

B.Tech III Year I Semester (R15) Supplementary Examinations June 2018

ANTENNAS & WAVE PROPAGATION

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) Define retarded vector potential.
 - (b) Calculate the physical height of a half wave dipole ($G/2$) having antenna Q of 30 and bandwidth of 10 MHz.
 - (c) Write a note on helical antenna and helical geometry?
 - (d) Why a short dipole is also called an elemental dipole?
 - (e) Explain different types of apertures.
 - (f) Find the directivity of an antenna having radiation resistance of 72 ohms and loss resistance of 12 ohms and a gain of 20.
 - (g) Differentiate broad side and end fire array.
 - (h) Explain the principle of pattern multiplication.
 - (i) Define gyro frequency.
 - (j) Estimate the surface wave tilt in degrees over an earth of 12 mm conductivity and relative permittivity 20 at a wave length of 300 m.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 A resonant half wave length dipole is made out of copper ($\sigma = 10 \times 10^7$ siemen/m). Calculate the conduction dielectric radiation efficiency of the dipole antenna at $f = 100$ MHz if the radius of the wire is $r_0 = 3 \times 10^{-4} \lambda$ and radiation resistance of the $\lambda/2$ dipole is 73 ohms.

OR

- 3 Discuss the induction field and radiation field of a small current element and explain at what distance these fields are equal.

UNIT – II

- 4 With the aid of appropriate sketches, explain fully the operation of Yagi-Uda array. List its applications.

OR

- 5 Explain the radiation mechanism of microwave Horn antenna with diagram.

UNIT – III

- 6 With necessary illustrations, explain the radiation characteristics of micro strip antenna and mention its possible applications.

OR

- 7 Discuss about dielectric and metal lens antennas and their applications.

UNIT – IV

- 8 Draw the field pattern of array of two point sources with equal amplitude & phase and explain.

OR

- 9 Explain absolute gain measurement and gain transfer method in detail.

UNIT – V

- 10 Explain in detail the various regions of ionosphere and discuss the effects of Earth's magnetic field on ionosphere radio wave propagation.

OR

- 11 Explain the terms: (i) Optimum working frequency. (ii) Duct propagation. (iii) Virtual height. (iv) Skip distance. (v) MUF.