Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 51223

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

Sixth Semester

Electronics and Communication Engineering

EC 1352 A — ANTENNAS AND WAVE PROPAGATION

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   State reciprocity theorem for antennas.

2.   How to increase the radiation resistance of a loop antenna?

3.   Distinguish between monopoles and dipoles.

4.   Write an expression for radiation resistance of current element.

5.   List the merits and demerits of wideband antennas.

6.   What are the two modes of operation in a Helical antenna?

7.   What is Huygens' Principle?

8.   What are the different methods of feeding slot antennas?

9.   What are the limitations of surface wave propagation?

10. What is duct propagation?

PART B — (5 × 16 = 80 marks)

11. (a) (i)   Obtain the power received by the receiver based on the concept of
               effective aperture.   (8)

          (ii) Explain loop antenna of different shapes.   (8)

Or

(b) (i) Obtain the maxima, minima and half power points of two radiating point sources fed with equal in magnitude and phase current. (8)

(ii) Explain different properties of broadside and end fire arrays. (8)

12. (a) Derive the expression for the power radiated and the radiation resistance of a half wave dipole. (16)

Or

(b) (i) Explain how the assumed current distribution is done for wire antenna. (8)

(ii) Describe the use of capacitor 'hat' and top loading coil for short antennas. (8)

13. (a) (i) Prove that the circumference is equal to wavelength of a loop antenna. (8)

(ii) Explain the salient features of Yagi-Uda antenna. (8)

Or

(b) (i) Discuss the construction and principle of operation of rhombic antenna. (8)

(ii) Describe how a log periodic antenna provides a large bandwidth of operation. (8)

14. (a) (i) Derive the expressions $E\theta$, $E\varphi$ and $H\varphi$ for the electromagnetic field of a Huygens' source. (8)

(ii) Explain the radiations from different types of slot antenna. (8)

Or

(b) (i) Describe the principle of operation and applications of parabolic reflectors? (8)

(ii) Discuss in detail the features of Luneburg lens and Einstein's gravity lens. (8)

15. (a) (i) Explain in detail the structure of atmosphere. (8)

(ii) Illustrate how the ionosphere reflects low and high frequency waves. (8)

Or

(b) (i) Describe the effect of Earth's magnetic field on sky wave propagation. (8)

(ii) Explain the method of measuring the virtual height of a layer. (8)

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