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Question Paper Code : 60463

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

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 × 2 = 20 marks)

1. What is an elementary dipole and how does it differ from the infinitesimal dipole?
2. What is the effective area of a half wave dipole operating at 1 GHz?
3. What are the applications of loop antenna?
4. Define Pattern multiplication.
5. The impedance of an infinitesimally thin $\lambda/2$ antenna ($L = 0.5 \lambda$ and $L/D = \infty$) is $73 + j42.5 \Omega$. Calculate the terminal impedance of an infinitesimally thin $\lambda/2$ slot antenna.
6. Draw the geometry for E-plane type of metal-plate lens antenna.
7. Mention the types of feeding structures used for microstrip patch antennas.
8. Design a 3 element Yagi-Uda antenna to operate at a frequency of 200 MHz.
9. What is free space loss factor?
10. What is Gyro frequency?

PART B — (5 × 16 = 80 marks)

11. (a) Examine the effectiveness of the following parameters of an antenna :
(4 × 4 = 16)

- (i) Beam solid angle
- (ii) Directivity
- (iii) Pattern lobes
- (iv) Input impedance.

Or

- (b) Define and describe the following parameters of an antenna : (4 × 4 = 16)

- (i) Radiation pattern
- (ii) Polarization
- (iii) Bandwidth
- (iv) Effective aperture.

12. (a) (i) What is binomial array? (2)
- (ii) Draw the pattern of 10 element binomial array with spacing between the elements of $3\lambda/4$ and $\lambda/2$. (14)

Or

- (b) Derive the expressions for field pattern of broad side array of n point sources.

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) What are the importance of Helical antenna? Explain the construction and operation of Helical antenna with neat sketch.

Or

- (b) Explain the principle of operation of Log periodic antenna with neat schematic diagram.
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.