Course Code: **23EE2T02**

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

I - B. Tech II-Semester Regular/Supplementary Examinations (BR23), June – 2025

NETWORK ANALYSIS (ECE)

Time: 3 hours
Max. Marks: 70

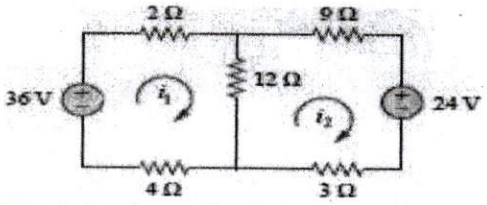
Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1.a)	Define passive and active components with examples	(2M)	CO1	TL1
b)	State the Thevenin's Theorem.	(2M)	CO1	TL1
c)	Define time constant in R-L and R-C circuits.	(2M)	CO2	TL2
d)	Define the unit step function and its Laplace transform.	(2M)	CO3	TL1
e)	Draw the phasor diagram of series RL Circuit	(2M)	CO2	TL2
f)	Describe the phase of series R-C circuit	(2M)	CO2	TL2
g)	Define quality factor	(2M)	CO4	TL2
h)	State coefficient of coupling	(2M)	CO4	TL1
i)	Define Z-Parameters	(2M)	CO5	TL2
j)	Give relationship between Z and Y-Parameters	(2M)	CO5	TL2

PART–B (5X10 = 50M)

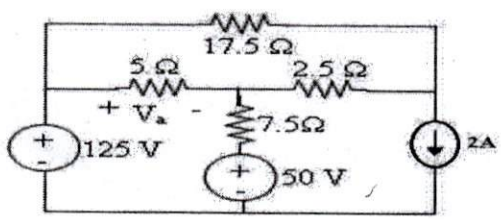
2.a)	Determine the currents i1 and i2 in the circuit shown below	5(M)	CO1	TL2



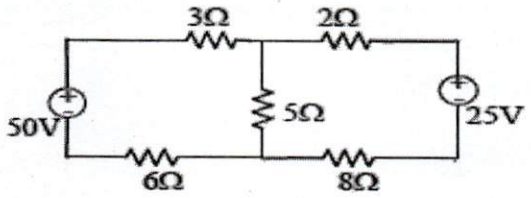
b)	Explain the principle of duality with the help of a network	5(M)	CO1	TL3

(OR)

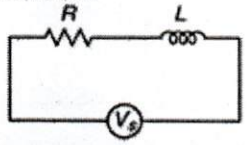
3.a)	Calculate the value of V_a for the following circuit using KVL.	5(M)	CO1	TL2



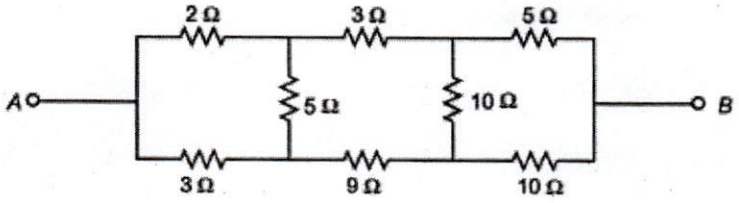
b)	Apply superposition theorem and compute current I through 5Ω Resistor	5(M)	CO2	TL3



4.a)	Determine the source voltage and phase angle, if the voltage across the resistance is 70 V and across an inductive reactance is 20 V, in an R-L series circuit	5(M)	CO2	TL3

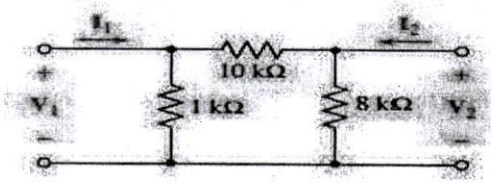


b)	Explain about star to delta conversion with an example	5(M)	CO2	TL1
	(OR)			
5.a)	A voltage V(t) = 177 Sin (314t +10⁰) is applied to a circuit. It causes a steady state current to flow, which is described by i(t)=14.14 sin(314t-20⁰). Determine the power factor & Average Power delivered to the circuit.	5(M)	CO3	TL3
b)	Find the voltage to be applied across AB in order to drive a current of 5A into the circuit by using star-delta transformation	5(M)	CO3	TL3



6.a)	Discuss the transient response of Series R-C circuit when dc voltage is applied to the circuit.	5(M)	CO3	TL3
b)	Find LT of the functions $f1(t)= \sin wt$ and $f2(t)= e^{-2t} u(t)$	5(M)	CO3	TL2
	(OR)			
7.a)	Solve the expression for i(t) and voltage across capacitor Vc (t) for series R-L circuit with D.C voltage applied to it at t=0.	5(M)	CO3	TL3
b)	Obtain the Laplace transform of $f(t) = t\, e^{-2t} \sin(3t)$.	5(M)	CO3	TL3
8.a)	Explain the series resonance with neat diagram	5(M)	CO4	TL4
b)	Determine quality factor, bandwidth, lower and upper cut off frequencies of a series resonant circuit with R=5Ω, L=0.05H, C=5μf	5(M)	CO4	TL4
	(OR)			
9.a)	Explain about dot convention in mutually coupled circuits.	5(M)	CO4	TL2

b)	For a series RLC circuit, the applied voltage is V(t) = 18 Sin wt.At resonance the maximum voltage across the capacitor is 400 V. Find the resonant frequency if the impedance at resonance is 126 Ω and the bandwidth is 350 rad/sec. Find also the circuit constants.	5(M)	CO4	TL3
10.a)	Formulate expressions for the Y-parameters in terms of ABCD parameters of a two-port network	5(M)	CO5	TL3
b)	Define open circuit parameters. Explain how the open circuit parameters can be obtained for a given two port network.	5(M)	CO5	TL4
	(OR)			
11.a)	Explain about the parameters used for series connected 2-port network.	5(M)	CO5	TL3
b)	Find the complete set of Y-parameters which describe the two-port network shown	5(M)	CO5	TL3



****