Q.P.Code:23EE0208 | R23 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Regular Examinations February-2025

ELECTRICAL CIRCUIT ANALYSIS-II

(Electrical & Electronics Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A

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

1	a	List the advantages of three phase system.	CO1	L1	2M
	b	A star connected load consists of 25Ω resistance in series with 15mH inductance in each phase. If the supply is 415V, 60Hz, find line current.	CO1	L3	2M
	c	Find the Laplace transform of exponential function f (t) = eat.	CO2	L4	2M
	d	An RLC series circuit with R = 5 Ω is excited by a dc source of 10 V by closing the switch at t = 0. Draw the initial and final conditions of the circuit.	CO2	L3	2M
	e	Why are the ABCD parameters termed transmission parameters?	CO3	L1	2M
	f	Define Z-parameters.	CO3	L1	2M
	g	Write the steps for application of Fourier transform to circuit analysis.	CO4	L1	2M
	h	Write the equation for an alternative to the trigonometric (or sine-cosine) Fourier series.	CO4	L1	2M
	i	Write the characteristic equations of T and Π network?	CO5	L1	2M
	j	What is a filter? Classify them.	CO5	L2	2M

PART-B

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

UNIT-I

2		Show that three-phase power can be measured by two wattmeter's. Draw the phasor diagrams. Derive an expression for power factor in terms of wattmeter readings.	CO1	L2	10M

OR

3		A three-phase balanced delta-connected load of 4+j8Ω is connected across a 400 V, three-phase balanced supply. Determine the phase currents and line currents. Assume the phase sequence to be RYB. Also, calculate the power drawn by the load. Sketch the phasor diagram.	CO1	L3	10M

UNIT-II

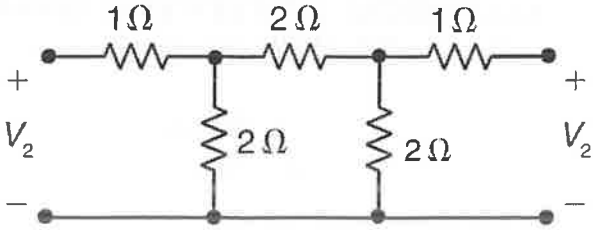
4		Derive shifting theorem of Laplace transform.	CO2	L4	10M
		i. Find the Laplace transform of $e^{at}\sin bt$.			
		ii. Find the Laplace transform of $(t+2)^2e^t$.			
		iii. If $u(t)=1$, for $t \geq 0$ and $u(t)=0$ for $t<0$, determine the Laplace transform of $[u(t)-u(t-a)]$.			

OR

5	a	Derive a differentiation of Laplace transform and find the Laplace transform of function $f(t)=t\sin 2t$.	CO2	L3	5M
	b	Define of Inverse Laplace Transform and find the function $f(t)$ If $(s)=\frac{2}{(s+1)(s+5)}$.	CO2	L3	5M

UNIT-III

6	a	Find the transmission parameters for the network shown in Figure considering two networks connected in cascade.	CO3	L3	5M



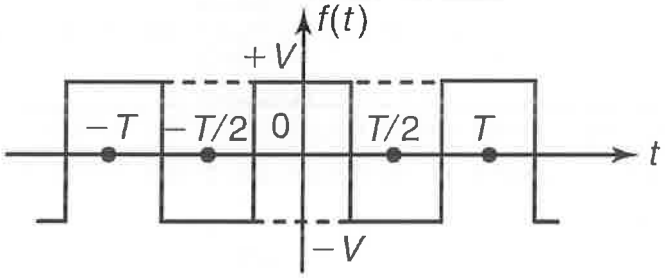
	b	Two two-port networks are connected in parallel. Prove that the overall y-parameters are the sum of corresponding individual y-parameters.	CO3	L4	5M

OR

7	a	Express Z-parameters in terms of Hybrid-parameters and ABCD parameters for a two-port network.	CO3	L4	5M
	b	Determine the h -parameter with the following data: (i) with the output terminals short-circuited, $V_1 = 25\ \text{V}, I_1 = 1\ \text{A}, I_2 = 2\ \text{A}$ (ii) with the input terminals open-circuited, $V_1 = 10\ \text{V}, V_2 = 50\ \text{V}, I_2 = 2\ \text{A}$	CO3	L2	5M

UNIT-IV

8		Determine the Fourier series for the square waveform shown below and plot the magnitude and the phase spectra.	CO4	L4	10M



OR

9		Show that the Fourier series expansion of a periodic function with odd (rotation) symmetry contains only the sine terms and even (mirror) symmetry contains only the cosine terms plus a constant.	CO4	L1	10M

UNIT-V

10		Explain in the detail with neat illustrations the Constant-k filters of High pass and Low pass network and derive the network parameters.	CO5	L2	10M

OR

11	a	Design a constant K-type HPF having a cut-off frequency of 5500 Hz and a design impedance of 750 Ω. Draw T-section filter and π-Section filter.	CO5	L3	5M
	b	Design the high pass RL filter and illustrate the frequency-phase response curve.	CO5	L1	5M

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