

Sixth Semester B.E. Degree Examination, July/August 2022
Antennas and Propagation

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1
 - a. Define Gain , Beam efficiency , HPBW and Aperture efficiency. (12 Marks)
 - b. Write the fundamental equation of Radiation. (04 Marks)
 - c. An Antenna field pattern is given by $E(\theta) = \cos^2 \theta$ for $0 \leq \theta \leq 90^\circ$. Find HPBW. (04 Marks)
- 2
 - a. Using Power theorem, obtain the directivity for the
 - i) Source with sine squared power pattern.
 - ii) Source with Uni – directional cosine cube power pattern. (08 Marks)
 - b. Derive a relationship between maximum effective aperture and effective height. (08 Marks)
 - c. What are Phase Patterns? (04 Marks)
- 3
 - a. Obtain the radiation resistance expression of a short dipole with uniform current. (07 Marks)
 - b. A $\lambda/10$ long antenna has a loss resistance of 2.1Ω . Find its radiation efficiency. (03 Marks)
 - c. Write the pattern factor for E – field component of a full wave (λ) antenna. (05 Marks)
 - d. Write a brief note on Low Side lobe arrays. (05 Marks)
- 4
 - a. Obtain the expression for instantaneous magnetic field at distance ‘r’ from a loop antenna of radius ‘a’. What are the applications of loop antenna? (10 Marks)
 - b. State and illustrate Babinet's principle. (07 Marks)
 - c. Write a brief note on : Patch antennas. (03 Marks)

PART – B

- 5
 - a. With the aid of neat diagram, discuss the basic working principle and design considerations of a log periodic antenna. (07 Marks)
 - b. Describe design considerations of a Horn antenna. What are the applications of horn antenna? (07 Marks)
 - c. Helix antennas are superior to other types when intended for the use in Satellite Communication - Justify. (06 Marks)
- 6 Write short note on :
 - a. Embedded Antenna. (07 Marks)
 - b. Lens Antenna. (06 Marks)
 - c. GPR Antenna. (07 Marks)
- 7
 - a. Define Path loss. Explain the significance of Log – distance path loss model. (07 Marks)
 - b. Discuss Knife edge and rounded surface diffraction models. (07 Marks)
 - c. Derive an expression for line of sight distance between transmitter and receiver antennas. (06 Marks)
- 8
 - a. Define Skip distance, Maximum usable frequency. (08 Marks)
 - b. Describe Ionisation characteristics during day and night hours. (06 Marks)
 - c. Discuss Faraday rotation in Ionospheric layer. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.