Reg.no								

B.E / B.Tech DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2011

ELECTRONICS AND COMMUNICATION ENGINEERING BRANCH

VI SEMESTER

EC9354 - ANTENNAS AND WAVE PROPAGATION

Time: 3 hr. Max.Mark:100

Answer ALL Questions

PART – A (10 X 2 =20 MARKS)

1. How is the bandwidth of narrowband antennas and wideband antennas specified?
2. Calculate the maximum effective aperture of a microwave antenna which has a directivity of 900.Frequency of operation is 5GHz.
3. State Babinet's principle and specify where it is applied.
4. Distinguish between uniform and tapered aperture. Give their merits and demerits.
5. Obtain the radiation pattern of 8 element array of isotropic antenna spaced $\lambda/2$ apart using principle of pattern multiplication.
6. Give the working principle of phased arrays.
7. State Rumsey's principle of frequency independence in antennas.
8. While measuring gain of a horn antenna the gain of the oscillator was set for 9.00GHz and the attenuation inserted was found to be 9.8dB. Calculate the gain of the horn. The distance between the two horns was 35cm.
9. Under what circumstances duct propagation will be effective? Give reasons for your answer.
10. A pulse of a given frequency transmitted upward is received back after a period of 5milli seconds. Find the virtual height of the reflecting layer.

PART – B (5 X 16 =80 MARKS)

11. i. Discuss the role of folded dipole in Yagi array. (5)
    ii. Describe how helical antenna works in axial and normal mode. (6)
    iii. Give the radiation mechanism of microstrip antenna. (5)

12. a. Discuss the principle of working of Parabolic reflectors. Explain the various feed techniques , their relative merits and demerits. Discuss the role of f/d ratio in the parabolic reflectors.(f-focal length, D- diameter of reflector)

(or)

12.b.i. Describe the various forms of Horn antenna. Obtain the design equations of Horn antenna. (8)

ii. Find the length L width W and half flare angle θ_E and θ_H of a pyramidal horn antenna for which the mouth height h=10 λ. The horn is fed by a rectangular waveguide with TE_{10} mode. (8)

13. a. Obtain the field strength due to N element linear array and obtain the maxima and minima for end fire configuration.

(or)

13.b.i. Obtain the expression for the directivity of broadside array. (10)

ii. Give the significance of binomial array. Obtain the excitation coefficients for 13 element binomial array. (6)

14. a. Describe the construction design and performance of log periodic dipole array.

(or)

14.b. Describe the procedure for the measurement of i)Antenna gain ii)VSWR

15. a. Draw the structure of atmosphere and ionosphere and explain in detail the various regions of ionosphere.

(or)

15.b.i. Two aircraft are flying at altitudes of 3000m and 5000m respectively. What is the maximum possible distance along the surface of earth over which they can have effective point to point microwave communication? Radius of earth=6.37×10^6metres. (4)

ii. A high frequency radio link has to be established between two points on the earth 200km away. The reflection region of the ionosphere is at a height of 200km and has frequency of 6 MHz. Calculate the MUF for the given path. (6)

iii. A communication link is to be established between two stations using half wavelength antenna for maximum directive gain. Transmitter power is 1KW, distance between transmitter and receiver is 100km. What is the Maximum frequency power received by receiver. Frequency of operation is 100 MHz. (6)

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