Code No. 442/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) III-Semester (CBCS)(Main) Examination, December, 2017

Subject : Network Analysis & Synthesis

Time : 3 hours **Max. Marks : 70**

Note : Answer all questions from Part-A and any Five Questions from part-B

PART – A (20 Marks)

1. Define image parameters and find image parameters in terms of short circuit and open-circuit parameters.
2. For a two port network, Z-parameters are Z_{11}=50 Ω , Z_{12} =Z_{21}=25 Ω and Z_{22} = 30Ω. Compute ABCD parameters of network.
3. Differentiate Active and Passive filter?
4. Design a m-derived low pass filter having a cut-off frequency of 1KHz, design impedance of 400 ohms, and resonant frequency 1100Hz. Obtain T-section filters.
5. The expression of N in a full series equalizer considering Z_1 as inductor and Z_2 as capacitor is?
6. Derive an expression for design impedance.
7. State two properties of the R-L driving point Impedance function.
8. What is the relationship between the transfer function and impulse response? Elaborate.
9. What is positive real functions? Write the properties of positive real functions.
10. Write the properties of RC and RL immittances.

PART – B (50 Marks)

11. a) Find the Z-Parameter of the circuit shown in figure 1.

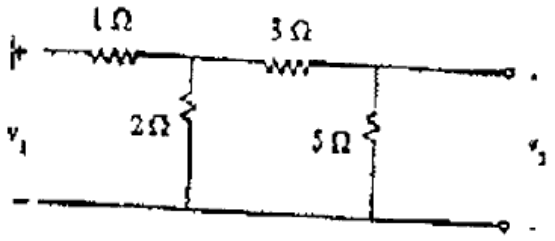

Figure 1

b) Prove that in a parallel –parallel interconnected two networks $[Y_A]$ and $[Y_B]$ respectively, the overall Y-matrix is given as $[Y]=[Y_A]+[Y_B]$.

12. a) Design a prototype band pass filter section having cut-off frequencies of 2000Hz and 5000Hz and nominal characteristic impedance of 600Ω .

b) Explain nominal characteristic impedance R_0 of a band –stop filter or band-reject filter. Derive design parameters R_1 , R_2 , C_1 and C_2 of a band-reject filter in terms of corner frequencies.

13. a) An π attenuator has been shown in figure 2, find Y parameter and draw the equivalent Y-parameter circuit.

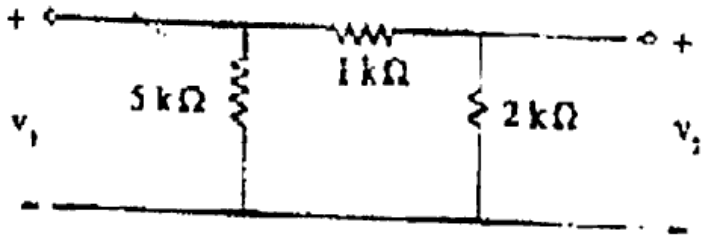

Figure 2

b) Explain the theory of P-type and L-type attenuator?

14. a) What do you mean by simple pole/zero, repeated pole/zero, complex conjugate pole/zero? Find the pole = 200 location of the current transfer ratio I_2/I_1 in the s-domain for the circuit shown in figure 3:

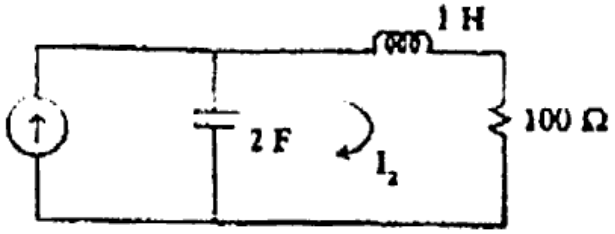

Figure 3

b) The unit-step response of a linear system is r(t) = $\left(2e^{-2t} - 1\right)u(t)$
   i) Find the response r(t) to the input f(t) = t u(t).
   ii) Sketch the response.

15. a) Test whether the polynomial P(s) is Hurwitz or not.
   i) $s^5 + 3s^2 + 2s$ ii) $s^4 + 5s^3 + 5s^2 + 4s + 10$

   b) Find the Cauer forms of the RL impedance functions.
   $Z(s) = 2(s+1)(s+3) / (s+2)(s+6)$

16. a) Derive the Relation between Z and Transmission parameters?

   b) Discuss about the effect of Resistance on filter operation?

17. a) Write about Restriction on location of poles and zeros in driving point function?

   b) The impedance function of a network is given by
   $Z(s) = 6s^3 + 5s^2 + 6s + 4/2s^3 + 2s$. Realise the network?

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