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**Question Paper Code : 11342**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Sixth Semester

Electronics and Communication Engineering

EC 2353/EC 63 – ANTENNA AND WAVE PROPAGATION

(Regulation 2008)

(Common to PTEC 2353 – Antenna 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. If the radiation resistance of an antenna is 65 ohms and loss resistance is 10 ohms, find its efficiency?
2. Define Half Power Beam Width.
3. State the principle of pattern Multiplication.
4. What are the conditions to obtain end fire array pattern?
5. State Huygen's Principle.
6. What are the features of slot antenna?
7. Mention any two applications of helical antenna.
8. What are the features of Anechoic chamber?
9. What is the critical frequency for reflection at vertical incidence if the maximum value of electron density is  $1.24 \times 10^6 \text{ cm}^{-3}$ ?
10. What is meant by skip distance?

PART B — (5 × 16 = 80 marks)

11. (a) Define and explain in detail the terms "Radiation Resistance", "gain", "directivity", "effective aperture" and "polarization" of an antenna. (16)

Or

- (b) Derive the electric and magnetic field components of Hertzian dipole. (16)

12. (a) Derive the near field and far field electric and magnetic component of a finite length dipole and obtain the radiation pattern for various values of the length. (16)

Or

- (b) For a 2 element linear antenna array separated by a distance  $d = 3\lambda/4$ , derive the field quantities and draw its radiation pattern for the phase difference of  $45^\circ$ . (16)

13. (a) Explain the principle of rectangular horn antenna with a neat sketch. Draw various types of horn structure. (16)

Or

- (b) With neat diagram, explain the principle of parabolic reflector antenna and various types of feed used. (16)

14. (a) With necessary illustrations explain the radiation characteristics of multi element log periodic antenna and mention its possible applications. (16)

Or

- (b) Draw and explain the function of Helical antenna and various modes of radiation. Highlight some of its applications. (16)

15. (a) (i) Explain the structure of the ionosphere with neat diagram. (6)  
(ii) Why do we use high frequency waves in sky wave propagation? Explain the mechanism of propagation. (10)

Or

- (b) (i) Describe the troposphere and explain how ducts can be used for microwave propagation. (8)  
(ii) Explain the term (8)  
(1) Optimum working frequency  
(2) Skip distance  
(3) Virtual height explain the following.