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53 (EC 710) AWPR

2019

## ANTENNA AND WAVE PROPAGATION

Paper : EC 710

Full Marks : 100

Time : Three hours

**The figures in the margin indicate full marks for the questions.**

Answer **any five** questions out of **seven**.

- (a) Define Characteristic impedance. Explain how characteristic impedance functions in a transmission line terminated by a load. 3+7=10
- (b) Explain different regions and shapes of an Antenna which results in proper working of an Antenna. 7
- (c) Define Dipole of an Antenna. 3

Contd.

2. (a) Describe Antenna size depending upon antenna size with respect to its wavelength. 6

(b) Point out the differences between Antenna Conductors and Antenna Insulators. 4

(c) Define Principle Pattern. Also point out the differences between Radiation pattern and Radiation intensity. 10

3. (a) Describe the comparisons between Directive gain and Directivity of an Antenna. 6

(b) Explain why Isotropic Antenna is used in Antenna system. Also find out the total power radiated from Isotropic Antenna placed at the centre of the sphere. 8

(c) Describe Front to Back ratio of an Antenna. Also give the differences between Effective area and Effective length of an Antenna. 4+2=6

4. (a) Define Radiation Pattern. Also explain how radiation pattern is completely related with the field strength of the maximum radiation of the signal in the three coordinate system. 7

(b) Explain the radiation process from a small current element dipole possessing electromagnetic field. 5

(c) Explain how Antenna Feeders are used in reducing the energy losses in the Antenna system. Also explain the various types of Antenna Feeders used in the Antenna system w.r.t its operation of frequency. 1+7=8

5. Explain and find out the power in a uniform plane wave which is necessary to develop a power theorem or Poynting theorem for an electromagnetic wave. 20

6. (a) Explain YAGI-UDA Antenna by showing its radiation pattern, optical equivalent. 10

(b) Point out the differences between Biconical Antenna and Helical Antenna.



- (c) Point out the differences between Tower and Pedestal. 4
7. (a) Find out the fundamental equation for free space propagation. 10
- (b) Explain the structure of Atmosphere and point out the different functions of layers present in the atmosphere. 10

