

Code: 23EC3201

I B.Tech - II Semester – Regular Examinations - JULY 2024**NETWORK ANALYSIS
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

- Note: 1. This question paper contains two Parts A and B.
 2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
 3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
 4. All parts of Question paper must be answered in one place.

BL – Blooms Level

CO – Course Outcome

PART – A

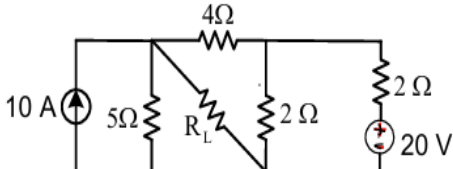
		BL	CO
1.a)	Explain about super node and super mesh.	L2	CO1
1.b)	Draw the phasor diagram of a series RL & RC circuit.	L2	CO1
1.c)	Distinguish between Independent and Dependent Sources.	L2	CO2
1.d)	Discuss the limitations of maximum power transfer theorem.	L2	CO2
1.e)	State the conditions for resonance in a parallel RLC resonant circuit.	L1	CO4
1.f)	Explain the term Coefficient of Coupling in magnetic circuits.	L2	CO4
1.g)	Why Laplace transform method is superior to classical method to solve the differential equations.	L1	CO3
1.h)	Write the second order differential equation that governs the series RLC circuit.	L2	CO3
1.i)	Write the condition for symmetry and reciprocity of a two port network represented in z parameters.	L1	CO5
1.j)	Draw the h-parameter model.	L2	CO5

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Derive the equations required to convert a star connected network to delta connected network.	L3	CO1	4 M
	b)	Determine the equivalent resistance between the terminals 'A' and 'B' of the following network. <div style="text-align: center; margin-top: 10px;"> </div>	L3	CO1	6 M
OR					
3	a)	Explain about Mesh analysis and write the steps for mesh analysis.	L2	CO2	4 M
	b)	Determine equivalent impedance seen looking into the open terminals of the network if $\omega = 100$ rad/sec <div style="text-align: center; margin-top: 10px;"> </div>	L3	CO1	6 M
UNIT-II					
4	a)	State and explain the Thevenin's theorem.	L3	CO2	4 M
	b)	Employ Thevenin's theorem to obtain a simple two component equivalent of the circuit shown below. <div style="text-align: center; margin-top: 10px;"> </div>	L3	CO2	6 M

OR

5	a)	State and explain the super position theorem.	L3	CO2	4 M
	b)	Determine the current through $R_L = 7.5 \Omega$ resistance using superposition theorem for the circuit shown below.	L3	CO2	6 M

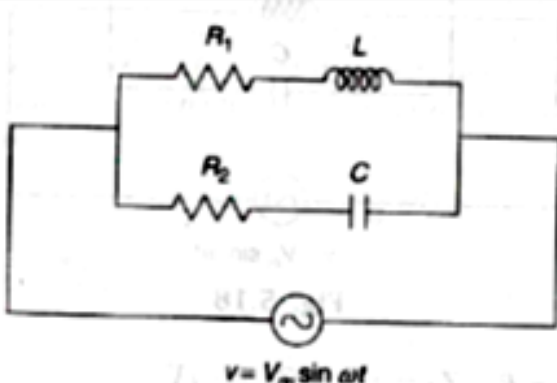


UNIT-III

6	a)	Draw the series RLC circuit and derive the expression for resonant frequency and bandwidth.	L3	CO4	6 M
	b)	Discuss about the quality factor of a series and parallel resonant circuit.	L4	CO4	4 M

OR

7	a)	What are coupled circuits and explain about self and mutual inductance.	L2	CO4	5 M
	b)	Derive the expression for the resonant frequency of the given circuit.	L3	CO4	5 M



UNIT-IV

8	a)	Derive the unit step current response of series RLC circuit.	L4	CO3	5 M
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	b)	A series RLC circuit with $R=50 \Omega$, $L=100 \text{ mH}$ and $C=50 \mu\text{F}$ as a voltage of 100V applied to it at $t=0$ through a switch. Evaluate the expression for a current transient. Assume initially relaxed circuit conditions.	L3	CO3	5 M
OR					
9	a)	Derive an expression for the transient current in series RC circuit with a sinusoidal source using differential equations.	L4	CO3	5 M
	b)	A voltage pulse $v(t) = u(t - 2) - u(t - 4)$ is applied to a series RL circuit with $R = 5 \text{ ohms}$ and $L = 5 \text{ henry}$. Obtain voltage expression across R and L. Where $u(t)$ is the unit step function.	L3	CO3	5 M
UNIT-V					
10	a)	Derive the relationship between transmission (ABCD) parameters and open circuit impedance (Z) parameters.	L3	CO5	6 M
	b)	Compute the transmission parameters for the two-port network if the Z parameters for the network are $Z_{11} = 42\Omega$, $Z_{22} = 35\Omega$, $Z_{12} = Z_{21} = 25\Omega$.	L3	CO5	4 M
OR					
11	a)	Discuss about the image parameters for the symmetrical two port networks.	L3	CO5	6 M
	b)	Derive the expression for image transfer constant (θ) in terms of transmission (ABCD) parameters.	L4	CO5	4 M