TEE-301A   1219

Odd Semester Examination 2018-19

B.TECH. (EEE/EN) (SEMESTER-III)

NETWORK ANALYSIS AND SYNTHESIS

Time: 03:00 Hours   Max Marks : 100

Note:- Attempt all questions.

Q1. Attempt any four: (4×5=20)

    a.   Define incidence matrix and also write its properties.

    b.   Differentiate between twig matrix and link matrix with a suitable example.

    c.   Write the properties of RL driving point impedance function.

    d.   What is frequency response?

    e.   Write the concept of complex frequency.

    f.   Differentiate between Ladder and Lattice network

Q2. Attempt any four: (4×5=20)

    a.   Define poles, zeros and pole zero plot.

    b.   How the location of poles affects the system performance ?

    c.   Define positive real function and mention its properties.

    d.   What is the difference between network analysis and network synthesis ?

    e.   Two identical sections of the network shown in Fig. 2e are cascaded. Determine T-parameter of the resulting network :
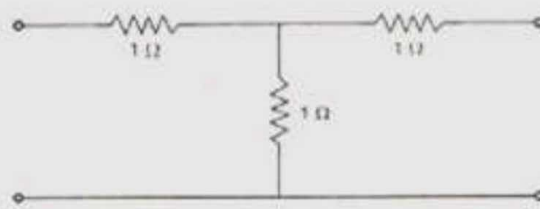
Fig 2.e

f.   Write short note on the following term of networks :

(i)   Transfer function

(ii)   Inverse transform voltage ratio

Q3.   Attempt any two: (2×10=20)

a.   Explain the following term:

(i)   Tree and co-tree

(ii)   Node and branch

(iii)   Twig and chord

(iv)   Incidence matrix

(v)   Tie set and cut set.

b.   Determine the current I for the circuit as shown in Fig. 3b by using Millman's theorem :
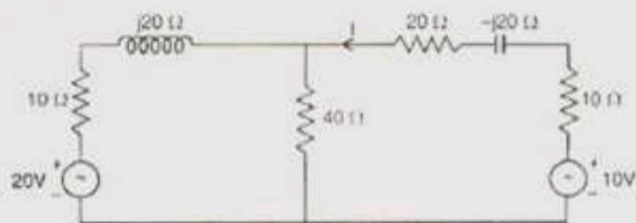

Fig. 3b

c.   State and prove tellegen's theorem with a suitable example.

TEE-301A/4000   (2)

Q4. **Attempt any two:** (2×10=20)

a. Derive transmission parameter in terms of open circuit and short circuit impedance of a two port network.

b. Draw the graph and hence obtain the f-cut set for the given reduced incidence matrix A of graph :

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

c. Show the function $F(s) = s\,(3s+8) / (s+1)(s+3)$ represents an R-L impedance. Synthesize the impedance in foster-I form.

Q5. **Attempt any two:** (2×10=20)

a. Determine the Y-parameter for the network shown in Fig. 5a. Find its equivalent circuit using Y- parameter and find whether the network is (i) reciprocal (ii) symmetrical :
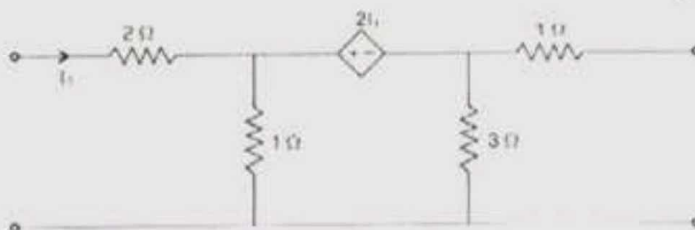

Fig. 5a

b. What are the step to draw the Bode plot ?

c. The current transform in a network is given by the expression, $I(s) = 5s / (s+1)(s+3)$. Draw its pole –zero plot and hence find the time domain response.

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