U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

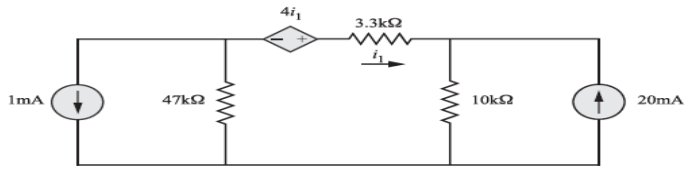
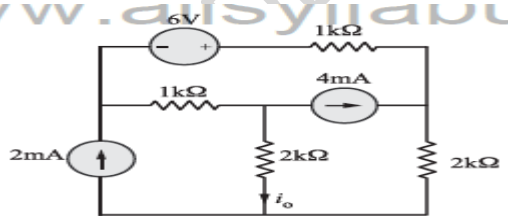
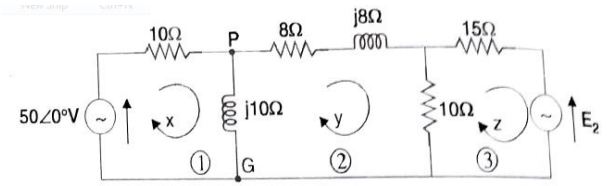
Autonomous Institute Affiliated to VTU

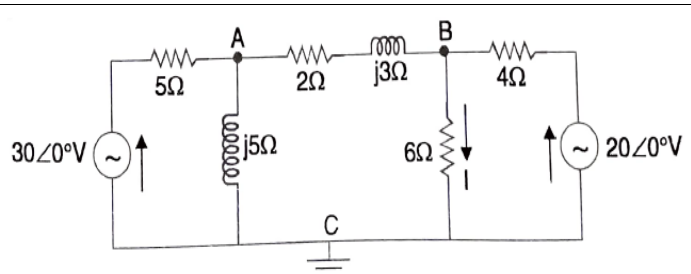
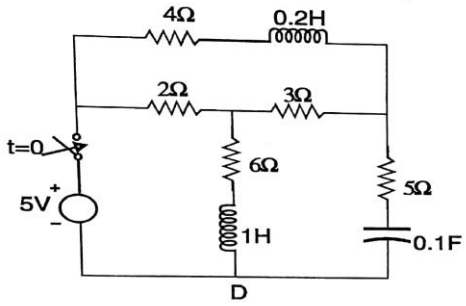
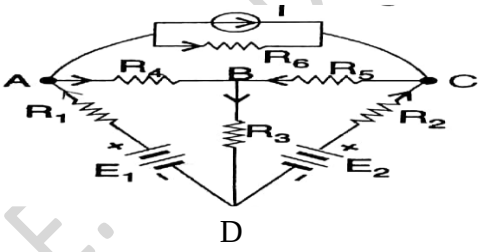
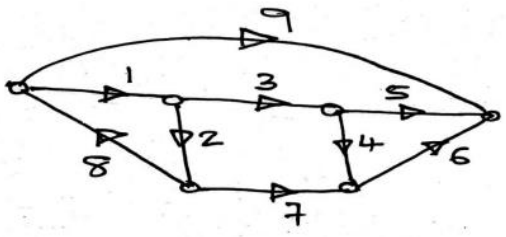
January / February 2025 Semester End Main Examinations

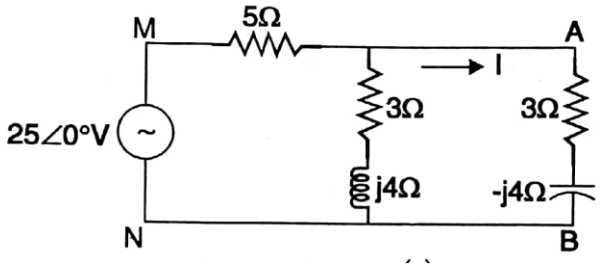
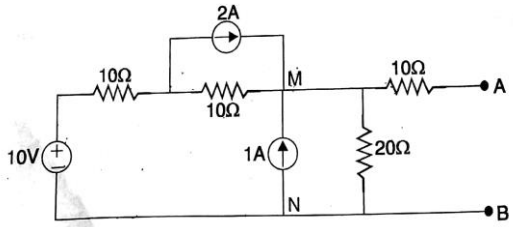
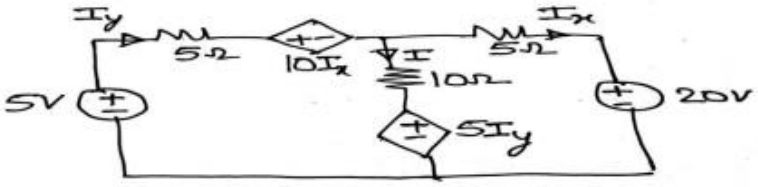
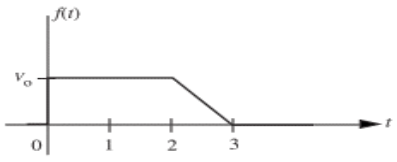
Programme: B.E. **Semester: III**
Branch: ES Cluster (EEE/ET/ECE/EIE/MD) **Duration: 3 hrs.**
Course Code: 19ES3CCECA **Max Marks: 100**
Course: Electrical Circuit Analysis

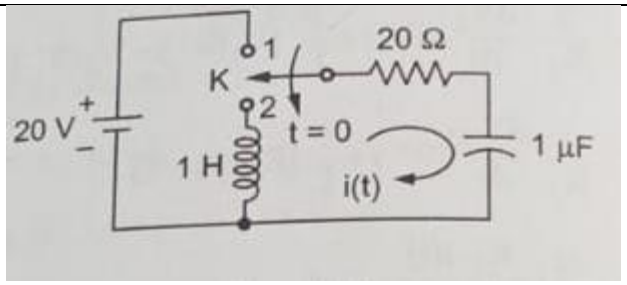
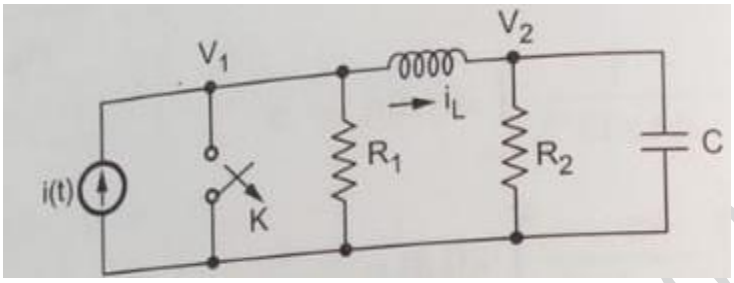
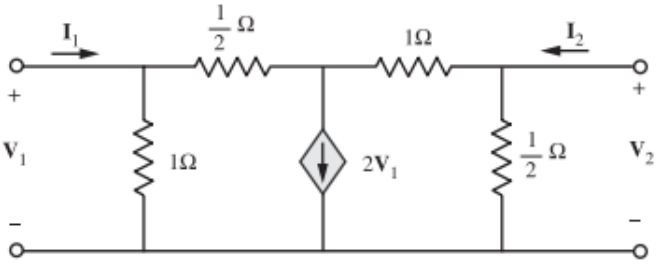
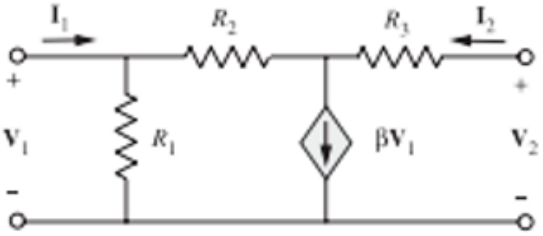
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)	Determine the current 'i_1' using source transformation for the circuit shown Figure 	CO2	PO1	**08**
	b)	Apply supermesh concept, determine the current 'I_0' 	CO2	PO1	**06**
	c)	Derive the expression for star to delta converter	CO1	PO1	**06**
		OR			
2	a)	In the circuit shown, determine the value of 'E_2' such that the current through the (8+ j8) Ω impedance is zero 	CO2	PO1	**10**
	b)	In the network shown in figure, find the current 'I' by node-voltage method	CO2	PO1	**10**

						
			UNIT - II			
3	a)		Derive the expression for resonant frequency in terms half power frequencies.	*CO2*	*PO2*	**08**
	b)		Construct the dual of the network shown in the figure 	*CO2*	*PO2*	**06**
	c)		For the network shown in figure draw the network graph, select a tree and write a tie-set schedule. 	*CO2*	*PO2*	**06**
			OR			
4	a)		A series RLC network has R=10 Ω, L=0.3H , C=100μF. Determine the following (i) resonant frequency (ii) bandwidth (iii) Quality factor (iv) Half power frequencies	*CO2*	*PO2*	**10**
	b)		Selecting 1,2,3,4 and 5 as tree branches for the graph shown in figure 4b Obtain Tie- set matrix, Cut –set matrix and corresponding equations 	*CO2*	*PO2*	**10**

			UNIT - III			
	5	a)	In the network shown in figure, apply the reciprocity theorem to determine the current 'I' in (3-j4) impedance shown network. 	*CO2*	*PO2*	**10**
		b)	Find the thevenins equivalent circuit at the terminals 'AB' for the network shown in figure and hence determine the power dissipated in a5 ohm resistor connected between A and B. 	*CO2*	*PO2*	**10**
			OR			
	6	a)	State and Prove maximum power transfer theorem	*CO2*	*PO2*	**10**
		b)	Find Ix using thevenin's theorem for the circuit shown in fig 6b.  fig 6b.	*CO2*	*PO2*	**10**
			UNIT - IV			
	7	a)	State and prove initial value and final value theorem	*CO3*	*PO1*	**10**
		b)	Find the Laplace transform of the waveform shown in figure 	*CO3*	*PO2*	**10**
			OR			
	8	a)	In the circuit as shown in the Fig, the switch K is changed from position 1 to 2 at t=0. The steady state having been reached before switching find values of i(t),di(t)/dt and $d^2i(t)/d(t^2)$ at $t=0^+$.	*CO3*	*PO2*	**10**

						
		b)	The network shown in figure has two independent node pairs of the switch K is opened at t=0, Calculate the following quantities at t=0 i)V_1 ii)V_2 iii)dV_1/dt iv)dV_2/dt 	*CO3*	*PO2*	**10**
			UNIT – V			
	9	a)	Determine the y-parameters for the two-port network shown in Figure 	*CO4*	*PO2*	**10**
		b)	Define Z parameter. Derive h parameter in terms of Z parameter	*CO4*	*PO1*	**10**
			OR			
	10	a)	Define ABCD parameter. Derive h parameter in terms of T parameter	*CO4*	*PO1*	**10**
		b)	Determine the z parameters for the two port network shown in Figure. 	*CO4*	*PO2*	**10**

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