ANNA UNIVERSITY COIMBATORE

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

REGULATIONS - 2007

FOURTH SEMESTER – ELECTRICAL & ELECTRONICS ENGINEERING

070280025 - NETWORK ANALYSIS AND SYNTHESIS

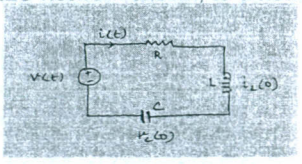
TIME : 3 Hours Max.Marks : 100

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. What do we mean by Network synthesis? How is it different from network analysis?
2. Transform the series RLC network shown, to a network in the Laplace domain



3. Compare natural and forced response in a circuit
4. Find the Laplace transforms of the function: (i) sin3t,(ii) tsin2t
5. List the fundamental difference between an RC and an LC impedance function
6. Define resonance frequency and quality factor for an RLC network.
7. Define poles and zeros in a network function.
8. Write the Fourier transform F (jw) of an even function f (t)
9. List four important properties of a driving point impedance function of an RC network.
10. In terms of ABCD parameters when is a two-port network symmetrical?

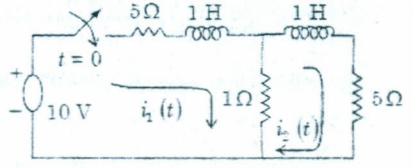
11. Show how you can connect two 2–port networks in parallel
12. What is meant by impedance matching?
13. Draw the ideal characteristics of low pass and high pass filters.
14. Discuss the merits of m–derived filters.
15. Design a high pass filter with a cut-off frequency of 1 KHz with a terminated design impedance of 800 ohms.
16. What are the conditions for characteristic impedances in the pass and stop bands?
17. Define propagation constant for a network
18. Test whether the polynomial $P(s)$ =s4 + s3 + s2 + 2s +2 is Hurwitz.
19. What are the properties of a positive real function?
20. State the properties of RC driving point impedance function.

PART - B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. For the network shown in Figure, find the current $i_2(t)$. The Network is deenergised before $t = 0$.



22. Derive the expression for RLC transient circuit and state its different conditions

23. Draw the pole zero diagram for the given network function and hence obtain $v(t)$

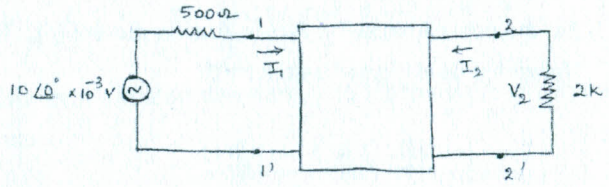
$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

24. Derive expressions for evaluating the driving point impedance at the output port of a network having a source impedance Z_S at the input, in terms of

(i) Z–parameters of the network, and 6

(ii) Y–parameters of the network. 6

25. The hybrid parameters of a two port network shown in Fig are $h11 = 1\ K$; $h12 = 0.003$; $h21 = 100$; $h22 = 50\ \mu V$. Find $V2$ and Z–parameters of the network.



26. Design an M-derived low pass filter (T and p-section) to match a line having characteristic impedance of 500ohms and to pass signals up to I KHz with infinite
attenuation occurring at 1.2 KHz

27. Realize the function z(s) in Foster I and Foster II

$$z(s) = \frac{5s\left(s^2+4\right)}{\left(s^2+1\right)\left(s^2+3\right)}$$

28. Determine if the following function are positive real. Give reasons to justify your conclusions.

$$\frac{4(s^2+1)(s^2+16)}{s(s^2+4)}$$

$$\frac{(s+3)(s+7)}{(s+2)(s+4)}$$

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