ANNA UNIVERSITY COIMBATORE

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

REGULATIONS – 2007

FOURTH SEMESTER : ELECTRICAL & ELECTRONICS ENGG.

070280025 – NETWORK ANALYSIS AND SYNTHESIS

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

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. Transform the series RLC network, to a network in the Laplace domain assume values.
2. Define resonance frequency and quality factor for an RLC network.
3. What are the advantages of the graph theoretic method of network analysis?
4. What is a fundamental cut–set matrix?
5. What is a two 2–port networks?
6. Express the elements of a T–network in terms of the ABCD parameters.
7. What are the properties of a positive real function?
8. What are the properties of a transfer function?
9. Define Neper and Decibel units for attenuation.
10. Define propagation constant for a network.
11. Draw the Laplace domain representations of an inductor of 2 H having an initial current of 4 mA.
12. Obtain the magnitude and phase response of a step function
13. Define tie–set matrix for a network graph.
14. Discuss the merits of m–derived filters
15. Express Z–parameters in terms of the Y–parameters.
16. What are transmission zeroes? Where do the transmission zeroes occur for a Low Pass Network?

17. Draw the normalized frequency response characteristic of a Butterworth Low
18. Pass Filter and show the effect of increasing the filter order.
19. Define positive real functions
20. Show how you can connect two 2–port networks in parallel.

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. A rectangular voltage pulse of unit height and T seconds duration is applied to a series R-C combination at t=+1. Determine the current in the capacitor as a function of time. Assume the capacitor to be initially charged.

22. Find the Fourier series expansion and the frequency spectrum of the Square wave

23. Plot the bode plot for the given transfer function

$$G(s) = \frac{k(0.5+0.25s)}{s(0.5+0.1s)(0.5+0.05s)}$$

24. Design a m-derived high pass filter having cut-off frequency of 2 KHz. Design impedance of 600 ohms and the resonant frequency 1000Hz

25. Design a band pass filter having a design impedance of 400 ohms and cut-off frequencies f_1= 3khz and f_2= 8KHz

26. Explain in detail the estimation of ABCD parameters of a 2-port network.

27. Explain the following:

i) Necessary and sufficient conditions for PR functions.

ii) Properties of driving point impedance

28. Realize the network in foster form I and II. Given

$$z(s) = \frac{s(2s^2 + 2)}{(s^2 + 2)(s^2 + 4)}$$

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