

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 130404 Roll No.

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B.Tech.

**(SEM. IV) THEORY EXAMINATION 2013-14
NETWORK ANALYSIS AND SYNTHESIS**

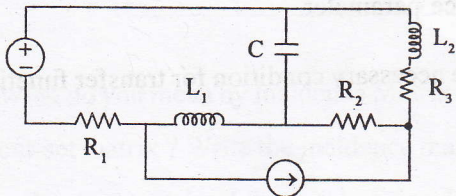
Time : 3 Hours

Total Marks : 100

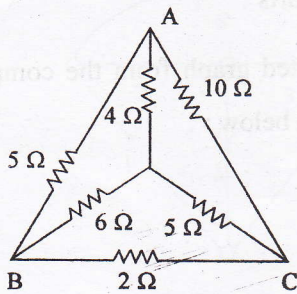
Note :- Attempt all questions.

1. Attempt all parts : (10×2=20)

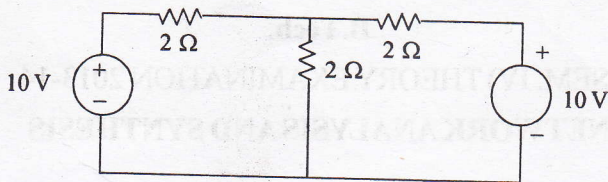
- (a) Define Tress, co-trees, and also write the properties of trees.
- (b) Draw the dual of the ckt shown in fig :



(c) Find the equivalent resistance between A and B.



- (d) Find the current I using superposition theorem.
- (e) Write the statement of the Thevenin and Norton's theorem.
- (f) Verify Tellegen's theorem for the N/W shown in fig :



- (g) Discuss the transient Response of series RLC ckt.
- (h) What do you mean by driving point Impedance and driving point Admittance.
- (i) Define open ckt Impedance parameter and short ckt admittance parameter.
- (j) Write the necessary condition for transfer function.

SECTION-B

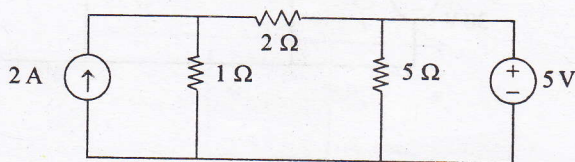
2. Attempt any **three** parts : (3×10=30)
- (a) Draw the oriented graph from the complete Incidence Matrix A_a given below :

Nodes Branches

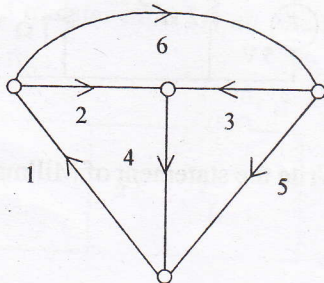
$$\begin{array}{l}
 A \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ -1 & 0 & 1 & 0 & 0 & 1 \end{bmatrix} \\
 B \begin{bmatrix} 0 & 0 & -1 & 1 & 0 & 0 \end{bmatrix} \\
 C \begin{bmatrix} 1 & 1 & 0 & -1 & 1 & -1 \end{bmatrix} \\
 D \begin{bmatrix} 0 & -1 & 0 & 0 & -1 & 0 \end{bmatrix}
 \end{array}$$

From the graph drawn, find the the no. of possible trees and co-trees and draw them.

- (b) Write the statement of superposition theorem. Using the superposition, determine the current, through 5Ω resistor in ckt shown :



- (c) What do you mean by Incidence Matrix tie-set matrix, and cut-set matrix ? Write the incidence matrix, tierset matrix and cut set matrix of the graph shown in fig :



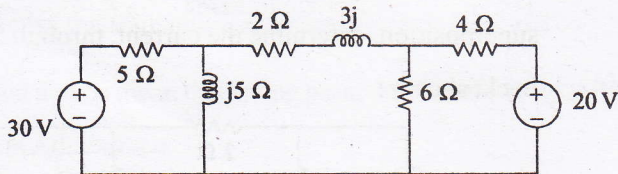
- (d) What do you mean by steady state Response and Transient Response ? Discuss the transient Response series RL ckt.

SECTION-C

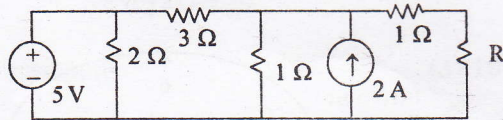
Note :- Attempt all questions from this Section. (5×10=50)

3. Attempt any one part : (1×10=10)

- (a) Using the superposition theorem, calculate the current through the $(2 + 3j) \Omega$ impedance branch of the ckt shown if fig :



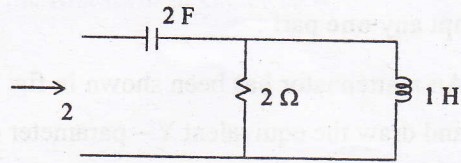
- (b) (i) Find the value of R in the ckt, such that maximum power transfer takes place. What is the amount of this power ?



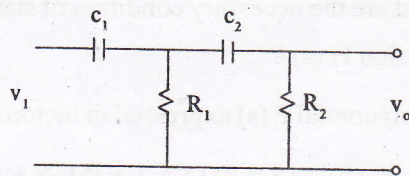
- (ii) Write the statement of Millman theorem.

4. Attempt any one part : (1×10=10)

- (a) What do you mean by driving point Impedance ? Write different properties of driving point Impedance. Find the driving point Impedance of the following N/W :

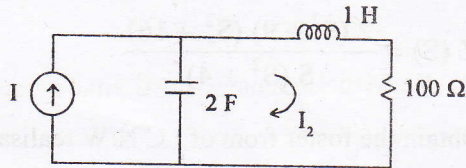


- (b) What is the significance of pole zero plot ? Find the expression of voltage transfer ratio for the N/W shown in fig :

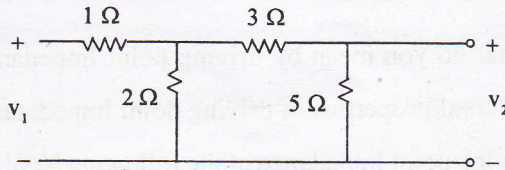


5. Attempt any one part : (1×10=10)

- (a) What do you mean by simple pole/zero repeated pole/zero, complex conjugate pole/zero ? Find the pole = 200 location of the current transfer ratio I_2/I_1 in the s-domain for the ckt shown in fig :

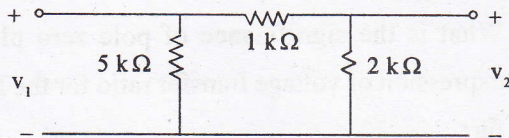


(b) Find the z-parameter for the ckt shown in fig :



6. Attempt any one part : (1×10=10)

(a) An π attenuator has been shown in fig; find Y parameter and draw the equivalent Y – parameter ckt :



(b) What are the necessary condition of stability of a network function $H(s)$?

A polynomial $P(s)$ expressed in factored form is given by

(i) $P_1(S) = (S + 2)(S + 1 + j5)(S + 1 - j5)$

(ii) $P_2(S) = (S - 2)(S + 1)(S + 3)$

Check whether the polynomial are Hurwitz or not.

7. Attempt any one part : (1×10=10)

(a) The driving point Impedance of a one-point LC N/W is given by :

$$Z(S) = \frac{2(S^2 + 9)(S^2 + 16)}{S(S^2 + 4)}$$

Obtain the foster from of LC N/W realisation.

(b) A driving point Impedance is given by

$$Z_{LC} = \frac{S(S^2 + 4)(S_2 + 6)}{(S^2 + 1)(S^2 + 5)}$$

Obtain the first form of Cauer N/W.