Register No: ...……..

**B.E. DEGREE EXAMINATIONS: APRIL/MAY 2011**

Sixth Semester

**ELECTRONICS AND COMMUNICATION ENGINEERING**

U07EC603: Antennas and Wave Propagation

**Time: Three Hours** **Maximum Marks: 100**

**Answer ALL Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. A half wave dipole used at a frequency of 300MHz has a length of -----

   A) 10 meters B) 3 meters C) 1 meters D) 50 centimeter

2. A dipole having a 3 cm length is operated at 1GHz .It having the radiation resistance of

   A) 10Ω B) 14Ω C) 7.89Ω D) 5.49Ω

3. Find the terminal impedance of a two wire folded dipole, having the impedance value of 70+j0Ω.

   A) 280Ω B) 630Ω C) 100Ω D) 50Ω

4. Which of the following antenna gives circular polarization?

   A) Yagi-Uda B) Parabolic reflector C) Helical antenna D) Dipole antenna

5. A rhombic antenna is a type of ----------

   A) Non-resonant antenna B) resonant antenna

   C) Frequency-independent antenna D) Inductive antenna

6. Which of the following antenna is called as the frequency independent antenna?

   A) Folded dipole B) Log-periodic C) Yagi-Uda D) Half wave dipole

7. The power gain of an optimum horn antenna approximately with a square aperture of 10λ on a side is?

   A) 46 dB B) 26.53 dB C) 36.43 dB D) 100dB

8. Which antenna is related to optical devices?

   A) Lens antenna B) Dipole antenna C) Yagi-Uda D) Helical antenna

9. Maximum Usable Frequency is given by

   A) MUF =fc.cosθ B) MUF =fc.secθ C) MUF =fc/secθ D) MUF =fc/tanθ

10. In practice, vertical polarization is employed for the ground wave propagation because

    A) It is difficult to radiate polarized waves

    B) Due to historical reasons

    C) The interference caused to vertically polarized waves is less

    D) The attenuation of vertically polarized waves is less

**PART B (10 x 2 = 20 Marks)**

11. Find the length of half wave dipole at 200MHz.
12. Compute the radiation resistance of an antenna having $\lambda/4$ long.
13. Define beam width.
14. State the principle method of pattern multiplication.
15. What is a travelling wave antenna?
16. What is the effect of decreasing apex angle ($\alpha$) in antennas?
17. State Huygens's principle.
18. What is meant by Lumberg lens?
19. Define skip distance.
20. List out the limitations of space wave propagation.

**PART C (5 x 14 = 70 Marks)**

21. a) (i) Explain in detail about the fields associated with Hertizian dipole? (8)

(ii) Derive the expression for power radiated and radiation resistance of a current element. (6)

**(OR)**

b) (i) Derive the expression for power radiated and find the radiation resistance of a half wave dipole (8)

(ii) Discuss about current distribution that is assumed for wire antennas. (6)

22. a) (i) State and prove reciprocity principle with regard to antennas. (8)

(ii) Write a note on folded dipole. (6)

**(OR)**

b) (i) Explain in detail about the construction, various modes of operation and design procedures of helical antenna.

23. a) (i) With suitable diagrams list out the various design methods of rhombic antennas. (8)

(ii) Enumerate about radiation from a travelling wave on a wire. (6)

**(OR)**

b) (i) Explain the geometry of a Log periodic antenna. Give the design equations and applications of log periodic antennas.

24. a) (i) Derive the expression for radiation from an elemental area of a plane wave. (8)

(ii) With suitable diagrams, explain the various methods of feeding slot antennas. (6)

**(OR)**

b) (i) Discuss on dielectric lens and metal plane lens antennas. (8)

(ii) A 300Ω twin lead transmission line is attached to a biconical antenna. Determine the cone angle that will match the line to an infinite length biconical antenna. (6)

25. a) (i) Derive the expression for refractive index of ionosphere and critical frequency. (8)

(ii) Explain about diversity reception. (6)

**(OR)**

b) (i) Find the expression for calculating field strength at a distance in space wave propagation. (8)

(ii) Write a note on duct propagation. (6)

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