Code No.2904/AICTE

FACULTY OF ENGINEERING
B.E. III Semester (Main)(AICTE) Examination, December 2019
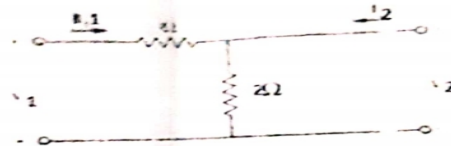
Subject: Network Theory

Time: 3 Hours

Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B

PART – A (10 x 2 = 20 Marks)

1. State Reciprocity Theorem.
2. Explain the reason for using Z-parameters for series-series interconnection of two port networks.
3. Define image and iterative impedance.
4. Find Iterative impedance of the network.

5. What are the advantages of a composite filter?
6. What is the criterion in choosing 'm' value in m-derived filter?
7. Design a symmetrical lattice attenuator with a Ro = 600Ω and attenuation of 60-dB
8. What are the applications of Equalizers?
9. Test Whether the polynomial $P(S) = 2s^4 + 5s^3 + 6s^2 + 2s + 1$ is Hurwitz.
10. List the properties of positive Real function.

PART – B (5 x 10 = 50 Marks)

11. a) Determine the admittance parameters of the T network shown below
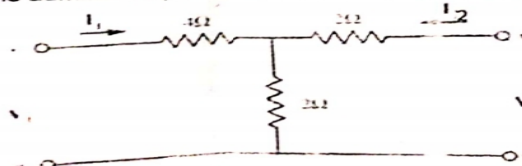
b) Define ABCD parameters of a Two Port network. Establish the relation between Admittance parameters and ABCD Parameters.

12. a) For L-network has series arm impedance-j500Ω and shunt arm impedance is j1000 Ω. Determine its iterative and image impedances

b) A symmetrical π network consists of a series arm of 300 Ω and two shunt arms of 600 Ω each. Determine characteristic impedance and propagation constant of Network.

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13. a) Design a constant 'K' T-section low pass filter having cutoff frequency of 2kHz and nominal characteristic impedance of 600 ohms.
   b) i) What is a high pass filter? In what respects it is different from a low pass filter and derive the equations to find the inductances and capacitances of a constant K high pass filter.

14. a) Design an asymmetrical T-attenator so that it works between a source and load impedance of 250 ohms and 480 ohms respectively and provides an attenuation of 40dB.
   b) In a symmetrical T-attenuator the series arm resistance is 1200 ohms calculate the load resistance if attenuation is 40 db.

15. a) Synthesis Y(S) = S(S+2)/(S+1)(S+2) is Foster Forms.
   b) Synthesize the following LC impedance function using the cauer Form I

$$Z(s) = \frac{s(s^2 + 4)(s^2 + 6)}{(s^2 + 3)(s^2 + 5)}$$

16. a) Determine the transmission parameters in the S domain for the network shown.
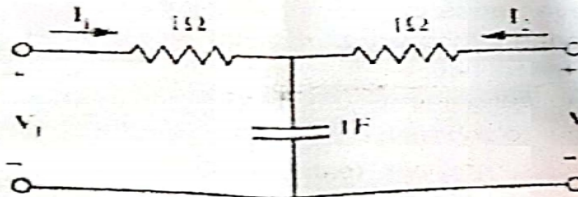
   b) Obtain the expressions for the image and iterative impedances of an asymmetrical Pi-network.

17. a) Answer any two of the following
   i) Calculate the elements of a band elimination filter to suppress harmonic whistles between 8.5 KHz to 9.0 KHz. The filter has to work between terminal impedances of 2000Ω.
   ii) The attenuation and characteristic impedance of a symmetrical lattice attenuator are 40 dB and 450 ohms. Design the network.
   iii) Determine whether the following functions are positive real.
      Z(s) = (s+3)/(s+2)

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