

Roll No.

Total Pages : 4

BT-3/D-18**33009****NETWORK ANALYSIS AND SYNTHESIS**

Paper : EE-203(E)

Time : Three Hours]

[Maximum Marks : 100]

Note : There are total *eight* questions. Each question carries equal marks. Attempt *five* questions selecting at least *one* question from each unit.

UNIT-I

1. (a) Explain what do you understand by following terms in relation to networks :
 - (i) Graph.
 - (ii) Tree.
 - (iii) Tie-sets.
 - (iv) Cut sets.10

- (b) Draw an oriented graph for the network of Fig. 1 and develop KVL and KCL in matrix form using fundamental circuit and cutset matrices. 10

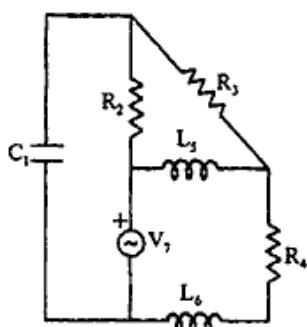


Fig. 1.

Assume all elements to be unity with appropriate units.

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2. Obtain the transient response expressions of R-L series circuit to
 - (a) Step input.
 - (b) Ramp input.20

UNIT-II

3. Find the transfer function $V_2(S)/V_1(S)$ for the network of Fig. 2. 20

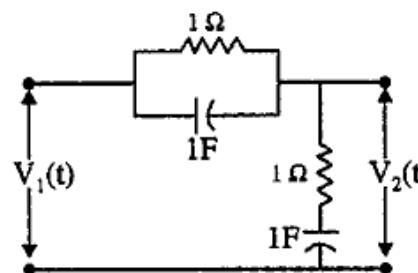


Fig. 2.

4. For the given transfer function of system whose response $y(t)$ to input $x(t)$ is

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

Find $y(t)$, if

- (i) Input is a unit step function.

- (ii) If $x(t) = e^{-5t}$.

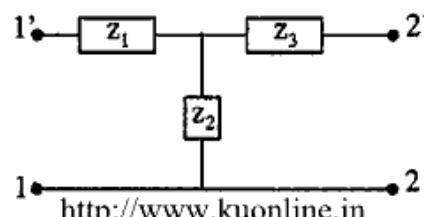
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UNIT-III

5. (a) Define and determine Z and Y parameters for the symmetrical T network shown in Fig. 3. 10



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Fig. 3.

- (b) Determine Y parameters for the network of Fig. 4 using the knowledge gained in part (a). 10

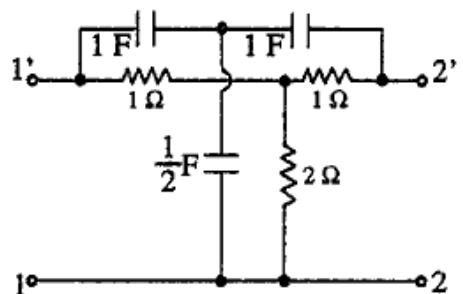


Fig. 4.

6. Suppose two identical sections of the network in Fig. 5 are first obtained and then they are cascaded. Obtain the transmission parameters of cascaded network. 20

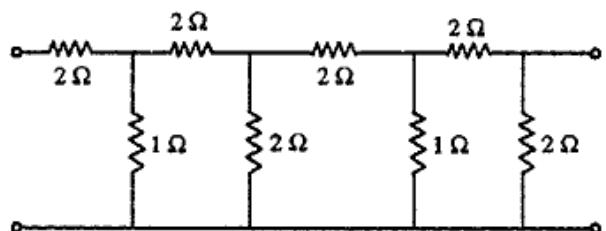


Fig. 5.

UNIT-IV

7. Design a constant K-high pass filter having cut-off frequency of 1 kHz and a load of $600\ \Omega$. Calculate α and β of your filter at 0, 500, 1000, 1500 and 2000 Hz. Derive relations used. 20

8. Obtain the Foster-I and Foster-II forms of network for given impedance function : 20

$$Z(s) = \frac{(s^2 + 1)(s^2 + 3^2)}{s(s^2 + 2^2)}$$

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