

Code: 23EE3201

**I B.Tech - II Semester – Regular / Supplementary Examinations
JUNE 2026**

**ELECTRICAL CIRCUIT ANALYSIS-I
(ELECTRICAL & ELECTRONICS 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.

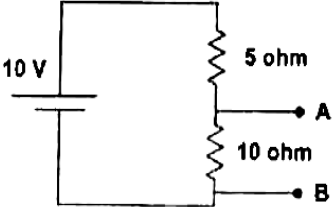
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.

4. All parts of Question paper must be answered in one place.

BL – Blooms Level

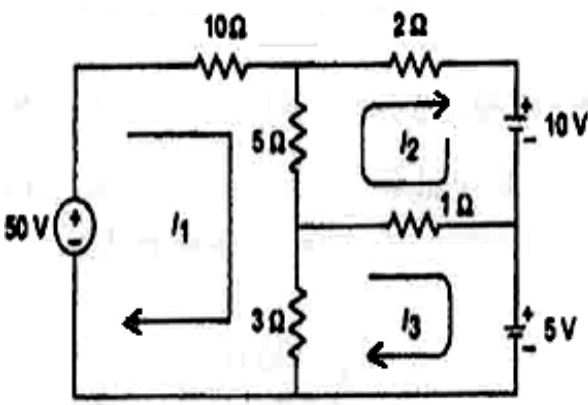
CO – Course Outcome

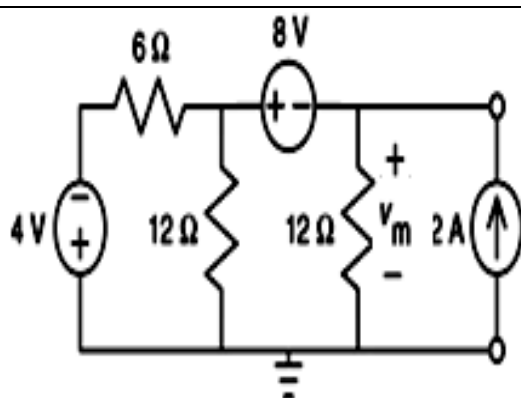
PART – A

		BL	CO
1. a)	Five resistors are connected in series. Four of them have resistance $5\ \Omega$ each, while the fifth resistor has a resistance equal to the sum of any two of the other resistors. Find the equivalent resistance of the circuit.	L3	CO1
b)	Determine the voltage across the $10\ \Omega$ resistor. 	L3	CO1
c)	Define Self and Mutual Inductance.	L2	CO1
d)	Give analogy between electrical and magnetic circuits.	L2	CO1

e)	List the advantages of single phase system.	L1	CO3
f)	Draw the Phasor diagram of RLC series circuit.	L3	CO3
g)	What are half-power frequencies and how are they related to bandwidth?	L2	CO4
h)	Why is current maximum at resonance in series RLC Circuit?	L4	CO1
i)	Give the application of Reciprocity theorem.	L2	CO1
j)	State Thevenin's theorem.	L1	CO4

PART – B

		BL	CO	Max. Marks
UNIT-I				
2.	Determine the mesh currents I_1 and I_2 in the circuit shown below. 	L3	CO1	10 M
OR				
3.	Find the voltage across 12 Ohm resistor using source transformation for the below circuit.	L3	CO1	10 M



UNIT-II

4	a)	Compare series aiding and series opposing connections of coupled coils.	L2	CO2	5 M
	b)	State and explain Faraday's laws of electromagnetic induction.	L1	CO2	5 M

OR

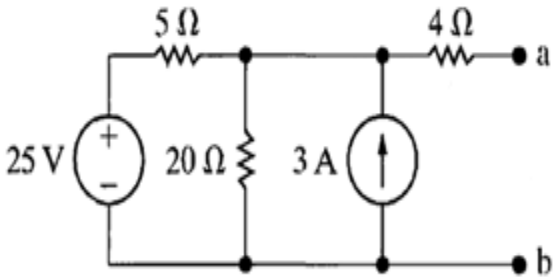
5	Explain the concept of a magnetic circuit and derive the expression for flux in a magnetic circuit.	L2	CO2	10 M
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UNIT-III

6	Consider a series RLC circuit energized by a sinusoidal source (assume amplitude A_m and angular frequency ω). Determine the instantaneous and average power dissipated in the elements R, L and C.	L3	CO3	10 M
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OR

7	Derive the expression for current in a series RC circuit.	L4	CO2	10 M
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UNIT-IV					
8		Explain the characteristics of a series resonant circuit. Derive expressions for resonant frequency, Q-factor and bandwidth.	L3	CO4	10 M
OR					
9		Derive the expression to obtain the frequency of parallel resonance.	L4	CO4	10 M
UNIT-V					
10	a)	Specify the procedure to solve any circuit using Thevenin theorem.	L2	CO4	5 M
	b)	Find the Thevenin equivalent for the given circuit across terminals a and b.	L3	CO4	5 M
					
OR					
11		Explain the Maximum Power Transfer theorem and derive the condition for maximum power transfer.	L3	CO4	10 M