Question Paper Code: R18A21EE03

R18

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech. I Semester Supplementary Examinations, December – 2024

ELECTRICAL CIRCUIT ANALYSIS

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)

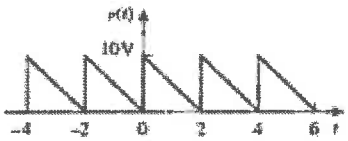
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	What are the uses of source transformation?	CO1	L1	2M
2.	State compensation theorem.	CO1	L1	3M
3.	Derive transient response for R-L circuit using AC excitation	CO2	L2	2M
4.	Find Laplace transform of f(t) = cos2t + e-3t , t > 0	CO2	L2	3M
5.	Write the circle equation of RL circuit with R variable.	CO3	L2	2M
6.	A series circuit has R=4 ohms, L=25 mH, and C=150 μF. What is the bandwidth?	CO3	L2	3M
7.	Derive expressions for transmission parameters of two two-port networks connected in cascade.	CO4	L2	2M
8.	Derive the expression for Y parameters in terms of ABCD parameters.	CO4	L2	3M
9.	What are the properties of tie-set matrix?	CO5	L1	2M
10.	Define the following terms i) Graph ii) Link iii) Tree	CO5	L2	3M

Section B (Essay Questions)

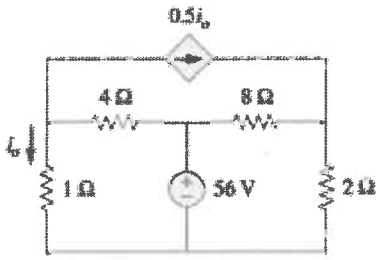
Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	i) State and explain Maximum power transfer theorem.	CO1	L2	4M
	ii) For the periodic wave form shown in the following figure, determine average and rms value, form factor.	CO1	L3	6M



OR

B)	i) Describe Ideal current source and Ideal voltage sources with examples.	CO1	L2	4M
	ii) Determine the current Io in 1 Ohm resistor of the circuit shown in figure.	CO1	L3	6M



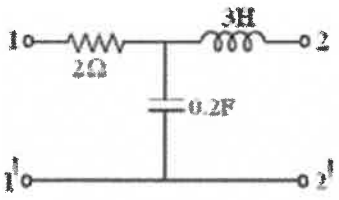
12. A)	i) Determine the transient current through a series R-C circuit when it is connected to a sinusoidal voltage source.	CO2	L2	5M
	ii) In a series RLC circuit, R=6 ohms, L=2 H, C=2 F. A DC voltage of 50 V is applied at t=0. Obtain the expression for i(t) using differential equation approach.	CO2	L3	5M

OR

B)	In a series RLC circuit L=0.3 H, and C=4 F. A DC voltage of 50 V is applied at t=0. Obtain an expression for current i(t) in the circuit, when (i) R= 5 Ω (ii) R= 6 Ω.	CO2	L3	10M
13. A)	i) Illustrate the concept of resonance.	CO3	L2	4M
	ii) A series RLC circuit has the following parameter values R= 10Ω, L=0.01 H and C= 10 μF. Find the Q factor of the circuit at resonance.	CO3	L3	6M

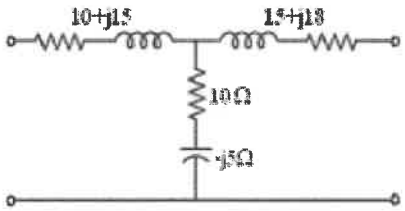
OR

B)	A voltage of V = $270\angle 0^0$ V is applied to a series circuit of fixed resistance R = 8 ohms and a variable capacitance C. Sketch the admittance and current locus diagrams.	CO3	L3	10M
14. A)	i) Classify filters in detail.	CO4	L2	4M
	ii) For the following network shown in below Figure. Determine h-parameters.	CO4	L3	6M

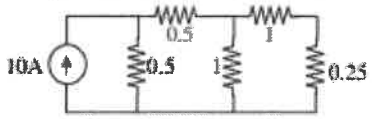


OR

B)	For the two port network given below, Determine Y and ABCD parameters.	CO4	L3	10M



15. A)	i) Explain the measurement of power in a balanced 3-phase system using a single watt meter.	CO5	L2	4M
	ii) For the network shown in figure, obtain the oriented graph of the network. Write the cut-set matrix of the graph and determine the loop currents. All the values of resistances in the circuit are in ohms.	CO5	L3	6M



OR

B)	For the network shown in figure 3(a) draw the graph and show some possible trees.	CO5	L3	10M