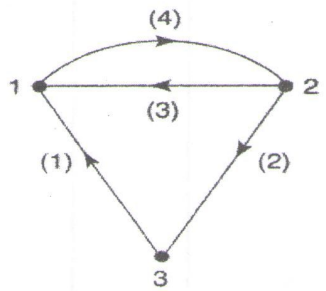
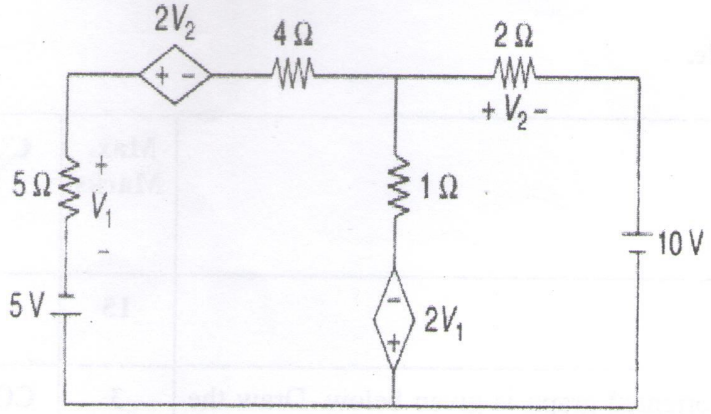
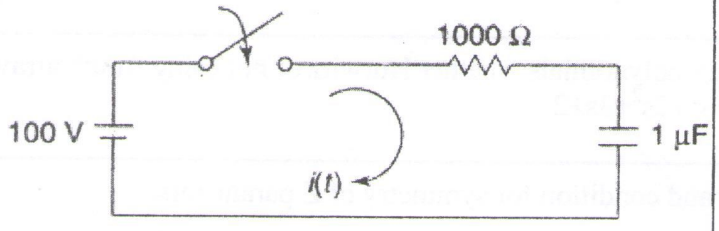
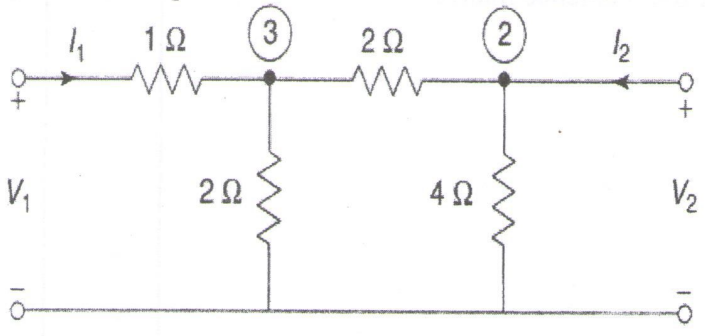
K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

03-02-2023

Nov – Dec 2022 (Jan 23-DSY)
(B.Tech / M.Tech.) Program: B.Tech (Electronics and Telecommunication)
Examination: SY Semester: III
Course Code: EXC305 and Course Name: Electrical Network Theory
Duration: 02 Hours **Max. Marks: 45**

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q1	**Solve any 5 questions out of six.**	**15**		
i)	The reduced incidence matrix of an oriented graph is given below. Draw the oriented graph. $A=\begin{bmatrix} 0 & -1 & 1 & 1 & 0 \\ 0 & 0 & -1 & -1 & -1 \\ -1 & 0 & 0 & 0 & 1 \end{bmatrix}$	3	CO2	Ap
ii)	Test the following polynomials whether Hurwitz or not using Routh array. $P(s)= s^4+s^3+2s^2+3s+2$	3	CO5	Ap
iii)	Write equations and condition for symmetry of Z parameters.	3	CO4	R
	For the given the oriented graph write the incidence matrix. 	3	CO2	Ap
v)	Obtain the pole zero plot of the following function. $F(s) = \frac{s(s+2)}{(s+1)(s+3)}$	5	CO5	Ap

vi)	State Thevenin's theorem with diagram.	3	CO1	R
Q.2	**Solve any three questions out of four.**	**15**		
i)	Find the mesh currents in the network shown in Figure using mesh analysis. 	5	CO1	Ap
ii)	In the network shown, the switch is closed at t=0. With the capacitor uncharged, *find value for* i, $\frac{di}{dt}$ *and* $\frac{d^2i}{dt^2}$ *at* $t = 0^+$. 	5	CO3	Ap
iii)	Determine the Y parameters for the network shown. 	5	CO4	Ar
iv)	Test whether given function is positive real function? $F(s) = \frac{s^2 + 6s + 5}{s^2 + 9s + 14}$	5	CO6	Ap

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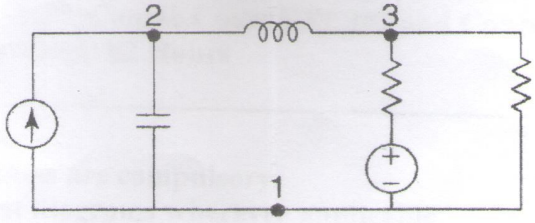
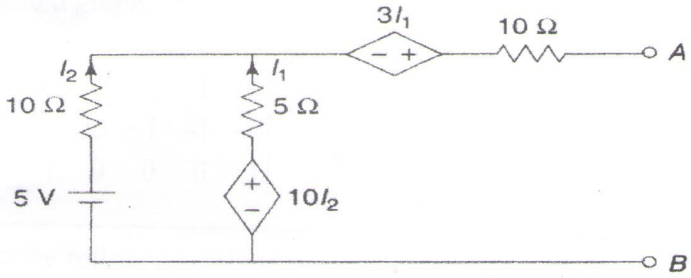
08-02-2023

Q.3	**Solve any three questions out of four.**	**15**		
i)	How many trees are possible for the graph of the given network? 	5	CO2	Ap
ii)	Test the following polynomials whether Hurwitz or not $P(s) = S^4+7S^3+6S^2+21S+8$ is Hurwitz? (Routh Array method)	5	CO5	Ap
iii)	Find Norton's equivalent network across terminals A and B of the following network. 	5	CO1	Ap
iv)	Test the following polynomials whether Hurwitz or not using continued fraction expansion. $P(s)= s^4+s^3+5s^2+3s+4$	5	CO5	Ap

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