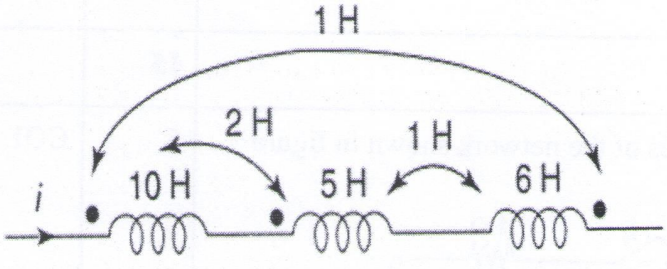
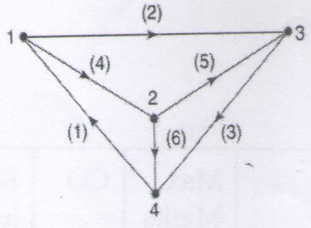
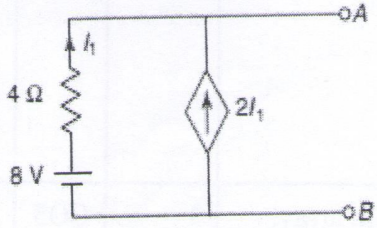
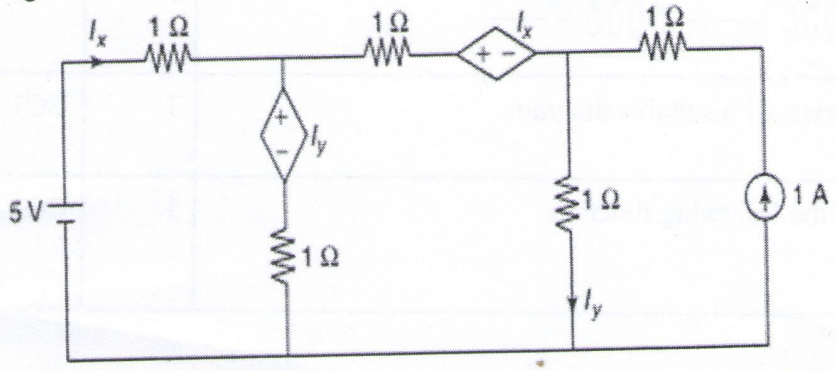
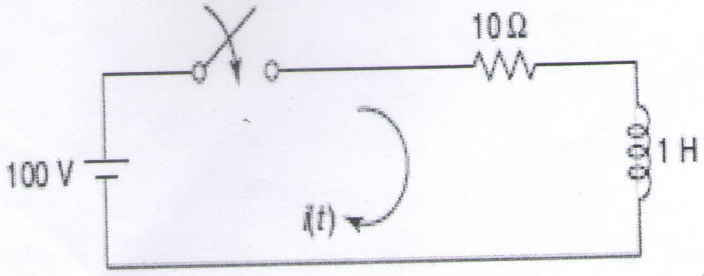
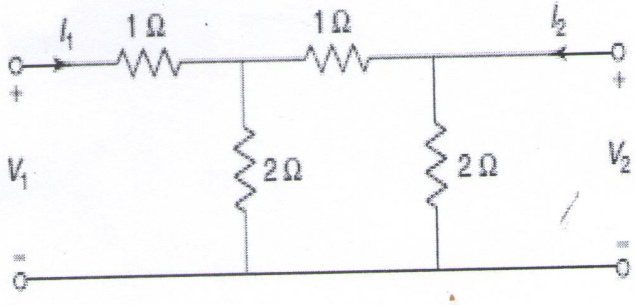
K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Supplementary Examination August 2023
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
Q 1	**Solve any 5 questions out of six.**	**15**		
i)	Write equations and condition for symmetry of Z parameters.	3	CO4	R
ii)	The reduced incidence matrix of an oriented graph is given below. Draw the oriented graph. $A=\begin{bmatrix} 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -1 & -1 \\ -1 & 0 & 0 & 0 & 1 \end{bmatrix}$	3	CO2	Ap
iii)	Test the following polynomials whether Hurwitz or not using Routh array. $P(s)= s^4+s^3+2s^2+3s+2$	3	CO5	Ap
iv)	Find the equivalent inductance of the network shown in Figure. 	3	CO1	Ap
v)	State the superposition theorem with suitable diagram.	3	CO1	R
vi)	Obtain the pole zero plot of the following function. $F(s)=\frac{S(S+1)}{(s+2)^2(s+3)}$	3	CO5	Ap

Q.2	**Solve any three questions out of four.**	**15**		
i)	The graph of a network is shown in Figure, Write the (a) incidence matrix, (b) tieset matrix, and (c) f-cutset matrix. 	5	CO2	Ap
ii)	Test the following polynomials whether Hurwitz or not is Hurwitz? (Use Routh Array method) $P(s) = S^4+7S^3+6S^2+21S+8$	5	CO5	Ap
iii)	Find Thevenin'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. $P(s)=s^4 + 7s^3 + 6s^2 + 21s + 8$	5	CO5	Ap
Q.3	**Solve any three questions out of four.**	**15**		
i)	Find the mesh currents in the three meshes of the network shown in figure using mesh analysis. 	5	CO1	Ap

ii)	Test whether given function is positive real function? $F(s)=\frac{2s^3+2s^2+3s+2}{s^2+1}$	5	CO6	Ap
iii)	In the network shown, the switch is closed at t=0. With zero current in the inductor, Find the values of i, di/dt and d^2i/dt^2 at $t=0^+$ 	5	CO3	Ap
iv)	Find the Z parameters for the network shown. 	5	CO4	Ap

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