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Question Paper Code : 80347

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Electronics and Communication Engineering

EC 6602 — ANTENNA AND WAVE PROPAGATION

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by retarded potential?
2. The voltage induced by the application of an electric field of strength 2 Volts/meter is 0.7. Calculate the effective length of the element.
3. Draw the different types of horn antennas.
4. Name some numerical tools that can be used to analyze an antenna.
5. How can we eliminate minor lobes?
6. What is the basic principle of antenna synthesis?
7. State Rumsey's principle.
8. Compare and contrast wedges and pyramids.
9. Find the critical frequency of an ionosphere layer which has an electron density of $1.24 \times 10^6 \text{ cm}^{-3}$.
10. What is meant by duct propagation?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the principle of radiation from an oscillating electric dipole. Derive the near field and far field expressions. (16)

Or

- (b) Derive the expressions for the fields at a far point due to a half wave dipole. (16)

12. (a) Explain in detail the radiation from a slot antenna and their feed systems. (16)

Or

- (b) Explain the radiation mechanism of reflector antennas and their feed systems. (16)

13. (a) Derive and plot the radiation from a broadside array of 4 point sources. (16)

Or

- (b) (i) Discuss in detail the concept, design principles and types of phased array. (10)
(ii) What is the significance of binomial array? (6)

14. (a) (i) Explain the operation and design of a helical Antenna. (10)
(ii) Explain the procedures involved in the measurement of gain in antennas. (6)

Or

- (b) Explain in detail about log periodic antennas. What is the need for feeding from end with shorter dipoles and the need for transposing the lines? Also discuss the effects of decreasing α . (16)

15. (a) Draw the electron density profile chart of an ionosphere and explain. Also derive an expression for the effective relative dielectric constant of the ionosphere. Explain about reflection and refraction of waves in ionosphere. (16)

Or

- (b) (i) Explain the attenuation characteristics for ground wave propagation. (8)
(ii) Explain LOS propagation and troposcatter propagation. (8)