I B.Tech - II Semester – Regular / Supplementary Examinations MAY 2025

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

$\mathbf{PART}-\mathbf{A}$

		BL	CO
1.a)	Illustrate Kirchhoff's Voltage Law with an	L3	CO2
	example.		
1.b)	An electric iron is rated 1000W, 240V. Find the	L3	CO2
	current drawn & resistance of the heating		
	element.		
1.c)	Define Magnetic flux and Flux density.	L2	CO1
1.d)	State Faraday's law of Electromagnetic	L3	CO2
	Induction.		
1.e)	Define Peak Factor and Form Factor.		CO1
1.f)	An alternating current is given by	L4	CO4
	$i=70.71 \sin (100\pi t)$, find R.M.S value and		
	Average value.		
1.g)	Define resonance?		CO1
1.h)	Draw the current locus for Series RL circuit with		CO3
	varying Resistance R.		
1.i)	State Millman's Theorem.		CO1
1.j)	Give the condition to transfer maximum power to		CO1
	load impedance.		

 $\mathbf{PART} - \mathbf{B}$

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2 a) Discuss in detail the classification of L3 CO2 4 M network elements. b) Find the value of current flowing through 20 Ohms resistor by using source transformation and network reduction techniques. L4 CO4 6 M 20 Ohms resistor by using source transformation and network reduction techniques. CO2 4 M 20 Ohms resistor by using source transformation and network reduction techniques. CO4 6 M 20 V Image: Cost of the technique set of technice set of technique set of technique set of technique s				BL	CO			
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b) Find the equivalent resistance R_{ab} in the L4 CO4 4 M circuit given below. 20Ω 3Ω 3Ω R_{ab} 18 Ω R_{ab} 18 Ω $I \Omega$ $I \Omega$ I	3	a)		L3	CO2	6 M		
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $			circuit given below.					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			20 Ω					
Image: Second			16Ω 5Ω					
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Image: Second			R_{ab} 18 Ω \geq 20 Ω					
4a)Give the differences between magnetic andL3CO25 Melectric circuits.								
4a)Give the differences between magnetic andL3CO25 Melectric circuits.			2Ω					
4a)Give the differences between magnetic andL3CO25 Melectric circuits.			<i>b</i>					
electric circuits.	UNIT-II							
	4	a)	Give the differences between magnetic and	L3	CO2	5 M		
b) An iron ring of mean circumference 30cm L4 CO4 5 M			electric circuits.					
		b)	An iron ring of mean circumference 30cm	L4	CO4	5 M		

	1		1	,	
		with area of cross section of 1.5 cm^2 has			
		240 turns of wire wound uniformly on it			
		through which a current of 2A Passes. The			
		flux on iron is found to be 0.75mwb in the			
		iron. Find the relative permeability of iron.			
		OR			
5	a)	Explain about dot convention in mutually	L3	CO2	5 M
		coupled circuits.			
	b)	Derive the expression for equivalent	L3	CO2	5 M
		inductance when the two coupled inductors			
		are connected in Series aiding and series			
		opposition.			
		UNIT-III			
6	a)	Interpret Average and RMS values.	L3	CO3	4 M
	,	Calculate the form factor and peak factor			6 M
		for the following waveforms i) sinusoidal			
		waveform ii) Full wave rectified sine wave.			
		OR		<u> </u>	
7	a)	Find I, I_1 , I_2 , Total Active, Reactive and	L4	CO4	5 M
		Apparent Powers of the circuit shown			
		below			
		→ I			
		→ 1 			
		$\downarrow = 8 \Omega$			
		$I_1 = 4\Omega$			
		$230 \ 0^{\circ} V \qquad 1^{\circ} \qquad 1^{\circ$			
		$\begin{bmatrix} - & \mathbf{a} \end{bmatrix}^{\mathbf{j} \in \Omega} = \begin{bmatrix} -\mathbf{j} \mathbf{j} & \mathbf{a} \end{bmatrix}$			
	b)	Interpret the steady state analysis of R-C	L3	CO3	5 M
		series circuit and draw the phasor diagram.			
UNIT-IV					
8	a)	Derive the equation for resonance	L3	CO3	4 M
		frequency of a series RLC circuit. Also			
		frequency of a series fille encart. This			

		obtain relation between bandwidth,			
		resonant frequency and Q-factor.			
	b)		ΙΛ	CO4	6 M
		and C=40 μ F. The applied voltage is 100V.	LT	COT	0 111
		Find (i) Resonant frequency (ii) Quality			
		factor of a coil (iii) Bandwidth (iv) Upper			
		and Lower half power frequencies.			
		OR			
9	Int	erpret the procedure to draw the locus	L3	CO3	10 M
		agram of R-C series circuit when C is	20	000	
		rying.			
	1	UNIT-V	<u> </u>	<u> </u>	
10	a)	State and explain Superposition theorem.	L2	CO1	4 M
	b)		L4	CO4	6 M
		resistor for the following circuit.			
		r			
		10 Ω 4 Ω			
		80 V $(+)$ 30 $\Omega \ge$ 50 $\Omega \ge$ (\downarrow) 10 A			
		OR		11	
11	a)	State and explain Thevenin's theorem.	L2	CO1	4 M
	b)	Find the Thevenin's equivalent circuit	L4	CO4	6 M
		across A&B terminals. Also draw the			
		Norton's equivalent circuit.			
		30 260			
		A BAR TA			
		SUV T A B			
		The share			
		6Ω D 4Ω			