

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2064)

14721

B. Tech 6th Semester Examination

Antenna and Wave Propagation

EC-6002

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt one question from each section A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) How current is distributed in short electric dipole? Derive the expression for power radiated of half wave dipole. (12)
- (b) Explain the antenna band width, antenna efficiency and beam width between first nulls. (8)
2. (a) Derive the expression for electric and magnetic field strength at a distance 'r' from a small current carrying element. (12)
- (b) Derive the field radiated from quarter wave monopole antenna. (8)

SECTION - B

3. (a) What is antenna aperture? Derive the expression for effective aperture of an antenna. (12)
- (b) Define array. Explain the various types of array alongwith diagram and their radiation pattern. (8)

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4. (a) What is meant by uniform linear array? Derive the expression for array factor of a uniform linear array consisting of N identical isotropic elements. (12)
- (b) Explain the binomial array in detail. Give its advantages and disadvantages. (8)

SECTION - C

5. (a) Explain the principle and working of lens antenna with neat diagram. (10)
- (b) Explain the working of yagi-uda antenna. Why folded dipole is used as driven element in it? (10)
6. (a) What is horn antenna? Explain how it is fed? What are its applications? (10)
- (b) Describe the methods of measuring the radiation resistance and field strength of an antenna. (10)

SECTION - D

7. (a) What is the frequency range for ground wave propagation? Explain in detail the attenuation caused by absorption and tilted wave front. (8)
- (b) Derive the formula for range and field strength for space wave propagation. (12)
8. (a) What is maximum usable frequency? Derive its expression for flat earth surface. (8)
- (b) What is sky wave propagation? Show that ionosphere act as variable refractive index medium in sky wave propagation. (12)

SECTION - E

9. (a) What is a half wave dipole?

- (b) What is meant by reciprocity of antenna?
- (c) Define gain of an antenna.
- (d) Give two differences between broad side array and end fire array.
- (e) What are the conditions for linear array of N isotropic elements to radiate in end fire and broad side mode?
- (f) What is the principle of multiplication of pattern?
- (g) What is effective length? On what factor it depends?
- (h) Define a travelling wave antenna.
- (i) Explain why troposphere duct is useful for propagation of microwaves.
- (j) Define critical frequency. (2×10=20)