Code: 20EC3304

## II B.Tech - I Semester – Regular / Supplementary Examinations DECEMBER 2023

## NETWORK THEORY AND ANALYSIS (ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	СО	Max.	
					Marks	
		UNIT-I				
1	a)	Calculate the RMS value of the voltage	L2	CO1	7 M	
		waveform shown below.				
		r(∂ ♠				
		5				
		0 1 2 3 4 1				
		_5				
	b)	Compare phasor relationships for R, L and C	L2	CO1	7 M	
		circuit components.				
OR						
2	a)	Explain the concept of phasors with suitable	L2	CO1	7 M	
		example.				
	b)	Define power factor. Why power factor is	L2	CO1	7 M	
		important in circuits?				
UNIT-II						
3	a)	Derive the transient response of series RC-	L3	CO2	7 M	
		circuit with DC excitation.				

b) A series RL circuit with R=30Ω and L= 15H has a constant voltage V=60 volts applied at t=0. Determine the current in the circuit, voltage across resistor and voltage across inductor.  OR  4 a) Derive the transient response of series RL circuit with DC excitation. b) Write a short note on transient analysis of a L2 CO2 7 M circuit.  UNIT-III  5 a) Determine the current in 10Ω resistor for the following network by using nodal analysis.  b) State and prove superposition theorem.  OR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω Λ Μ  3Ω Λ Μ  4 CO3 7 M  CO2 7 M  CO3 7 M								
t=0. Determine the current in the circuit, voltage across resistor and voltage across inductor.  OR  4 a) Derive the transient response of series RL L3 CO2 7 M circuit with DC excitation. b) Write a short note on transient analysis of a L2 CO2 7 M circuit.  UNIT-III  5 a) Determine the current in 10Ω resistor for the following network by using nodal analysis.  b) State and prove superposition theorem.  L2 CO3 7 M  OR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ		b)	A series RL circuit with $R=30\Omega$ and $L=15H$	L3	CO2	7 M		
voltage across resistor and voltage across inductor.  OR  4 a) Derive the transient response of series RL L3 CO2 7 M circuit with DC excitation. b) Write a short note on transient analysis of a L2 CO2 7 M circuit.  UNIT-III  5 a) Determine the current in 10Ω resistor for the following network by using nodal analysis.  b) State and prove superposition theorem.  L2 CO3 7 M  OR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ			has a constant voltage V=60 volts applied at					
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circuit with DC excitation.  b) Write a short note on transient analysis of a L2 CO2 7 M circuit.  UNIT-III  5 a) Determine the current in 10Ω resistor for the following network by using nodal analysis.  b) State and prove superposition theorem.  L2 CO3 7 M  OR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  L4 CO3 7 M		l	OR					
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UNIT-III  5 a) Determine the current in 10Ω resistor for the L4 CO3 7 M following network by using nodal analysis.  b) State and prove superposition theorem.  COR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ			circuit with DC excitation.					
UNIT-III  5 a) Determine the current in 10Ω resistor for the following network by using nodal analysis.  5 a) State and prove superposition theorem.  Correct Description of the L4 CO3 Test Mean of the following network by using nodal analysis.  5 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1 Ω 2 Ω A CO3 Test Mean of the flowing through 10 Ω resistor using Norton's theorem.		b)	Write a short note on transient analysis of a	L2	CO2	7 M		
5 a) Determine the current in 10Ω resistor for the following network by using nodal analysis.  b) State and prove superposition theorem.  CR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω Λ Μ  1Ω Λ Μ  2Ω Λ Μ  2Ω Λ Μ  Δ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ			circuit.					
5 a) Determine the current in 10Ω resistor for the following network by using nodal analysis.  b) State and prove superposition theorem.  CR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω Λ Μ  1Ω Λ Μ  2Ω Λ Μ  2Ω Λ Μ  Δ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ Θ								
following network by using nodal analysis.  b) State and prove superposition theorem.  Correct  OR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ Λ			UNIT-III					
b) State and prove superposition theorem.  Cor  In the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  L2 CO3 7 M  The correct of the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.	5	a)	Determine the current in $10\Omega$ resistor for the	L4	CO3	7 M		
b) State and prove superposition theorem.  Cor  In the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  L2 CO3 7 M  CO3 7 M  To the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.			following network by using nodal analysis.					
b) State and prove superposition theorem.  COR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem.  1Ω 2Ω 4  1Ω 2Ω 4  1Ω			$\frac{3\Omega}{W}$ $\frac{1\Omega}{W}$					
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OR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem. $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			$5A \uparrow \uparrow \uparrow \uparrow 10\Omega $ $\lessgtr 5\Omega \uparrow 10V$					
OR  6 a) For the given circuit, determine the current flowing through 10 Ω resistor using Norton's theorem. $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			Y					
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flowing through 10 $\Omega$ resistor using Norton's theorem.			OR					
theorem. $ \begin{array}{c} 1\Omega \\ & \\ \end{array} $	6	a)	For the given circuit, determine the current	L4	CO3	7 M		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			flowing through 10 $\Omega$ resistor using Norton's					
+ A			theorem.					
$9 \text{ V} \xrightarrow{+} \qquad \qquad$			${}^1\Omega$ ${}^2\Omega$					
$9V \stackrel{+}{\overline{}} \qquad \qquad$								
$9V \stackrel{+}{\overline{}} \qquad \qquad \qquad \qquad \geqslant_{10} \Omega$								
			$9V + \frac{1}{T}$ $\leq 3\Omega$ $\leq 10\Omega$					
B								
В								
			В					

	b)	Find $V_{TH}$ , $R_{TH}$ and the load current $I_L$ flowing	1.4	CO3	7 M
		through and load voltage V <sub>L</sub> across the load			, 1,1
		resistor in the circuit below using Thevenin's			
		Theorem.			
		12 kΩ 8 kΩ			
		$\perp$ $\geq$ $_{4\mathrm{k}\Omega}$ $\geq$ $_{R_{\mathrm{L}}}$			
		\(\beta\) \(\beta\) \(\delta\)			
		L → B			
		UNIT-IV			
7	a)	Derive the relation between ABCD and	L3	CO2	7 M
		Z-parameters.			
	b)	The Z-parameters of a two-port network are	L2	CO1	7 M
		$Z_{11}=10\Omega$ , $Z_{22}=15\Omega$ , $Z_{12}=5\Omega$ and $Z_{21}=5\Omega$ .			
		Find ABCD parameters.			
		OR			
8	a)	Obtain Z – parameters for the network shown	L4	CO3	7 M
		below.			
		1Ω 2Ω 3Ω			
		1 0 0 2			
		$\uparrow \uparrow \rightarrow \uparrow_1$ $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$ $\uparrow$ $\uparrow$ $\uparrow$			
		. 4Ω			
		$V_1$ $V_2$			
		<del>.                                   </del>			
		1' o 2'			

