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Question Paper Code : 73461

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

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. A uniform linear array contains 50 isotropic radiation with an inter element spacing of $\lambda/2$. Find the directivity of broadside forms of arrays.

4. What is pattern multiplication and draw the pattern of 2 point sources separated by $\lambda/2$.

5. State Huygen's Principle.

6. What are the features of pyramidal horn antenna?

7. What is the difference between Yagi Uda antenna and log periodic dipole array?

8. Mention the requirements of an ANECHOIC CHAMBER.

9. Find the maximum distance that can be covered by a space wave, when the antenna heights are 60 m and 120 m.

10. A HF radio link is established for a range of 2000 Km. If the reflection region of the ionosphere is at a height of 200 Km and has f_c of 6 MHz, calculate MUF.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the radiation resistance of an Oscillating Electric Dipole. (8)

    (ii) Define and explain the polarization and its significance in antenna analysis. (8)

Or

    (b) (i) State and prove Lorentx Reciprocity Theorem for Antennas. (8)

    (ii) Define:

       (1) Gain

       (2) Beam width

       (3) Antenna Temperature

       (4) Antenna Input impedance. (8)

12. (a) A thin dipole is $\lambda/15$ long. If it has loss resistance of 1.5 Ohms, Calculate:

    (i) Directivity (4)

    (ii) Gain (3)

    (iii) Effective Aperture (3)

    (iv) Beam Solid Angle (3)

    (v) Radiation Resistance. (3)

Or

    (b) Develop a treatise on following forms of arrays: (4 × 4 = 16)

    (i) Linear array

    (ii) Two-element array

    (iii) Uniform array

    (iv) Binomial array.

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)

2 73461

14. (a) With neat diagram explain helical antenna and briefly describe its operation in the axial mode. How does it differ from other antennas?

Or

(b) With neat block diagram explain how Radiation pattern and Gain of an antenna can be measured.

15. (a) (i) Draw the structure of ionosphere and explain the mechanism of ionosphere propagation. (10)

(ii) Explain the effects of magnetic fields on EM wave propagation. (6)

Or

(b) (i) Explain the terms:
(1) MUF
(2) Virtual height
(3) Duct propagation
(4) Skip distance
(5) Fading. (10)
(ii) Explain the mechanism of tropospheric propagation. (6)

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73461