53 (EC 710) AAWP

2014

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** questions.*

1. *(a)* Define characteristic impedance ? Explain how characteristic impedance function in a transmission line terminated by a load. 10

   (b) Explain different regions and shape of an antenna which results in proper working of an antenna. 7

   (c) Define Dipole of an antenna. 3

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

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

(c) Define principle pattern. Also point out the difference between Radiation pattern and Radiation Intensity. 10

3. (a) Describe the comparison between Directive gain and Directivity of an antenna. 6

(b) Explain Single wire transmission line depending upon its frequency range. 4

(c) Define Front to Back ratio of an antenna. Also give the difference between Effective Area and Effective length of an antenna. 10

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. 4

(b) Describe radiation process from a half wave dipole ($\lambda/2$ antenna). 8

(c) Define Array of an antenna. Point out the difference between Broadside Array and End fire Arrays of an antenna. 8

6. (a) Explain pattern multiplication of array of an antenna. Also point out the multiplication of field pattern and addition of phase pattern. 7

(b) Explain YAGI-UDA antenna by showing its radiation pattern, optical equivalent. 7

(c) Point out the difference between Biconical antenna and helical antenna. 6

7. (a) Find out the fundamental equation for free space propagation. 7

(b) Explain the structure of Atmosphere and point out the different functions of layers present in the atmosphere. 7

(c) Describe the effect of the earth's magnetic field on ionosphere radio wave. Also show the value of fg by putting the values of m, e and B in its equation. 6