U.S.N.										

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

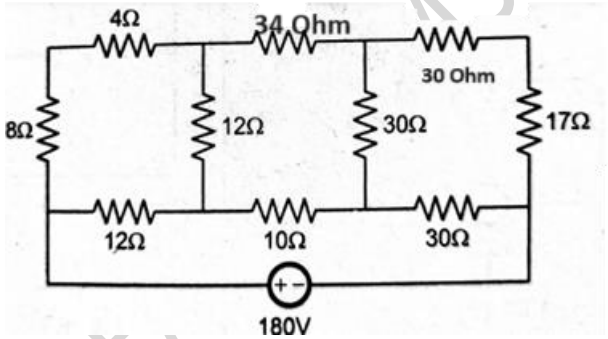
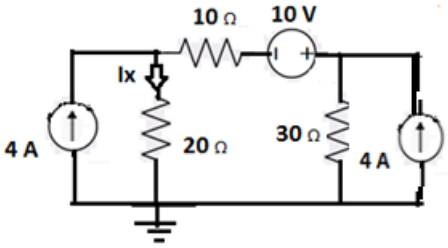
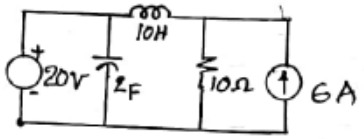
Autonomous Institute Affiliated to VTU

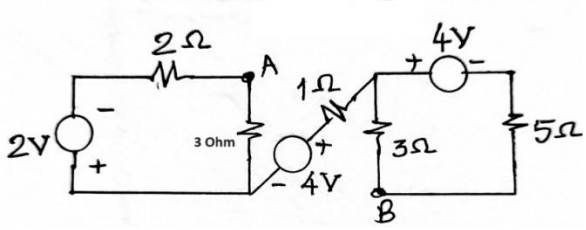
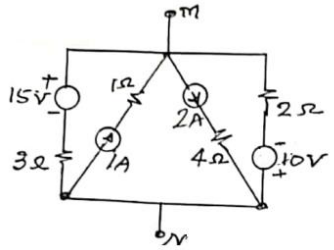
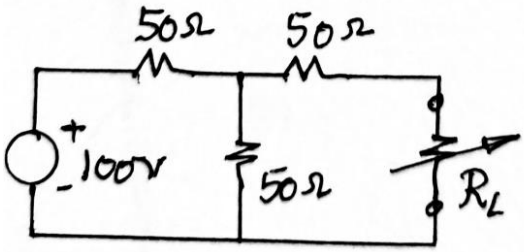
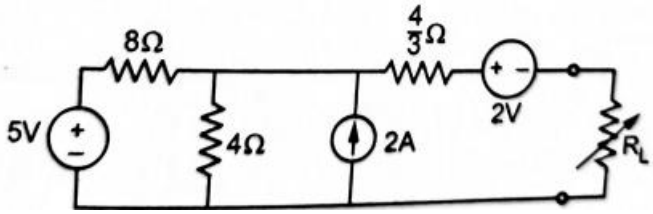
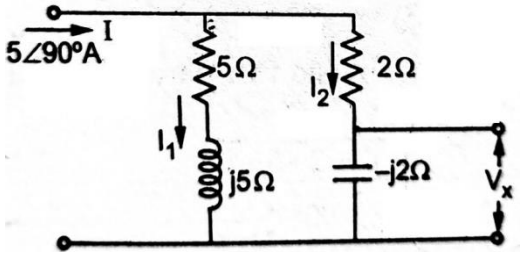
August 2024 Semester End Main Examinations

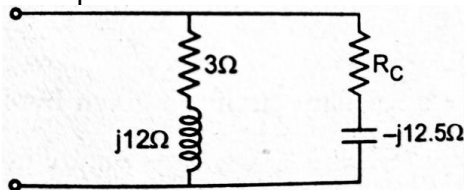
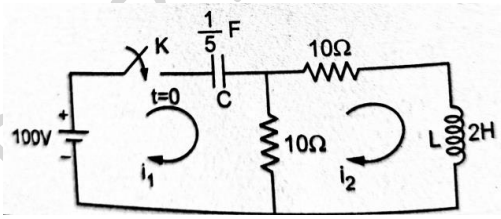
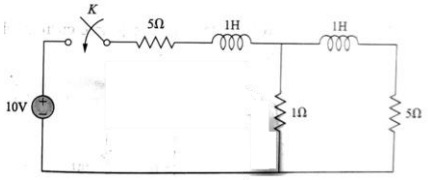
Programme: B.E. **Semester: III**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 22EE3PCECT **Max Marks: 100**
Course: Electrical Circuit Theory

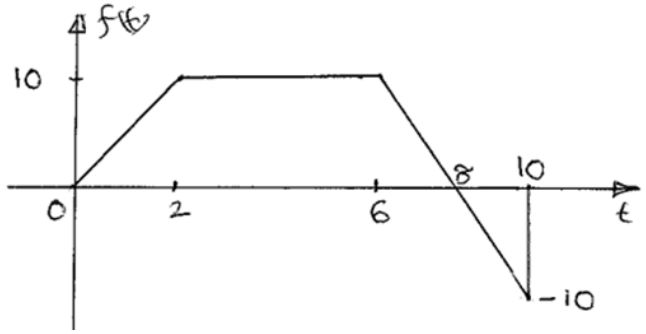
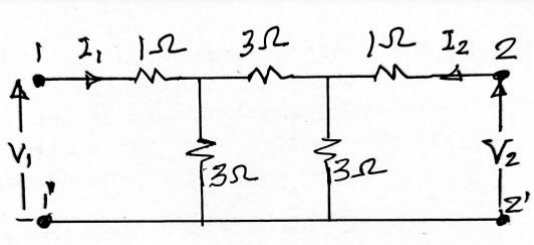
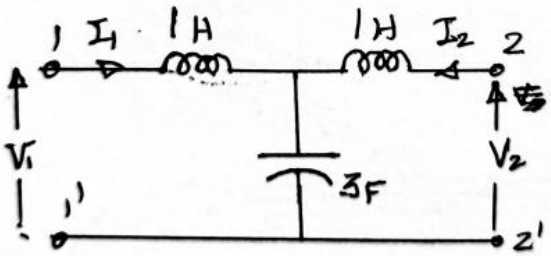
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

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)	Differentiate between: (i) Active and passive networks, (ii) Ideal and practical sources, (iii) Linear and bilateral elements.	CO1	PO1	**06**
	b)	Using star-delta transformations find the current through the 10 Ohm resistor in the circuit shown in Fig. 1(b).  Fig.1(b)	CO1	PO1, 2	**07**
	c)	In the circuit shown in Fig.1(c) find the current I_X by Node voltage analysis.  Fig.1(c)	CO1	PO1, 2	**07**
		OR			
2	a)	What do you mean by duality? Construct the dual of the circuit shown in Fig.2(a) by dot method.  Fig.2(a)	CO1	PO1, 2	**06**

		b)	In the circuit shown in Fig.2(b), find the potential difference across the points A and B.  Fig.2(b)	CO1	PO1, 2	**08**
		c)	Determine the potential difference between the terminals M-N in the circuit shown in Fig.2(c) using source transformations.  Fig.2(c)	CO1	PO1, 2	**06**
			UNIT - II			
	3	a)	State Thevenin's theorem and obtain the Thevenin's equivalent of the circuit shown in Fig.3(a)  Fig.3(a)	CO2	PO1, 2	**07**
		b)	State the maximum power transfer theorem for the case of totally variable impedance, and find the value of R_L for maximum power transfer through it and also find the maximum power in the circuit shown in Fig. 3(b)  Fig.3(b)	CO2	PO1, 2	**07**
		c)	State and verify Reciprocity theorem for the circuit shown in Fig. 3(c).  Fig.3(c)	CO2	PO1, 2	**06**

			UNIT-III			
	4	a)	Define what are initial conditions and what is its importance in networks?	CO3	PO1, 2	**04**
		b)	Calculate the value of R_C for the circuit shown in Fig.4 (b) for resonance. Also determine the value of R_L and R_C for the circuit to resonate at all frequencies.  Fig.4(b)	CO3	PO1, 2	**08**
		c)	A series R-L-C circuit having R = 10 Ohm, L = 1 H and C = 1 micro farad is connected to a source of 10 V through a switch. The switch is closed at t=0, all the initial conditions are zero. Calculate the values of i, Di and D^2i at t=0+	CO2	PO1, 2	**08**
			OR			
	5	a)	Define the following: (i) Band width, (ii) Quality factor, (iii) Half power frequencies.	CO3	PO1	**06**
		b)	A series resonant circuit having R = 30 Ohm, C = 2 micro farad and L=20 mH are connected across a sinusoidal supply of constant voltage of 9 V. Calculate: (i) the resonant frequency, (ii) current at resonance, (iii) Quality factor.	CO3	PO1, 2	**06**
		c)	In the circuit shown in Fig. 5(c), the switch K is closed at time t = 0 with all zero initial conditions. Find: (i) i_1, (ii) i_2, (iii) Di_1 and (iv) DI_2 at t=0+  Fig. 5(c)	CO3	PO1, 2	**08**
			OR			
			UNIT - IV			
	6	a)	What is an impulse function and show that the Laplace transformations of a unit impulse function is unity.	CO4	PO1	**04**
		b)	In the circuit shown in Fig. 6(b), find the transformed current through the 1 H [$I_2(s)$]of the second loop using Laplace transformations considering all the initial conditions to be zero.  Fig.6(b)	CO4	PO1, 2	**08**

		c)	Find the Laplace transformation of the waveform shown in Fig.6(c).  Fig.6(c)	CO4	PO1, 2	**08**
			UNIT - V			
	7	a)	Define Z and T-parameters and write the relation between Z and T-parameters.	CO5	PO1	**06**
		b)	Determine the y-parameters of the network shown in Fig.7(b).  Fig.7(b)	CO5	PO1, 2	**08**
		c)	Determine the Z - parameters of the network shown in Fig.7c.  Fig.7(c)	CO5	PO1, 2	**06**

****