U.S.N.										

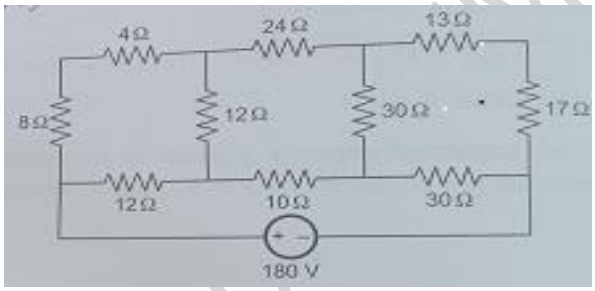
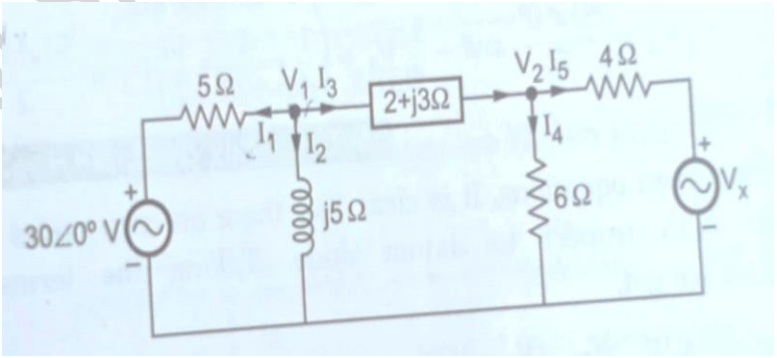
B.M.S. College of Engineering, Bengaluru-560019

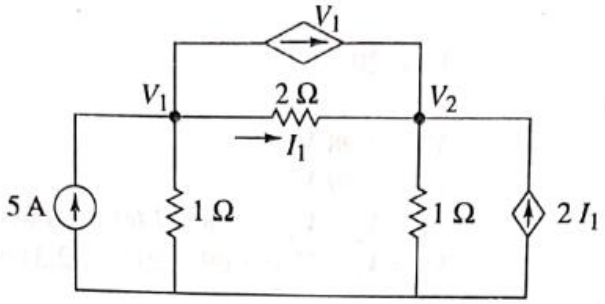
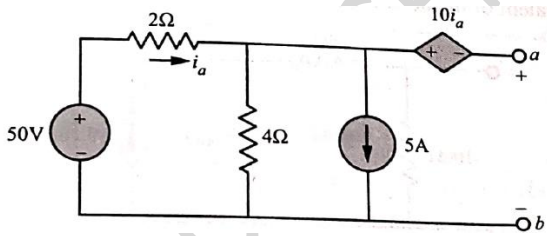
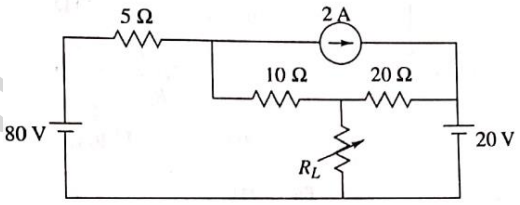
Autonomous Institute Affiliated to VTU

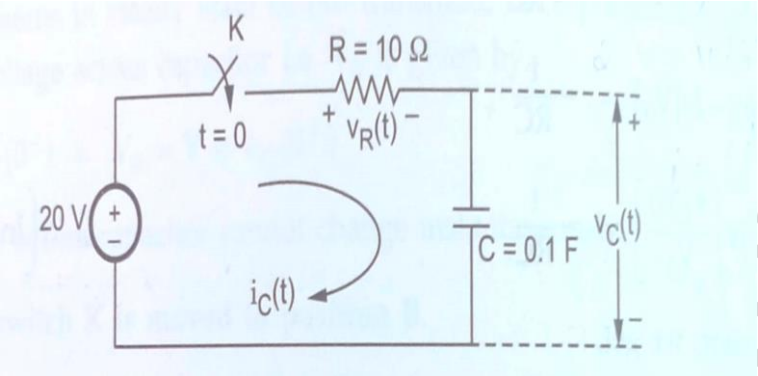
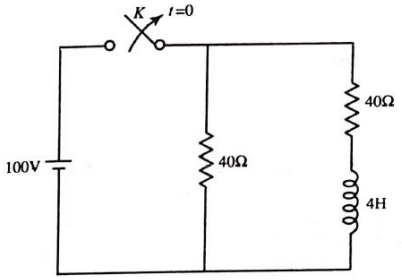
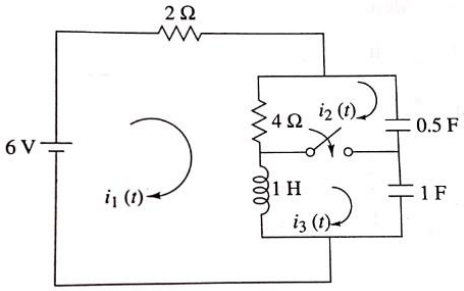
April 2024 Semester End Main Examinations

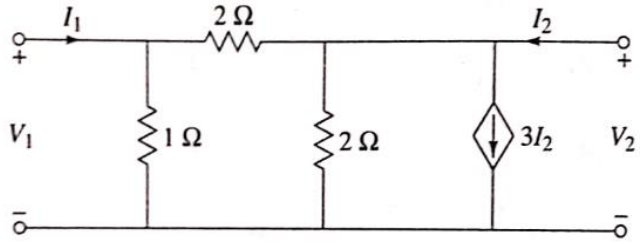
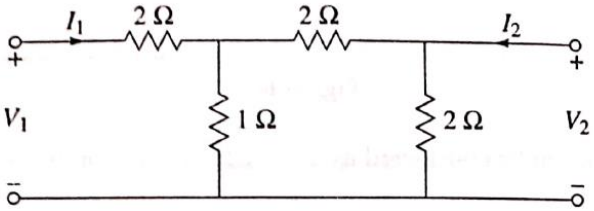
Programme: B.E. **Semester: III**
Branch: ES CLUSTER (EC, EE, EI, ET & MD) **Duration: 3 hrs.**
Course Code: 23ES3PCNAL **Max Marks: 100**
Course: Network Analysis

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

			UNIT - I	*CO*	*PO*	Marks
1	a)	Determine the current through 10 Ω resistance in the network shown in the Fig 1a by star-delta conversion.  Fig 1a	*CO* 1	PO 1	**10**
	b)	Use the nodal analyses to find the values of V_x in the circuit shown in Fig 1b such that the current through (2+j3)Ω impedence is zero.  Fig 1b	*CO* 1	PO 1	**10**
		OR				
2	a)	Enumerate the following with suitable examples: 1. Unilateral and Bilateral networks 2. Lumped and Distributed networks	*CO* 1	PO 1	**05**

		b)	Draw the network for the following mesh equation: $\begin{bmatrix} 5+j5 & -j5 & 0 \\ -j5 & 8+j8 & -6 \\ 0 & -6 & 10 \end{bmatrix} \begin{bmatrix} I1 \\ I2 \\ I3 \end{bmatrix} = \begin{bmatrix} 30\angle 0° \\ 0 \\ -20\angle -0° \end{bmatrix}$	***CO*** 1	PO 1	**05**
		c)	Find Voltages V_1 and V_2 for the circuit shown in Fig 2c.  Fig 2c			**10**
			UNIT - II			
	3	a)	Find the Thevenin's and Norton's equivalent circuit for the network shown in Fig 3a.  Fig 3a	***CO*** 1	PO 1	**10**
		b)	For the circuit shown in Fig 3b, Find the value of Resistance R_L for maximum power and calculate the maximum power.  Fig 3b	***CO*** 1	PO *1*	**10**
			UNIT - III			
	4	a)	Two coils, one of R_1=0.51Ω, L_1=32mH, the other of R_2=1.3Ω and L_2=15mH and two capacitors of 25μH and 62μH are all in series with a resistance of 0.24Ω. Determine the following i) Resonant frequency ii) Q of each coil iii) Q of the circuit iv) Cutoff frequencies v) Power dissipated at resonance if E=10V.	***CO*** 2	PO *2*	**10**

		b)	A parallel circuit has a fixed capacitor and variable inductor having constant quality factor of 4. Find values of inductance and capacitance for circuit impedance of 1000 Ω at resonating frequency 2.4MHz. What is the bandwidth of circuit?	***CO*** 2	PO *2*	**10**
			UNIT - IV			
	5	a)	A series R-C ciruit shown in fig 5a consists R=10 Ω and C=0.1F initially switch K is kept open for very long time at t=0 it is closed. Find expression for $V_c(t)$, $i_c(t)$ and $V_r(t)$ against time.  	***CO*** 2	PO 2	**10**
		b)	For the circuit shown in Fig 5b, the steady state is reached with 100V source. At t=0, switch k is opened. What is the current through the inductor at t=1/2 sec?  Fig 5b	***CO*** 2	PO 2	**10**
			OR			
	6	a)	State and prove Initial and Final value theorem of Laplace transform.	***CO*** 1	PO 1	**08**
		b)	In the network shown in Fig 6b, a steady state is reached with switch open. At t=0, switch is closed. Find the three loop currents at t=0+.  Fig 6b	***CO*** 2	PO 2	**12**
			UNIT - V			
	7	a)	Express Hybrid parameters in terms of Y-parameters.	***CO*** 1	PO 1	**04**

		b)	For the network shown in Fig 7b, find Z and Y-parameters.  Fig 7b			**08**
		c)	Determine the transmission parameters for the network shown in Fig7c.  Fig7c	***CO*** 1	PO1	**08**

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