the pattern multiplication?

g) What are the advantages of binomial array?

h) Define the Field Equivalence principle.

i) What are the factors that affect the propagation of radio waves?

j) What is Brewster's angle?

### Section - B

*(4 x 5 = 20)*

*Q2)* For an antenna having an effective temperature of 20°K, calculate available noise power per unit bandwidth.

*Q3)* Define radiation field and induction field. At what distance from the dipole is the induction field equal to the radiation field?

*Q4)* Discuss the techniques used for array tapering.

*Q5)* Describe the construction and operation of paraboloid reflector antenna.

*Q6)* Describe the space wave propagation.

## Section - C

*(2 x 10 = 20)*

*Q7)* What is the condition on phase for the end fire array with increased directivity. Derive the expressions for maxima, null and beamwidth for broad side array and end fire array.

*Q8)* (a) Write a note on the antenna impedances.

(b) Define Polarization. Explain the different types of polarization in detail.

*Q9)* (a) Explain the basic principle of communication by troposcatter.

(b) What is critical frequency with reference to ionospheric layer? Derive the expression for critical frequency in terms of the ionization density.

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