TEC-505 1226 Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | |

B. Tech. III Year (V Sem.)

Odd Semester Examination-2015

ANTENNA AND WAVE PROPAGATION

Time : 3 Hours] *[Maximum Marks :100*

Unit - I

Answer any Four **(4X5=20)**

1. (1) How power gain is different from directive gain for an antenna? Under what conditions are both equal?

(2) Derive relation between Directivity and effective aperture of an antenna.

(3) Calculate the maximum effective aperture of a $\lambda/2$ (half-wave) antenna.

(4) Find the gain, beamwidth and capture area for a parabolic antenna with a 6 meters diameter dish and dipole feed at a frequency of 10 GHz.

(5) Discuss the effects of ground on radiation patterns of vertical and horizontal dipole.

Answer Any Four **(4x5=20)**

2. (1) What are the various types of antenna arrays. Describe each with radiation pattern.

(2) State "Multiplication of pattern "in antenna arrays.

(3) What are the advantages of Chebyshev arrays?

(4) A linear broadside array consists of four equal isotropic inphase point sources with $\lambda/3$ spacing (overall length of the array= λ). Calculate and plot (rough) pattern. Find the directivity and beamwidth.

(5) Describe the principles of End-fire and Broad side arrays.

Answer Any Two **(2x10=20)**

3. (1) Compare grounded antennas with Ungrounded antennas.

(2) Draw the sketch of Yagi-uda array. Prove how the longer antenna behind the main antenna behaves as a reflector and the shorte antenna in front of main antenna act as a director.

(3) i) Explain how a loop antenna may be used for finding directions.

ii) Determine the gain, beamwidth and capture area of a parabolic antenna with 10 m diameter dish and dipole feed at 10 Ghz.

Answer Any Two **(2x10=20)**

4. (1) i) Write a Note on Equivalent noise temperature of antenna

ii) Why circularly polarized antenna are generally used as receiving antennas?

4. (2) An antenna having an effective temperature of 15 K is fed into a microwave amplifier that has an effective noise temperature of 20 K. calculate the available noise power per unit bandwidth at the input for this particular antenna temperature. Calculate the available noise power for a noise bandwidth of 4MHz. Assume $k=1.38 \times 10^{-23}$.

(3) An antenna has a radiation resistance of 72 ohm, a loss resistance of 8 Ohmsand a power gain of 12 db. Determine antenna efficiency and its directivity.

Answer Any Two **(2x10=20)**

5. (1) Briefly describe the composition of ionosphere. Prove that the refractive index of a layer of the ionosphere is given by $n = \sqrt{1 - \frac{81N}{f^2}}$ where N= ionic density

(2) i) Describe the effect of terrain and earth's curvature on ground propagation.

ii) What are different modes of wave propagation?

(3) Explain clearly the concept of wave propagation by ground waves.

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