O.P.Code: 23EE0208   R23   H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. II Year I Semester Regular & Supplementary Examinations November-2025

ELECTRICAL CIRCUIT ANALYSIS-II

(Electrical and Electronics Engineering)

Time: 3 Hours   Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

1	a	What is balanced voltage and balanced impedance?	CO1	L1	2M
	b	A star-connected load has $6 + j8$ W impedance per phase. Determine the line current if it is connected to 400 V, 3φ, 50 Hz supply.	CO1	L3	2M
	c	Find the Laplace transform of exponential function $f(t) = e^{at}$.	CO2	L4	2M
	d	What is the time constant of an RL circuit?	CO2	L1	2M
	e	Define z-parameters.	CO4	L1	2M
	f	What are the short-circuit impedance parameters of a two-port network?	CO4	L1	2M
	g	What are the conditions which a periodic function must satisfy to have its Fourier series expansion?	CO5	L1	2M
	h	Write the steps for application of Fourier transform to circuit analysis.	CO5	L1	2M
	i	Draw constant-k low pass filter and high pass filter.	CO6	L3	2M
	j	What is a filter? Classify them.	CO6	L2	2M

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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2		Discuss in detail the three phase 4-wire circuits with star connected balanced loads and power consumed by a balanced star-connected load.	CO1	L2	10M

OR

3		Show that three-phase power can be measured by two wattmeters. Draw the phasor diagrams. Derive an expression for power factor in terms of wattmeter readings.	CO1	L1	10M

UNIT-II

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4		Derive an expression for the step response in an R-C series circuit Excited by DC Supply and write, the initial and final condition with characteristics.	CO2	L3	10M

OR

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5		For the circuit shown in Figure, determine the current in the 10Ω resistor when the switch is closed at $t = 0$. Assume initial current through the inductor is zero.	CO3	L2	10M
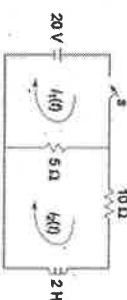
UNIT-III

6	a	Find the y-parameters for the network shown in Figure.	CO4	L4	4M
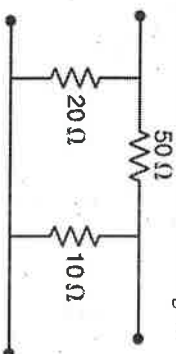
	b	Develop an equation for Hybrid Parameters (h-Parameters) and Inverse Hybrid Parameters (g-Parameters).	CO3	L2	6M

OR

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7	a	Two two-port networks are connected in cascade. Prove that the overall transmission parameter matrix is the product of individual transmission parameter matrices.	CO4	L4	5M
	b	Find the transmission parameters for the network shown in Figure considering two networks connected in cascade.	CO4	L3	5M
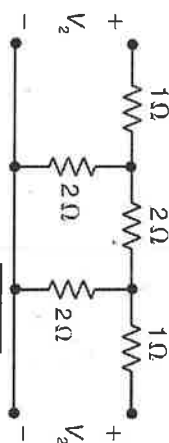
UNIT-IV

8		Stipulate the complex Fourier series for periodic waveform.	CO5	L4	10M

OR

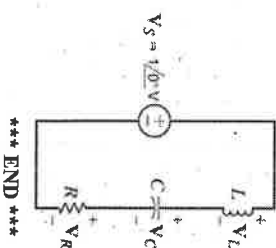|					
9		Determine the Fourier series of repetitive waveform of Figure shown up to 5th harmonic, when time of repetition, T = 20 ms. Calculate the fundamental frequency current, where $R = 10$ ohms and $L = 0.0318H$ with voltage transform of the waveform.	CO5	L2	10M
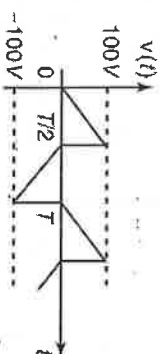
UNIT-V

10	a	Design the low pass RL filter and illustrate the frequency-phase response curve.	CO6	L1	5M
	b	Define Band Elimination Filter. Derive the operational characteristics of a band elimination filter.	CO6	L1	5M

OR

11		Consider the frequency-dependent network in Figure. Given the following circuit parameter values: $L = 159$ μH, $C = 159μ$ F, and $R = 10Ω$, let us demonstrate that this one network can be used to produce a low-pass, highpass, or band-pass filter.	CO6	L3	10M

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