Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 31372

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Electronics and Communication Engineering

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

(Regulation 2008/2010)

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

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 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.   How a dipole antenna can be formed from a 2 wire open circuited transmission line?

4.   Mention the features of radiation pattern multiplication principle.

5.   State Huygen's principle.

6.   What are the merits and applications of offset feed reflector antenna?

7.   What is the difference between Yagi Uda antenna and log periodic dipole array?

8.   Mention the requirements of an ANECHOIC CHAMBER.

9.   What is free space loss factor?

10. What is Gyro Frequency?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the radiation resistance of an Oscillating Electric Dipole. (8)

      (ii) Define and explain the polarization and its significance in antenna analysis. (8)

Or

(b) (i) State and prove Lorentz Reciprocity Theorem for Antennas. (8)

      (ii) Define

         (1) Gain

         (2) Directivity

         (3) Antenna Temperature

         (4) Antenna Input impedance. (8)

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) Explain the Image theory and its application in detail. (8)

      (ii) Explain the construction and principle of pyramidal horn antenna. A pyramidal horn antenna having aperture dimensions of a= 5.2cm and b=3.8cm is used at a frequency of 10 GHz. Calculate its gain and half power beam widths. (8)

Or

(b) (i) Discuss the various feed techniques for Rectangular patch antenna with neat diagrams. (8)

      (ii) Find the diameter of a dish antenna that will form a beam having 0.5 deg, half power beam width (HPBW) at a frequency of 8.2 GHz. Assuming an efficiency constant of 0.6, calculate the antenna gain and effective aperture. (8)

14. (a) (i) Differentiate V antenna from Rhombic antenna. Explain their construction and principles in detail. (8)

      (ii) Explain the design details of log periodic dipole antenna. (8)

Or

(b) (i) Draw a neat block diagram for antenna radiation pattern measurement. Explain the procedure in detail. (10)

      (ii) Give an account on "Helical Antenna" (6)

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15. (a) (i) Discuss the factors that are involved in the propagation of radio waves. (6)

(ii) Draw a 2 ray model of Sky wave propagation and explain it in detail. (10)

Or

(b) (i) Derive the characteristic equations of Ionosphere. (8)

(ii) Define and explain. (8)

(1) Skip Zone

(2) MUF

(3) Multihop propagation

(4) Whistlers.