ANNA UNIVERSITY COIMBATORE

B.E / B.TECH. DEGREE EXAMINATIONS : OCTOBER 2009

REGULATIONS – 2007

FOURTH SEMESTER : ELECTRONICS AND COMMUNICATION ENGG.

070290038 - TRANSMISSION LINES AND WAVEGUIDES

TIME : 3 Hours **Max.Marks : 100**

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. Define characteristic impedance of a transmission line.
2. Define standing wave ratio.
3. Design a quarter wave transformer to match a load of 200Ω to a source resistance 500Ω. The operating frequency is 200 MHz
4. What are the characteristics of TEM waves?
5. Define the terms phase velocity and group velocity
6. A rectangular waveguide has a following dimensions l=2.54cm, b=1.27cm, waveguide thickness=0.127m, calculate the cut off frequency TE_{11} mode.
7. What are dominant mode and degenerate modes in rectangular waveguide
8. Define the quality factor of a resonator ?
9. A circular wave guide operated at 11GHZ has the internal diameter of 4.5cm.for TE01mode propagation. calculate λ and λc
10. What is frequency distortion?
11. Calculate the load reflection co-efficient of open and short circuited line?
12. Find the VSWR and a reflection co-efficient of a perfectly matched line with no reflection from load ?
13. Name few applications of half wave line ?
14. What is the cut off frequency of TEM wave?

15. Give the expressions that relate phase velocity(Vp),group velocity(Vg) and free space velocity (c)
16. Why the TE10 mode is launched or initiated in rectangular wave guide using a probe?
17. Why the TE10 wave is called as dominant wave rectangular wave guide?
18. Define the quality factor of cavity resonator?
19. What is cavity resonator?
20. Define damping effect?

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. Derive the expression of attenuation and phase constant after obtaining for characteristic impedance?

22. Derive the expression for the reflection co-efficient in terms of characteristic impedance Z0 and terminal impedance ZR?

23. a Explain.briefly about single stub and double stub matching 6

    b What are the features of quater wave transform? 6

24. a Derive the field components of the wave propagating between parallel planes 6

    b Explain the characteristic of TE and TM waves 6

25. For a frequency of 6GHZ and plane separation of 7cm find the following for the TE mode

    a. cut off frequency
    b. angle of incidence on the plane
    c. phase velocity
    d. group velocity
    e. Is it possible to propagate TE2 mode

26. Derive the expression for wave impedance of TE and TM in a rectangular wave guide?

27. a Derive the solution of electric and magnetic fields of TM wave guided along circular wave guides(7m) 6

    b Derive the TM wave components in circular wave guides using BESSEL function(5m) 6

28. Obtain the expression for resonant frequency of circular cavity resonator.

*****THE END*****