

B.Tech III Year I Semester (R13) Supplementary Examinations June 2017

ANTENNAS & WAVE PROPAGATION

(Electronics and Communication and Engineering)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

- (a) Why do you need of radiation resistance of an antenna? Explain with an example.
- (b) Estimate the value of effective aperture of isotropic antenna using its directivity.
- (c) Deduce the relation of radiation between small loop and short dipole antennas.
- (d) Draw the E – plane view and H – plane view of a pyramidal horn antenna.
- (e) Explore the advantage of lens antenna over a reflector antenna? Explain.
- (f) Justify preference of rectangular patches to circular? Justify.
- (g) Comment on reliability of a point source in practice.
- (h) Where near and far fields of a.c. current element coincide? Justify.
- (i) Explore the boundary limits of different means propagation above the sky.
- (j) Are horizontal polarization antennas are suitable for ground waves? Justify.

PART – B

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

UNIT – I

- 2 (a) With suitable assumptions, using electric and magnetic fields, explain how much power is radiated by a vertical radiator if it carries 1A a.c.
- (b) Explain importance of discontinuity for radiation.

OR

- 3 Compute the radiation resistance of a half wave dipole. Hence give the value of a quarter wavelength monopole.

UNIT – II

- 4 With neat diagrams, describe the principle of working of 3 element Yagi antenna, listing out its design requirements.

OR

- 5 Determine the length L , H-plane aperture and flare angles θ_E and θ_H of a pyramidal horn for which E-plane aperture $a_E = 10\lambda$. The horn is fed by a rectangular wave guide with TE_{10} mode. Let $\delta = 0.2\lambda$ in the E-plane and 0.375λ in the H-Plane. Also calculate the beam width and directivity.

UNIT – III

- 6 Give advantages and limitations of microstrip patch antennas.

OR

- 7 With reference to parabolic antenna, explain: (i) f/d ratio. (ii) Spill over and aperture efficiency. (iii) Front to back ratio. (iv) Types of feeds.

UNIT – IV

- 8 Distinguish between broad side array and end fire array.

OR

- 9 Describe how gain of an antenna under test is measured using absolute gain method.

UNIT – V

- 10 What are the different paths used for propagating radio waves from 300 kHz and 300 MHz?

OR

- 11 A radio link has to be established between two earth stations placed at a distance of 25000 km between them. If the height of the ionosphere is 200 km and its critical frequency is 5 MHz, calculate the MUF for the given path. Also calculate the electron density in the ionospheric layer.
