

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)

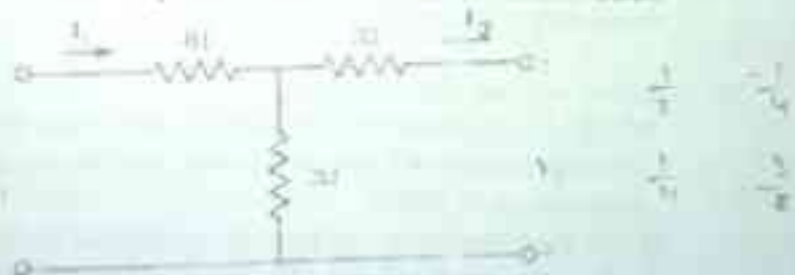
- ✓ 1 State Reciprocity Theorem.
- 2 Explain the reason for using Z-parameters for series-series interconnection of two port networks.
- 3 Define image and iterative impedance.
- ✓ 4 Find iterative impedance of the network.



- ✓ 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 $R_o = 600\Omega$ 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 $-j500\Omega$ and shunt arm impedance is $j1000\Omega$. Determine its iterative and image impedances.
- b) A symmetrical π network consists of a series arm of 300Ω and two shunt arms of 600Ω each. Determine characteristic impedance and propagation constant of Network.

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

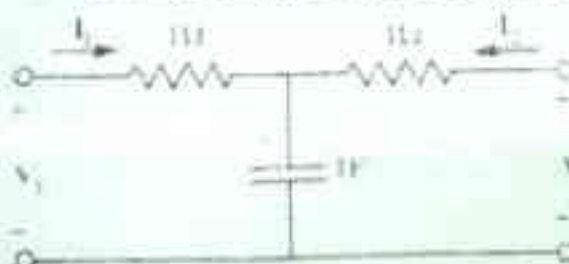
K high pass filter

14. a) Design an asymmetrical T-attenuator so that it works between a source and load impedance of 250 ohms and 450 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 Form I.
 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
- 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.
 - The attenuation and characteristic impedance of a symmetrical lattice attenuator are 40 dB and 450 ohms. Design the network.
 - Determine whether the following functions are positive real.
 $Z(s) = (s+3)/(s+2)$
