



# VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test - II - May 2023

: B.Tech (ECE/ECM)	Semester	: Winter 2022-23
: Circuit Theory	Code	: BECE203L
: Dr. Niraj Kumar Dr. Anith Nelleri Dr M.Saranya Nair Dr. Kalaiyanan K Prof. Hemavathy S	Slot	: AI+TAI+TAII
	Class Nbr(s)	: CII2022232300112 CII2022232300113 CH2022232300114 CH2022232300115 CH2022232300119
: 90 Minutes	Max. Marks	: 50

Answer ALL the questions

Question Description

Marks

Determine the branch voltages, currents and the loop equations using equilibrium [12] equations for the network shown in Fig.1 using a tie-set schedule. Consider the branches 1,2,3 and 6 as twigs for the design of the tree.

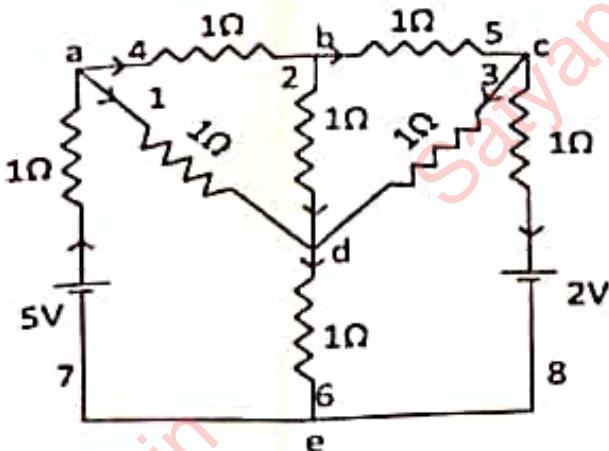
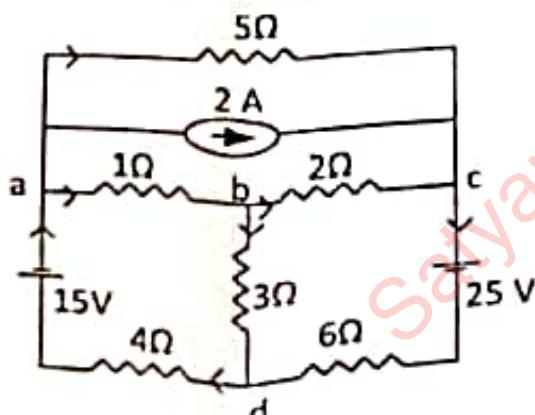


Fig. 1

Draw the oriented graph of the circuit shown in Fig.2. Determine the number of tree, [8] links and incidence matrix. Also draw all the possible trees of the graph.



Calculate the Y-parameters of the two-port network shown in Fig.3.

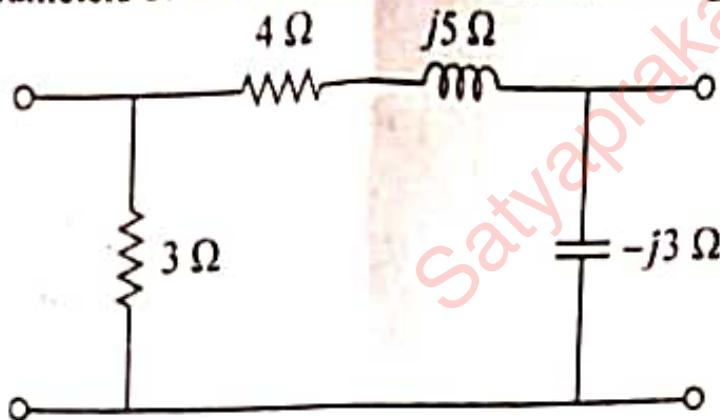


Fig.3

Consider a two-port network as shown in Fig. 4, whose h-parameters are as follows:  $h_{11} = 500 \text{ ohm}$ ,  $h_{12} = 1.5 \times 10^{-3}$ ,  $h_{21} = 75$ , and  $h_{22} = 15 \text{ mS}$ . Determine the value of  $V_2$  and  $I_2$ .

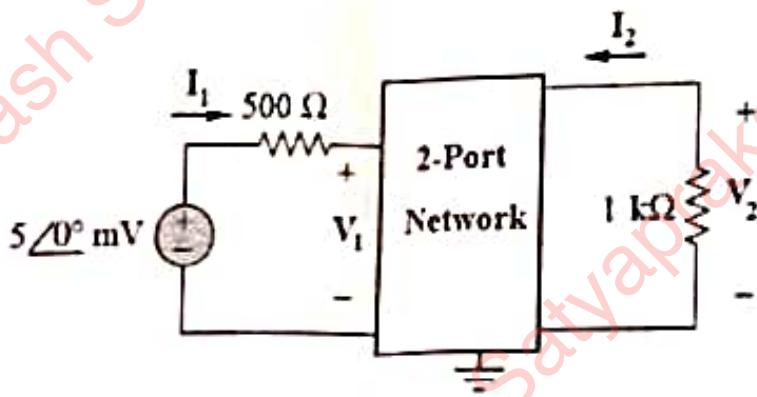


Fig. 4

The two port networks of Fig. 5(a) and Fig. 5(b) are connected in series. Determine the admittance parameters for the series connection by first finding the z parameters of the individual networks.

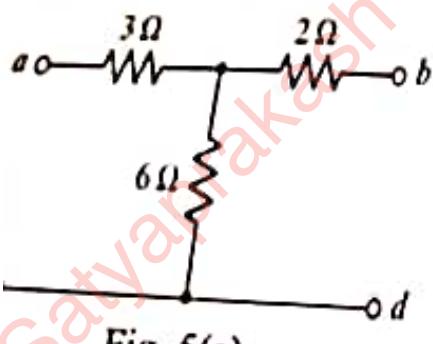
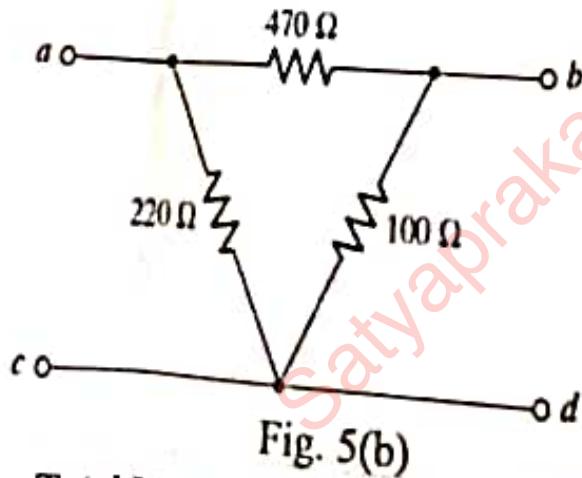


Fig. 5(a)



Total Marks

VIT<sup>TM</sup>Vellore Institute of Technology  
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## Continuous Assessment Test - II - May 2023

Programme	B.Tech (ECE)	Semester	Winter 2022-23
Course	Circuit Theory	Code	BECE203I
Faculty	Dr. ASHISH KUMAR Dr. KRITHIKA ALIAS ANBU DEVI M Prof. SRINIVASAN R Dr. NIRAJ KUMAR Dr. USHA RANI S Dr. SARANYA NAIR M	Slot	A2+TA2+TAA2
Time	90 Minutes	Class Nbr(s)	CH2022232300116 CH2022232300117 CH2022232300118 CH2022232300120 CH2022232300121 CH2022232300122
		Max. Marks	50

Answer ALL the questions

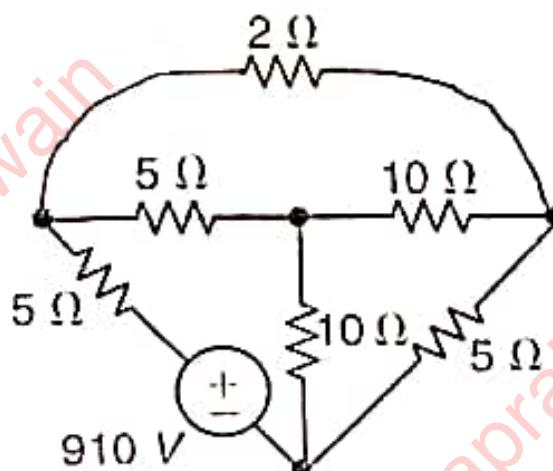
Q.No.	Sub. Sec.	Question Description	Marks
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1 Draw the directed graph. Determine and draw the number of all possible trees from the given incidence matrix.

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

[8]

3 For the resistive network shown in Fig.1, write a cut-set schedule and equilibrium equations on voltage basis. Hence obtain values of branch voltages and branch currents.

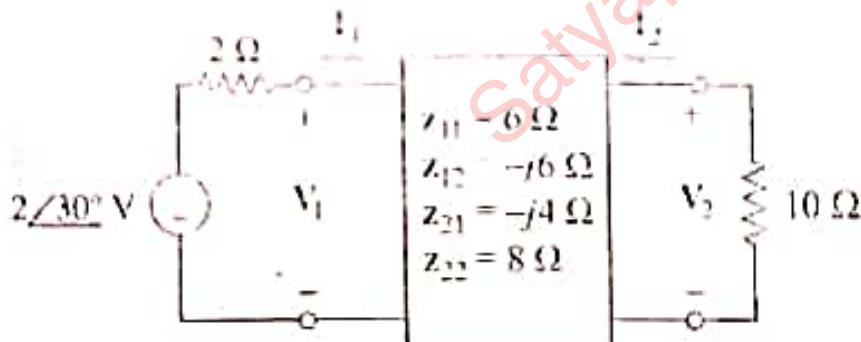


[12]

Fig.1

3

Calculate the incoming currents from port 1 ( $i_1$ ) and port 2 ( $i_2$ ) in the circuit of Fig.2.

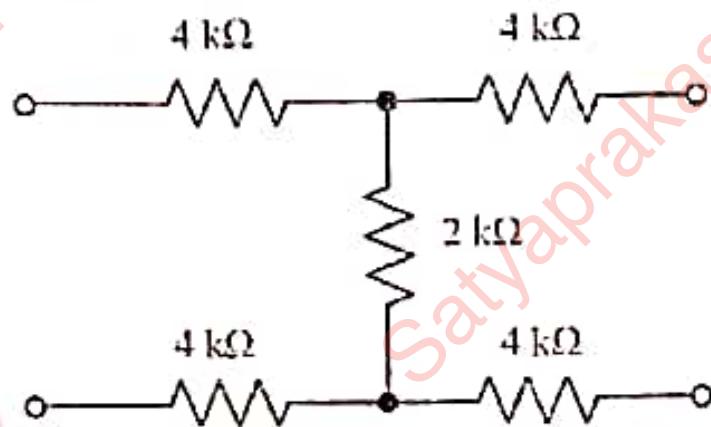


[10]

4

Consider the two-port network shown in Fig. 3, determine the following.

- $h_{11}$
- $h_{12}$
- $g_{21}$
- $g_{22}$



[10]

5

A two-port network with Z-parameters ( $Z_{11} = 25 \Omega$ ,  $Z_{12} = 20 \Omega$ ,  $Z_{21} = 5 \Omega$ ,  $Z_{22} = 10 \Omega$ ) is connected in parallel with another network with its Z parameters ( $Z_{11} = 50 \Omega$ ,  $Z_{12} = 25 \Omega$ ,  $Z_{21} = 25 \Omega$ ,  $Z_{22} = 30 \Omega$ ). Find the Admittance (Y) parameters of the overall network.

[10]

Total Marks

[50]



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[VIT-C 27 \(Satya Helpzz\)](#)

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