TEE-301 202 Printed Pages : 4

Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | | |

Semester: III

B. Tech End Semester Examination Dec 2014

NETWORK ANALYSIS AND SYNTHESIS

Time: 3 Hours MM. 100

Note:- Attempt All Questions. All Questions carry equal marks.

Q1. Attempt any four Questions of the following:- 4x5=20

a) Define the terms: Tree, Co-tree, Tie-set & Cut-set.

b) Explain the concept of duality with the help of suitable example.

c) Write the matrix-node equation using the nodal analysis & the matrix-loop equation using the loop analysis in graph theory

d) Calculate & draw the total number of possible trees for the given reduced incidence matrix:

$$A=\begin{bmatrix} 1 & 0 & 0 \\ -1 & 0 & -1 \\ 0 & 1 & 1 \end{bmatrix}$$

(e) The Z parameters of a circuit are given by $\begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix}$ obtain transmission line parameters

(f) Define the following terms related to a network graph
a) Path b) Loop c) Tree d) Cotree e) Planar Graph

Q2. Attempt any four Questions of the following:- 4x5=20

(a) Determine the condition of reciprocity and symmetry in h parameters.

(b) Check when the function $Z(s) = \frac{2s^2+2s+1}{s^3+s^2+s+2}$ is a positive real function

(c) Discuss the properties of RC Driving point impedance.

(d) State & prove compensation theorem with the help of a suitable example.

(e) Define the terms Gain Margin and Phase margin.

(f) State & prove Milliman's theorem for AC voltage sources.

Q3. Attempt any two questions of the following 2x10=20

(a) For the symmetrical 2-port network shown in Fig.2, find the z-and ABCD-parameters.

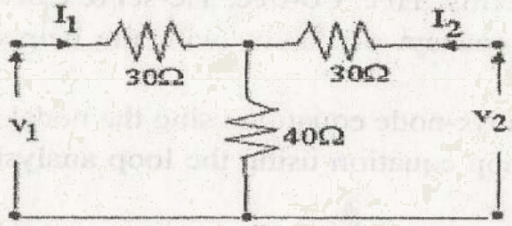

Figure 2

(b) Find the driving-point impedance $Z(s) = K \cdot \frac{N(s)}{D(s)}$, for the network shown in Fig.3. Verify that Z(s) is positive real and that the polynomial D(s) + K.N(s) is Hurwitz.

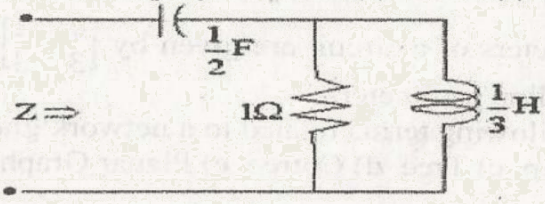

Figure 3.

(c)

Q5. Attempt any two questions of the following 2x10=20

a) Obtain Z-parameters of the network shown in fig.6. Whether the network shown is symmetrical & reciprocal or not.

Q4.

(a)

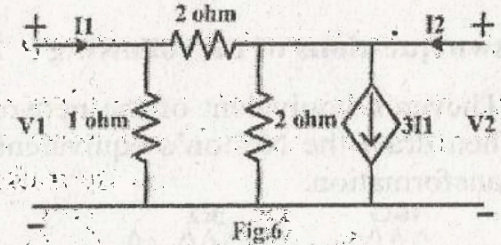

Fig.6

(b) Consider the function $F(s) = \frac{s^2 + 1.03}{s^2 + 1.23}$. Plot its poles and zeroes. Sketch the amplitude and phase for F(s) for $1 \leq \omega \leq 10$.

(b)

(c) Given $F(s) = \frac{6(s+2)(s+4)}{s(s+3)}$, find the continued fraction expansion & hence synthesize the network for the case when:

i. F(s) is an impedance Z(s).

ii. F(s) is an admittance Y(s).

(c)