FirstRanker.com
Firstranker's choice


Paper ID: 2005 Roll No.

**B. Tech.**

**(SEM. III) THEORY EXAMINATION 2017-18**

**NETWORK ANALYSIS AND SYNTHESIS**

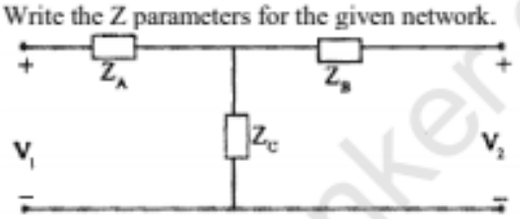
***Time: 3 Hours*** ***Total Marks: 70***

**Note: 1.** Attempt all Sections. Assume missing data if any.

## SECTION A

**1. Attempt *all* questions in brief.** **2 x7 = 14**

a. Write two properties of Complete Incidence matrix.
b. Write Hybrid parameters in terms of Z parameters.
c. State two properties of the R-L driving point Impedance function
d. Describe the following: Tree, Co-Tree, Twig, Link, Cut-set and Tie set.
e. State and describe the properties of RL and RC DPI Network.
f. State and describe thevenin theorem with suitable example.
g. Describe complex frequency in brief.
h. Write the Z parameters for the given network.



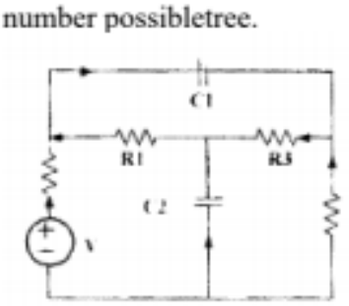

## SECTION B

**2. Attempt any *three* of the following:** **7 x 3 = 21**

a. For the given reduced incidence matrix. Draw thegraph and hence obtain the f-cutset matrix

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

b. For the network shown in Fig below drawthe directed graph. And also find number possibletree.

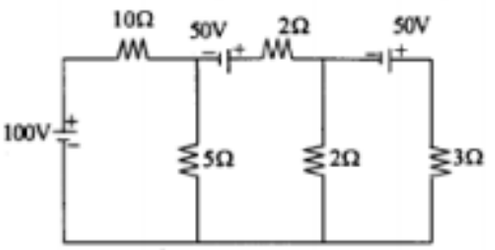




FirstRanker.com
Firstranker's choice
www.FirstRanker.com

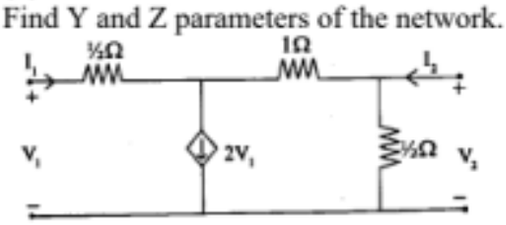
FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

c. Find current through 50 resistor using Thevenin's theorem.




d. Test whether the polynomial P(s) is Hurwitz or not.
(i) *s*5 + 3s2 + 2s
(ii) s4 + 5s3 + 5s2 + 4s + I 0.

e. Find Y and Z parameters of the network.




## SECTION C

**3. Attempt any *one* part of the following: 7 x 1 = 7**

(a) State the properties of RL driving point impedance function .Also realize the given network impedance function using Foster form I
Z(s)= (s+l)(s+3) / (s+2)(s+4)

(b) Explain the advantage of active filter in comparison to passive filter in detail.

**4. Attempt any *one* part of the following: 7 x 1 = 7**

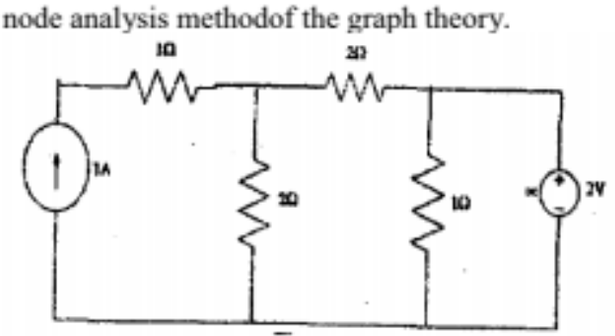
(a) For the given network function, draw the pole zerodiagram and hence obtain the time response I(t)

$$I(s) = \frac{5s}{(s+1)(s^2+4s+8)}$$

(b) Design constant K low pass T and πsectionfilters to be terminated in 600 Ω having cut-offfrequency 3 kHz.

**5. Attempt any *one* part of the following: 7 x 1 = 7**

(a) Determine the currents in all the 'branches of thenetwork shown in fig.S using node analysis methodof the graph theory.






FirstRanker.com
Firstranker's choice
www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com

(b) Explain following terms with reference to network topology www.FirstRanker.com

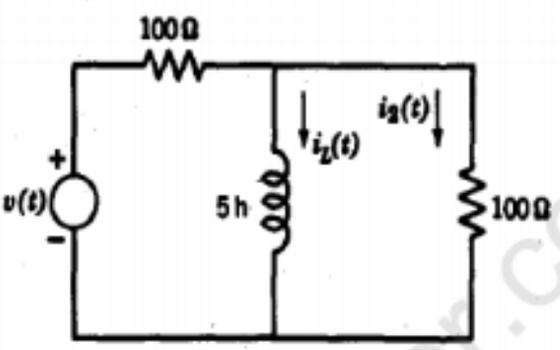
(i) Tree
(ii) Co-tree
(iii) Incidence matrix
(iv) Oriented graph
(v) Twig and link

**6. Attempt any *one* part of the following: 7 x 1 = 7**

(a) Sketch the following signals:-
i). $t^2[U(t-1)-U(t-3)]$

ii). (t-4)[U(t-1)-U(t-4)]

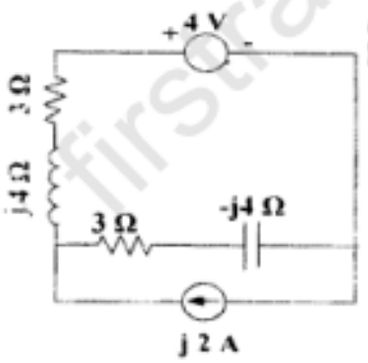
(b) In the circuit shown v(t) =2u(t) and *iL(O-)* = 2 amps. Find andsketch l2(t).




**7. Attempt any *one* part of the following: 7 x 1 = 7**

(a) State and prove the maximum power transfertheorem applied to the AC circuits.

(b) Determine the current in capacitor C by the principleof superposition of the network shown below






FirstRanker.com
Firstranker's choice
www.FirstRanker.com