U.S.N.										

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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

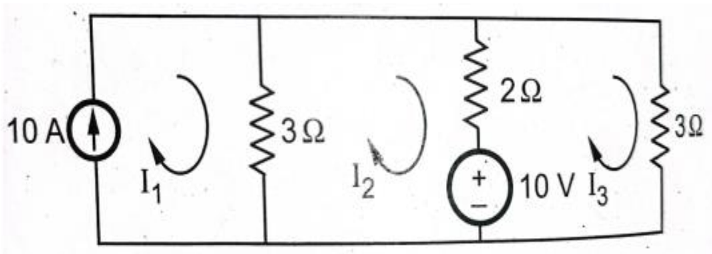
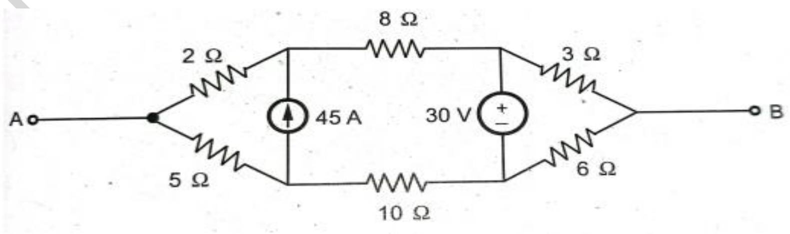
Programme: B.E. | **Semester: III**

Branch: EEE/ECE/MD/ETE/EIE | **Duration: 3 hrs.**

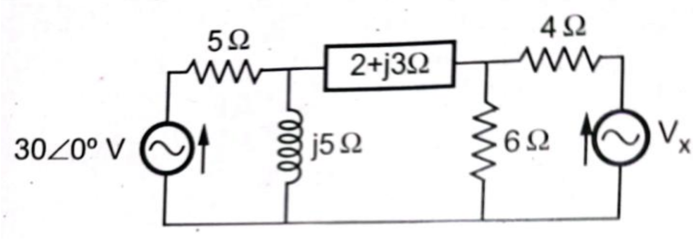
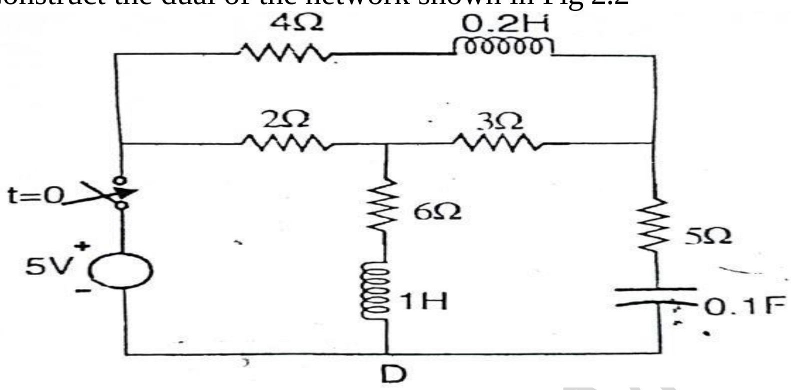
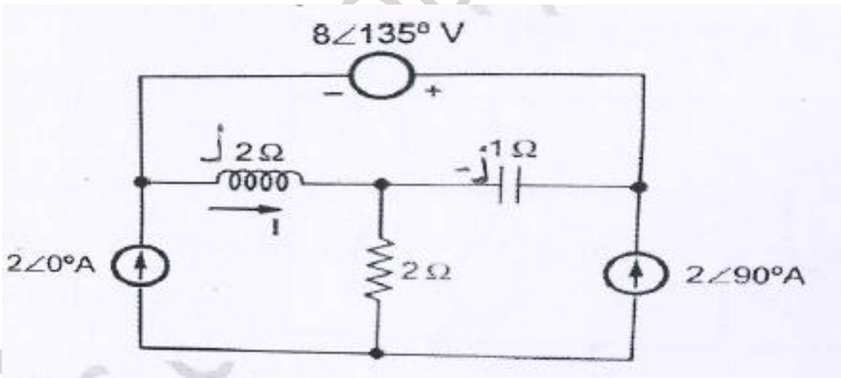
Course Code: 23ES3PCNAL | **Max Marks: 100**

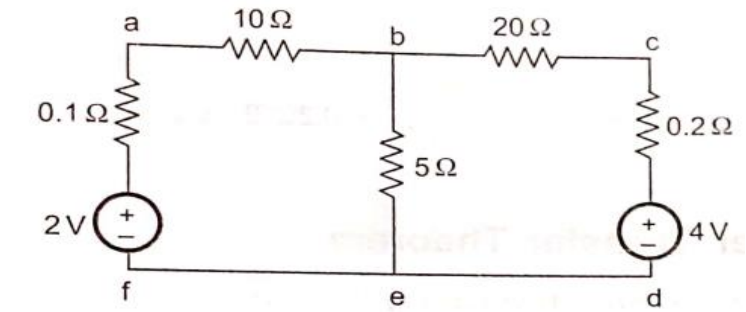
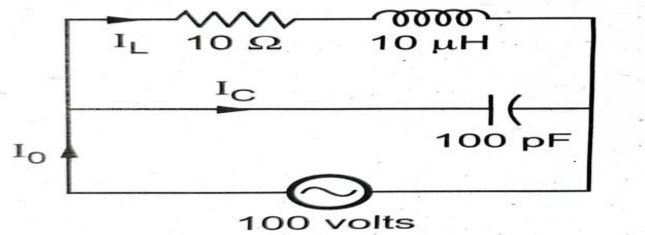
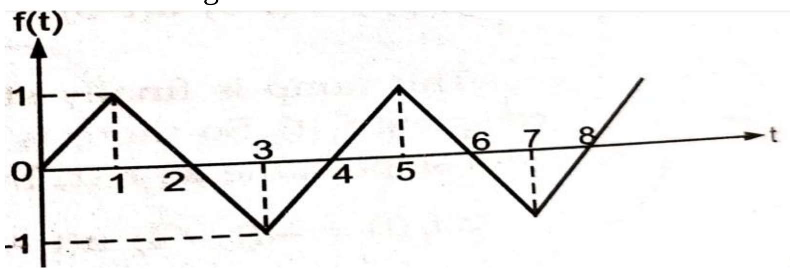
Course: Network Analysis

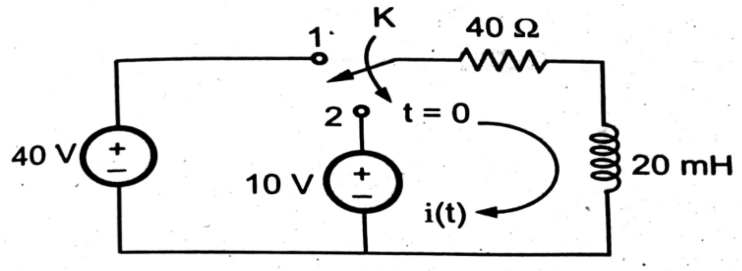
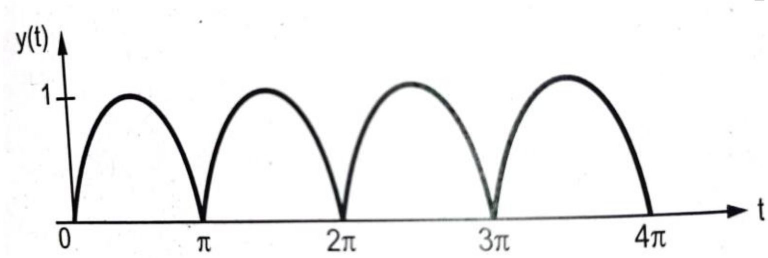
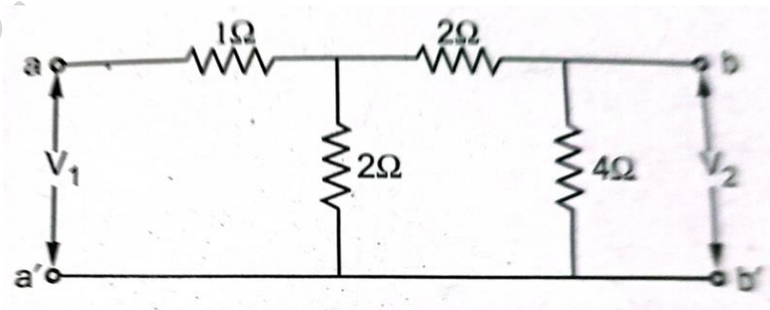
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	**CO**	**PO**	**Marks**
1	a)	Define the following: (i) Active and passive elements, (ii)Independent and Dependent Sources, with Symbols.	*CO1*	*PO1*	**5**
	b)	Write the mesh equation for the circuit shown in Fig 1.1 and determine mesh currents using mesh analysis.  Fig 1.1	*CO1*	*PO1*	**8**
	c)	Reduce the network shown in the Fig 1.2 to a single voltage source in series with a resistance using source shifting and source transformations.  Fig 1.2	*CO1*	*PO1*	**7**
		OR			
2	a)	Use the nodal analysis to calculate the value of V_x in the circuit shown in the Fig 2.1 such that the current through (2 + j3) Ω impedance is zero.	*CO1*	*PO1*	**10**

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.

			 Fig 2.1			
		b)	Explain the Concept of Super-mesh with an example.	***CO1***	***PO1***	**5**
		c)	Construct the dual of the network shown in Fig 2.2  Fig 2.2	***CO1***	***PO1***	**5**
			UNIT - II			
	3	a)	Using Superposition Theorem, obtain the response 'I' for the network shown in Fig 3.1  Fig 3.1	***CO2***	***PO2***	**10**
		b)	State and prove Thevenin's theorem.	***CO2***	***PO2***	**10**
			OR			
	4	a)	State and Prove Maximum Power transfer Theorem.	***CO2***	***PO2***	**10**
		b)	Calculate the current through the branch 'be' for the circuit given in Fig 4.1 using Norton's Theorem.	***CO2***	***PO2***	**10**

			 Fig 4.1			
			UNIT - III			
	5	a)	A series RLC circuit consists of R=10 Ω, L=0.01 H, and C=0.01µF is connected across a supply of 10mV. Determine, (i) f_0 ii) Q-factor iii) BW iv) f_1 and f_2 v) I_0	***CO2***	***PO2***	**10**
		b)	Explain parallel resonance. Derive the condition for parallel resonance when RL connected parallel to RC.	***CO2***	***PO2***	**10**
			OR			
	6	a)	Define Q of a series resonant circuit. Obtain half power frequencies in terms of Q and show that the resonant frequency is the geometric mean of half power frequencies.	***CO2***	***PO2***	**10**
		b)	For the parallel resonant circuit shown in Fig.6.1 Determine: I_0, I_L, I_C, f_0 and dynamic resistance.  Fig.6.1	***CO2***	***PO2***	**10**
			UNIT - IV			
	7	a)	State & prove Initial value theorem and Final value theorem.	***CO2***	***PO2***	**8**
		b)	Determine the Laplace transform of the periodic waveform shown in the Fig 7.1  Fig 7.1	***CO2***	***PO2***	**12**

			OR			
	8	a)	The network shown in the Fig.8.1 is under steady state condition with switch K is at position 1. Calculate expression for i(t) if switch K is moved to position 2. Draw variation of i(t).  Fig.8.1	*CO2*	*PO2*	**10**
		b)	Determine the Laplace transform of the periodic waveform shown in the Fig.8.2  Fig.8.2	*CO2*	*PO2*	**10**
			UNIT - V			
	9	a)	State and derive expressions for Z-Parameters or open circuit (O.C) Impedance Parameters.	*CO2*	*PO2*	**10**
		b)	Define h-Parameter? and obtain the relationship between ABCD parameter in terms of Z-parameter.	*CO2*	*PO2*	**10**
			OR			
	10	a)	Define Z and Y parameters. Obtain 'Z' Parameter in terms of 'Y' Parameters.	*CO2*	*PO2*	**10**
		b)	Determine Y- parameters of the network shown in Fig.10.1  Fig 10.1	*CO2*	*PO2*	**10**

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