

Code: EC5T4

**III B.Tech - I Semester–Regular/Supplementary Examinations
March - 2021**

**ANTENNA AND WAVE PROPAGATION
(ELECTRONICS AND COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) List the properties of antenna.
- b) Illustrate the figure of radiation pattern for Hertzian dipole.
- c) Predict the value of effective aperture area of an antenna operating at 10MHz, which has a directivity of 900.
- d) Define pattern multiplication.
- e) Mention the advantages of Binomial array.
- f) Distinguish between small loop antenna and short dipole antenna.
- g) What are the advantages of Rhombic antenna.
- h) List the salient features of reflectors.
- i) Mention the applications of lens antennas.
- j) Relate the expression of Electric field in ground wave propagation.
- k) Define duct propagation.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Illustrate the radiation pattern in polar form and define the following terms. 8 M
(i) Beam Width (ii) Beam efficiency (iii) Directive gain
(iv) Power gain
- b) Derive an expression for radiation resistance of current element starting from the expression for radiation fields. 8 M
3. a) Distinguish board side and fire arrays. 8 M
- b) Derive the expression of array factor for a two element array. 8 M
4. a) Compare the requirements and radiation characteristics of resonant and non resonant radiators. 8 M
- b) Determine the lengths and spacing requirements for a 3-element Yagi-Uda antenna array at 500MHz and explain its characteristics. 8 M
5. a) Establish and explain different types of feed techniques in parabolic reflectors. 8 M

b) Explain the Gain comparison method for measuring the gain of an antenna. 8 M

6. a) Discuss the characteristics of different ionised layers in ionospheric propagation. 8 M

b) Describe the structure of atmosphere and specify the factors affecting the radio wave propagation. 8 M