Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 80458

B. E./B. Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth Semester

Electronics and Communication Engineering

EC 2353/EC 63/10144 EC 604 – ANTENNAS AND WAVE PROPAGATION

(Regulations 2008/2010)

(Common to PTEC 2353– Antennas and Wave propagation for B. E. (Part-Time) Fifth Semester– Electronics and Communication Engineering– Regulations 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are θ and ϕ patterns in antenna radiation pattern?

2. What are dB_i and dB_d? Write their significances.

3. Give the importance of radiation resistance of an antenna.

4. Define Pattern Multiplication

5. State Huygen's Principle.

6. What are the features of pyramidal horn antenna?

7. Mention any two applications of helical antenna.

8. What are the features of Anechoic chamber?

9. Find the maximum distance that can be covered by a space wave, when the antenna heights are 60 m and 120 m

10. What is fading? And how it is compensated.

PART B — ($5 \times 16 = 80$ marks)

11. (a) Derive the Electric and magnetic field components of a Hertzian dipole

Or

(b) (i) Two spacecrafts are separated by 3 Km. Each has an antenna with directivity D = 200 operating at 2 GHz. If craft A's receives 20 db power what is the transmitted power by craft B? (7)

(ii) Explain the following terms with respect to antenna

(1) Polarization

(2) Effective aperture

(3) Directivity (9)

12. (a) (i) Explain the differences between half wave dipole and Quarter wave monopole antenna. (6)

(ii) Derive the directivity of Half wave dipole antenna. (10)

Or

(b) (i) Explain about loop antenna and discuss the radiation pattern. (8)

(ii) Derive Array factor of an Uniform linear array. Explain the significance of array factor. (8)

13. (a) (i) Compare flat reflector and corner reflector antennas. (2)

(ii) Explain how a paraboloidal antenna gives a highly directional pattern. (6)

(iii) Explain in detail about the feeding structure of parabolic reflector antenna. (8)

Or

(b) Write short notes on :

(i) Slot antenna (8)

(ii) Lens antenna (8)

14. (a) With necessary illustrations explain the radiation characteristics of multi element log periodic antenna and mention its possible applications. (16)

Or

(b) Draw and explain the function of Helical antenna and various modes of radiation. Highlight some of its applications. (16)

15. (a) Evaluate the values of surface impedance if $\sigma = 5 \times 10^{-5}, ' \varepsilon_r = 15, \mu = \mu_0$ at

(i) 5 kHz (5)

(ii) 50 kHz (5)

(iii) 500 kHz. (6)

Or

(b) Derive the expressions for phase velocity and group velocity of sky waves. (16)

———————