53 (EC 710) AAWP

2018

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.***

1. *(a)* Define transmission line of an Antenna System. Also, with the help of figure, show the transition region between guided wave and free space wave. 5

(b) Define Characteristic impedance. Explain how Characteristic impedance function in a transmission line terminated by a load. 10

(c) Define Dipole of an antenna. 5

2. (a) Describe Antenna size depending upon antenna size with respect to its wavelength and frequency of the electromagnetic wave transmitting through the antenna system. 6

(b) Compare between Directive gain and Directivity of an antenna. 6

(c) 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

3. (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 coordinated system. 7

(b) Define Front to Back ratio of an antenna. Point out the differences between Effective area and Effective length of an antenna. 5

(c) Define principle pattern. Also point out the differences between Radiation Pattern and Radiation Intensity. 3+5

4. 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

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

(b) Define Array of an antenna. Point out the differences between Broad-side Array and End-fire Array of an antenna. 2+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

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. 6

(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
