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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. I Year II Semester Regular & Supplementary Examinations June-2025
NETWORK ANALYSIS
(Electronics & Communications Engineering)

Time: 3 Hours **Max. Marks: 70**

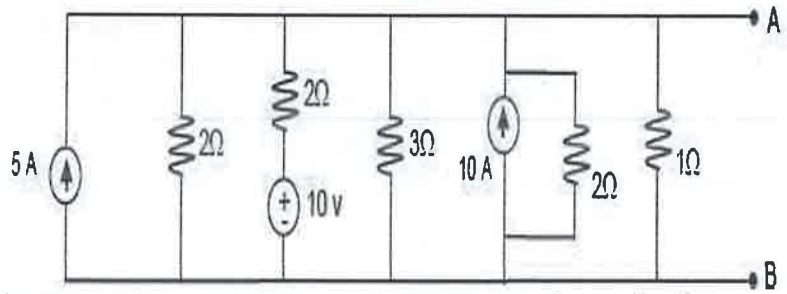
PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define statement of Tellegen's theorem.	CO1	L1	2M
	b	Define statement of Reciprocity theorem.	CO1	L1	2M
	c	State Final value theorem.	CO2	L1	2M
	d	What is the significance of initial conditions.	CO2	L1	2M
	e	Draw the impedance triangle of series R-L circuit with sinusoidal supply.	CO3	L2	2M
	f	What is the phase of a sine wave?	CO3	L1	2M
	g	Define Self-inductance.	CO4	L1	2M
	h	Define Q- Factor.	CO4	L1	2M
	i	What is the condition for Symmetry in Z and Y parameters.	CO5	L1	2M
	j	Draw the equivalent circuit of Z-parameters.	CO5	L1	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

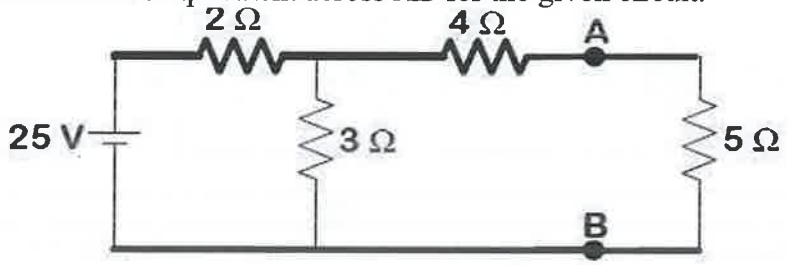
UNIT-I

2	a	By using source transformation, convert the circuit shown in figure below into a single voltage source and single resistance.	CO1	L3	5M



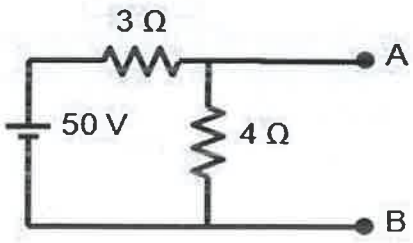
1.

	b	Find the Norton's equivalent across AB for the given circuit.	CO1	L3	5M



OR

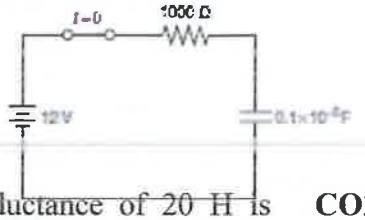
3	a	Define independent source and dependent source, what are the types ofdependent sources.	CO1	L2	5M
	b	Find the Thevenin's equivalent circuit across AB for the given circuit.	CO1	L3	5M



UNIT-II

4	a	Find the Inverse Laplace transform of given F(s) using Heaviside's expansion theorem. $$F(s) = \frac{(S+2)}{S(s+3)(s+4)}$$	CO2	L3	5M
	b	Find the Laplace transform of sin ωt.	CO2	L3	5M

OR

5	a	A circuit has resistance of 1000Ω and a series capacitance of 0.1μF. At t = 0, it is connected to a 12 V battery. Find the following: i) The current at t = 0 ii) Rate of change of current at t = 0 Rate of change of capacitor voltage at t = 0 	CO2	L3	5M
	b	A coil having a resistance of 100Ω and an inductance of 20 H is connected to a 200 V DC source. Suddenly, the coil is disconnected from the battery and short-circuited. Calculate the following: i) The current in the coil at t = 0 ii) Rate of change of current at t = 0 Time constant	CO2	L3	5M

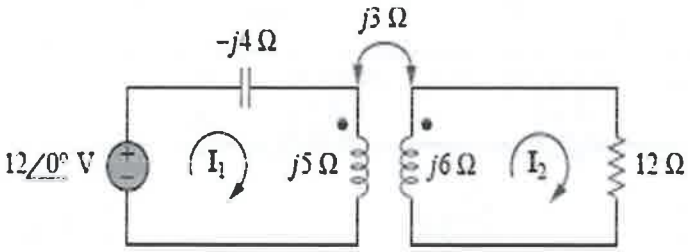
UNIT-III

6		Derive the necessary relations for performing star to delta and delta to star transformations	CO3	L1	10M

OR

7	a	Explain phasor representation of series R L circuit	CO3	L2	6M
	b	A voltage of 120 V at 50 Hz is applied to a resistance, R in series with a capacitance, C. The current drawn is 2 A, and the power loss in the resistance is 100 W. Calculate the resistance and the capacitance	CO3	L3	4M

UNIT-IV

8		Calculate the phasor currents I_1 and I_2 in the circuit shown in Figure. 	CO4	L2	10M

OR

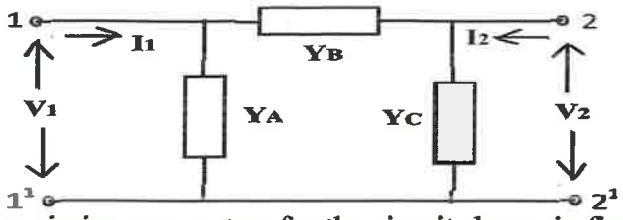
9	a	A parallel resonant circuit is driven by ac mains supply 230V, 50Hz. Find value of C required to be varied to achieve antiresonance in the circuit if it is shunted with a coil of 1mH inductance and 10Ω resistance	CO4	L2	5M
	b	Derive an equation for the resonance frequency of a series resonant circuit interms of L and C.	CO4	L2	5M

UNIT-V

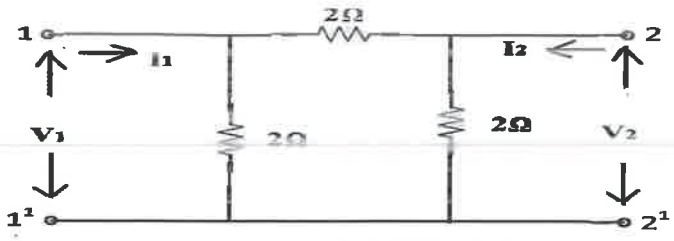
10		Obtain the ABCD parameters in terms of Z parameters and find ABCD parameters for the given Z-parameters of a two-port network, Z_{11}= 10Ω, Z_{22}= 15Ω, Z_{12}= 5Ω and Z_{21}= 5Ω	CO5	L2	10M

OR

11 a Find the Short-circuit parameters for the circuit shown in figure. CO5 L3 5M



b Find the transmission parameters for the circuit shown in figure. CO5 L3 5M



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