TEC-505   1207

Odd Semester Examination, 2017-18

B.TECH. (SEMESTER-V)

ANTENNA AND WAVE PROPAGATION

Max Marks: 100

Time: 03:00 Hours

Note: Attempt **all** questions: [5x4]

1.   Attempt **any four** of the following:

   (a)   Write in brief the working of Yagi antenna.

   (b)   How radiation is accomplished? Explain physical concept of radiation in a single wire.

   (c)   Derive relation between directivity and effective aperture of an antenna.

   (d)   The maximum radiation intensity of a 90% efficiency antenna is 200 mw/unit solid angle. Find the directivity and gain.

   (e)   Explain the term antenna impedance and radiation resistance.

                                                                                       [5x4]

2.   Attempt **any four** of the following:

   (a)   Derive the array factor of N element linear array of a uniform amplitude and spacing.

   (b)   What are the advantages of Binomial array? Describe about binomial array in detail.

   (c)   State "multiplication of pattern" in antenna array.

   (d)   What are the advantage of chebyshev array

   (e)   Explain the effect of earth on vertical pattern

                                                                                       [10x2]

3.   Attempt **any two**:

   (a)   Explain how loop antenna may be used for finding direction.

   (b)   Define isotropic radiator. Calculate the directivity of isotropic antenna.

   (c)   Discuss the rectangular and circular aperture antenna in detail.

                                                                                       [P.T.O.]

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4. Attempt **any two**: 10x2]

    (a) Describe the method of measuring the antenna efficiency in detail.

    (b) An antenna having effective temperature of 12 k is fed into a microwave amplifier that has an effective noise temperature of 18 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 4 MHz assume K=1.38*10^{-23}

    (c) Derive the total power radiated by half wave dipole also derive an expression for the gain of it.

5. Attempt **any two** : [10x2]

    (a) Explain.

        i.   Skip distance

        ii.   Optimum working frequency

        iii. Fading

        iv.   MUF

        v.   DUCT propagation.

    (b) Briefly describe the composition of ionosphere, prove that the refractive index of layer of the ionosphere is given by $N = \sqrt{1 - \frac{81n}{f2}}$ where N= ionic density

    (c) What are the different modes of propagation?

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