

BT-5 / D-15

ANTENNA AND WAVE PROPAGATION

Paper-ECE-301-E

Time allowed : 3 hours]

[Maximum marks : 100

Note : (i) Answer any 'five' questions, selecting at least one question from each unit.

(ii) All questions carry equal marks.

Unit-I

1. Explain the following antenna parameters :

(i) Radiation pattern

(ii) Effective height

(iii) Gain

(iv) Bandwidth

(v) Radiation resistance.

20

2. (a) Find the effective area of a Hertzian dipole operating at 100 MHz. 5

(b) An antenna whose radiation resistance is 300Ω operates at a frequency of 1 GHz and with a current of 3 amperes. Find the radiated power. 5

(c) Compare radiation and induction fields. 10

Unit-II

3. (a) Describe Principle of Pattern multiplication. Also, give its advantages and disadvantages. 8

(b) Discuss the working of the following :

(i) Folded dipole

(ii) Helical antenna.

6+6=12

(2)

4. Briefly explain the following :

- (i) Array pattern synthesis
- (ii) Yagi-Uda antenna
- (iii) Broadside arrays
- (iv) Chebyshev array
- (v) Biconical antenna.

20

Unit-III

5. (a) Compare the following :

- (i) Lens and Reflector antennas
- (ii) E-plane and H-plane Horns.

6+6=12

(b) Describe the concept of radiation from rectangular aperture.

8

6. Describe the following :

- (i) Broadband antenna
- (ii) Log periodic antenna.

10+10=20

Unit-IV

7. (a) If the critical frequency of an ionised layer is 1.5 MHz, find the electron density of the layer. 4

(b) An HF radio communication is to be established between two points on the earth's surface. The points are at a distance of 2600 km. The height of the ionospheric layer is 200 km and critical frequency is 4 MHz. Find MUF. 8

(c) Explain wave propagation in the ionosphere. 8

8. Write short note on the following :

- (i) Radio noise of terrestrial and extra terrestrial origin
- (ii) Propagation of radio waves.

10+10=20

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