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Question Paper Code : X 20454

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Sixth Semester

Electronics and Communication Engineering
EC 6602 – ANTENNA AND WAVE PROPAGATION
(Regulations 2013)

(Common to PTEC 6602 – For B.E. (Part-Time) – Antenna and Wave Propagation –
Fifth Semester – Electronics and Communication Engineering –
Regulations 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Find the radiation resistance of a wire dipole of length 0.01λ .
2. Define antenna noise temperature.
3. The physical aperture of the horn antenna is $137 \lambda^2 \text{ m}^2$. Find the directivity of the horn antenna.
4. What are the limitations of coaxial probe feed of a microstrip antenna ?
5. Compare the radiation patterns of five element, uniform, optimum and binomial array.
6. What are the important properties of Tchebyscheff polynomial ?
7. What is the working principle of dielectric lens antenna ?
8. What are the advantages of far field antenna measurements ?
9. What is duct propagation ?
10. The critical frequency of an ionosphere layer is 6.5 MHz. Find the value of Maximum Usable Frequency (MUF) if the angle of incidence is 74° .



PART – B

(5×13=65 Marks)

11. a) i) Explain the different types of antenna polarization with example. (7)
 ii) An Electromagnetic Wave (EM) travelling in air medium has x and y components.
 $E_x = 5 \sin (\omega t - \beta z) a_x$
 $E_y = 10 \sin (\omega t - \beta z + 75^\circ) a_y$
 Find the direction of EM wave, type of polarization and average power per unit area of the wave. (6)

(OR)

- b) i) Derive the expression for electric and magnetic field components for a half wave dipole and derive the expression for radiation resistance. (7)
 ii) Explain the working of folded dipole antenna with neat diagram. (6)
12. a) i) Explain the working of septum horn antenna with neat diagram. (7)
 ii) Explain the working of Cassegrain reflector with neat diagram. (6)

(OR)

- b) Explain the working of microstrip patch antenna with neat diagram. (13)
13. a) i) Derive the expression for electric field for an array of two isotropic point sources of same amplitude and phase. (7)
 ii) Explain the working principle of two element adaptive array with block diagram. (6)

(OR)

- b) i) Explain the working of phased array antenna with neat diagram. (7)
 ii) Explain the principle used in Binomial array. (6)
14. a) Explain the working principle of log periodic antenna with neat diagram. (13)

(OR)

- b) i) Explain the principle used in gain measurement of an antenna with neat block diagram. (8)
 ii) Explain the working of electronic band gap structures. (5)
15. a) i) Explain the structure of the atmosphere with neat diagram. (7)
 ii) Explain about troposphere propagation. (6)

(OR)

- b) Explain about sky wave propagation and derive the expression for critical frequency. (13)



PART – C

(1×15=15 Marks)

16. a) i) What are requirements for an antenna used in mobile phone ? (5)
ii) Explain the types of antenna used in base station and mobile receiver. (5)
iii) What is radome antenna ? Explain the specifications of base station radome. (5)

(OR)

- b) i) What is the type of antenna used to receive C band and Ku band satellite TV channels ? Explain the characteristics of this antenna with neat diagram. (10)
ii) What is Low Noise Block down converter (LNB) ? Explain the characteristics of LNB. (5)
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