5. (a) Define the following terms:

a. Troposphere wave.

b. Ground wave.

c. Space wave

d. Surface wave 1*4=4

(b) Explain briefly the various modes of Propagation 6

6. Write short on:

a. Uniform linear array

b. Yagi-Uda Antenna 5+5=10

7. (a) The radiation resistance of an antenna is 75Ω and loss resistance is 8Ω. What is the directivity if antenna power gain is 16. 3

(b) What are meant by Elevation and Azimuthal patterns? 3

(c) Explain briefly the principle of pattern multiplication with suitable example. 4

8. Explain the effect of Earth's Magnetic Field on Radio wave Propagation 10

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B. Tech Odd Semester Examination, February, 2023

Electronics & Communication Engineering

(7th Semester)

Course No.: ECE-706

(Antena and Wave Propagation)

Full Marks: 50

Pass Marks: 15

Time: 2 hours

Note:
1. Attempt any five questions.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the right margin indicate full marks for the question.
6. All the mathematical symbols and abbreviations have their usual meanings.

1. Derive the expressions of time-average power density and radiation resistance for short-dipole antenna 3+7=10

2. Derive the expressions of direction of maxima and nulls for an End-fire antenna array. Draw the radiation pattern of array factor for d=λ/2 element spacings. 4+4+2=10

3. What do you mean by Broadband antenna and frequency dependent antenna? Discuss the log-periodic dipole array and derive the expression for the spacing factor. 2+3+5=10

4. Write short notes on:

a. Parabolic reflector

b. Smart antenna 5+5=10