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Question Paper Code : 51216

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

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. Write the relationship between aperture efficiency and maximum effective aperture.
2. Draw the radiation pattern of two-element end fire array with $d = 2\lambda$ where d = spacing between two elements.
3. When we use less loading coil why does the efficiency of the antenna go higher?
4. Write the equation for magnetic vector potential due to a current element.
5. Define frequency independent antenna.
6. Which mode of operation is more practical in Helical antenna? Why?
7. A parabolic antenna having a circular mouth is to have a power gain of 1000 at $\lambda = 10\text{cm}$. Estimate the diameter of mouth and BPBW of the antenna.
8. Write the formula for F-number of lens antenna.
9. List the types of fading.
10. Write the relation between MUF and critical frequency.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the formula for null direction, first nulls and directivity for broad side array. (8)
(ii) Explain the modes of operation of Helical Antenna. (8)

Or

- (b) (i) Prove that the impedance of folded dipole is four times that of single dipole. (8)
(ii) Prove that the radiation resistance of $\frac{\lambda}{2}$ antenna is 73Ω . (8)

12. (a) Explain near and far fields of a Hertzian dipole. (16)

Or

- (b) Explain amplitude pattern, radiated power and radiation resistance of finite length infinitesimal thin dipole. (16)

13. (a) How do you achieve end fire beam formation using Yagi-Uda antenna configuration and moment method? Explain. (16)

Or

- (b) Explain the geometrical structure of Helical antenna. Write the design procedure of log periodic dipole array. (16)

14. (a) With biconical antenna geometry explain how the input impedance varies with half cone angle for an infinitely long biconical antenna radiating in free space. (16)

Or

- (b) Explain about the polarization for a waveguide fed slot antenna. List the types of Horn antenna and derive the design equations of EM horn. (16)

15. (a) Explain the median basic transmission loss for ground wave propagation. Describe the commonest method to determine the critical frequency and virtual height.

Or

- (b) Explain the types of diversity technique. Discuss about the ray trajectory in a surface duct. (16)