U.S.N.										

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

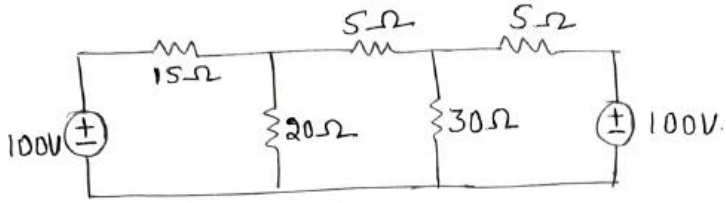
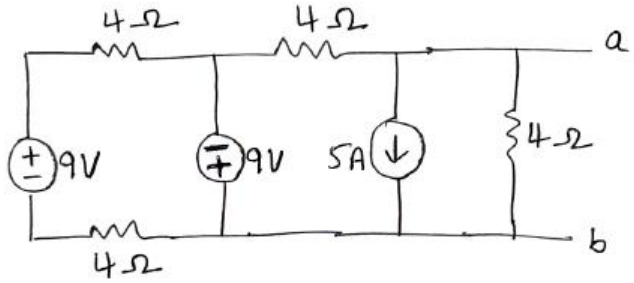
Autonomous Institute Affiliated to VTU

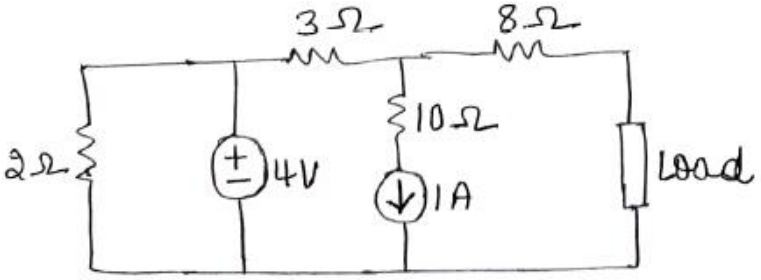
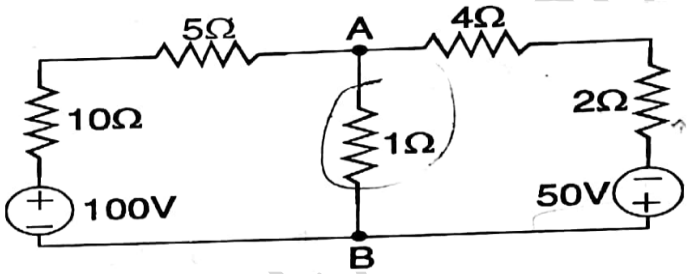
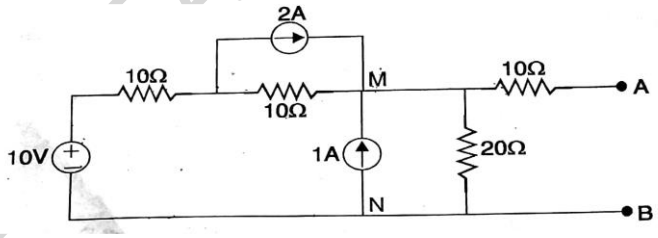
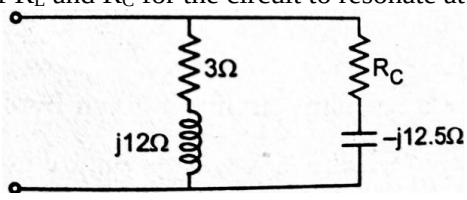
June 2025 Semester End Main Examinations

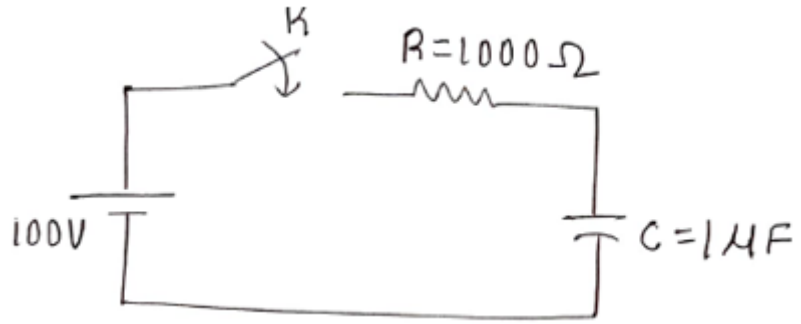
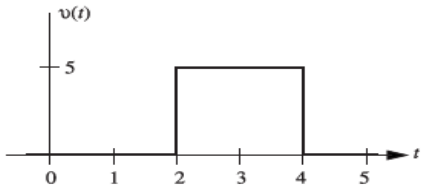
Programme: B.E. **Semester: III**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 22EE3PCECT **Max Marks: 100**
Course: Electrical Circuit Theory

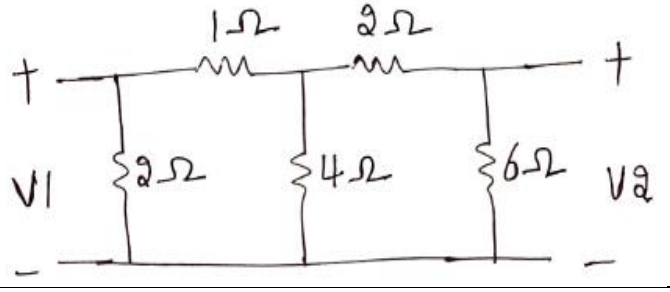
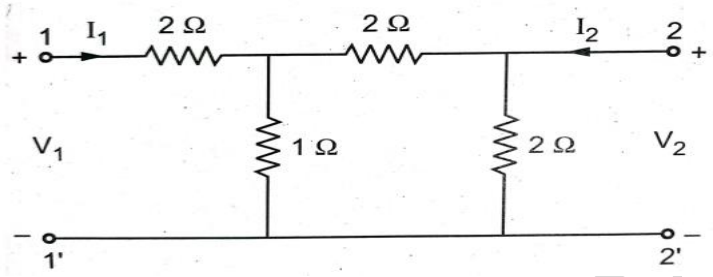
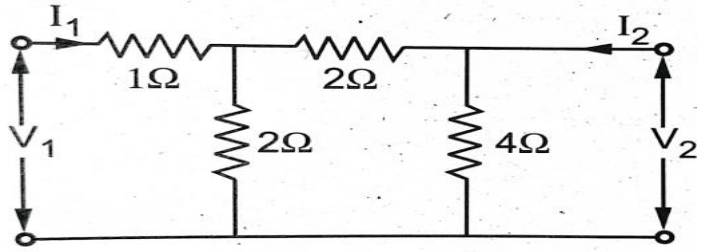
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

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)		Briefly explain the classifications of electrical networks.	CO1	PO1	**10**
	b)		Determine current through 30Ω resistor using mesh analysis.  Fig Q1(b)	CO1	PO1	**06**
	c)		Explain the Super-node analysis.	CO1	PO1	**04**
			OR			
2	a)		Explain the following (i)Delta-Star conversion (ii)Star-Delta conversion	CO1	PO1	**10**
	b)		Use source transformation to convert the circuit to a single current source in parallel with a single resistor shown in Fig 2 (b).  Fig Q2(b)	CO1	PO1	**06**
	c)		Discuss independent sources.	CO1	PO1	**04**

			UNIT-II			
	3	a)	State and explain Thevenin's theorem.	CO2	PO2	**10**
		b)	Determine Norton's equivalent circuit as shown in Fig Q3(b)  Fig Q3(b)	CO2	PO2	**05**
		c)	State and Prove reciprocity theorem.	CO2	PO2	**05**
			OR			
	4.	a)	Determine the current through branch 'AB' in the network shown in the figure using superposition theorem.  	CO2	PO2	**10**
		b)	Find the Thevenin's equivalent circuit at the terminals A, B for the network shown in figure and hence determine the power dissipated in a 5-ohm resistor connected between A and B.  	CO2	PO2	**10**
			UNIT - III			
	5.	a)	Discuss the initial conditions in inductor, capacitor and resistor.	CO3	PO2	**06**
		b)	Find the value of R_C for the circuit shown in Fig.5(b) for resonance. Also find the value of R_L and R_C for the circuit to resonate at all frequencies.  Fig.5(b)	*CO3*	*PO2*	**06**
		c)	Define the following terms with reference to resonance circuit (i)Resonance (iii)Selectivity (ii)Q- factor (iv)Bandwidth	CO3	PO2	**08**

			OR			
	6.	a)	Obtain an expression for resonant frequency in an series RLC circuit.	CO3	PO2	**10**
		b)	For the given circuit shown in Fig. k is closed at t > 0. Calculate i, $di/dt, d^2i/dt^2$ at $t = 0^+$.  	CO3	PO2	**07**
		c)	A coil of 5mH inductance and 10Ω resistance is connected in series with 5μF. Determine the frequency at which circuit resonance.	CO3	PO2	**03**
			UNIT – IV			
	7.	a)	State and prove initial and final value theorem.	CO4	PO2	**10**
		b)	Obtain the Laplace transform of (i)Unit step function (ii)Impulse function (iii)Sinusoidal function	CO4	PO2	**10**
			OR			
	8.	a)	State and prove initial value and final value theorem.	CO4	PO2	**10**
		b)	Express the voltage pulse shown in Fig. in terms of unit step function and then find V(s) also determine L{dv(t)/d(t)}  	CO4	PO2	**10**
			UNIT – V			
	9.	a)	Obtain the Z-parameters in terms of Y-parameters.	CO4	PO3	**10**

		b)	Find Z and h-parameters given in Fig. 	CO4	PO3	**10**
			OR			
	10.	a)	Determine the Z-parameters for the circuit shown in the Fig. 	CO4	PO3	**10**
		b)	Obtain the h-parameters of the network shown in Fig. Give its equivalent circuit. 	CO4	PO3	**10**

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