Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech. (Full Time) - END SEMESTER EXAMINATIONS, APRIL / MAY 2024

ELECTRICAL AND ELECTRONICS ENGINEERING
Semester III
EE5304 ELECTRIC CIRCUIT ANALYSIS
(Regulation 2019)

Time: 3hrs | Max.Marks: 100

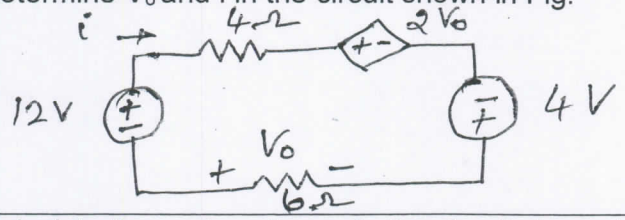
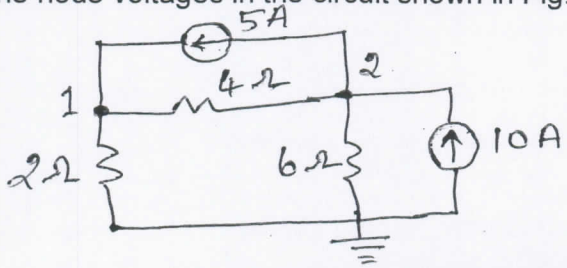
CO 1	Able to understand the basic concepts of electrical circuits.
CO 2	Ability to compute solutions to first and second order networks.
CO 3	Ability to construct and analyze equation representing AC circuits.
CO 4	Ability to compute circuit representations quantitatively in Laplace domain.
CO 5	Able to construct and analyze two port networks and its parameters.

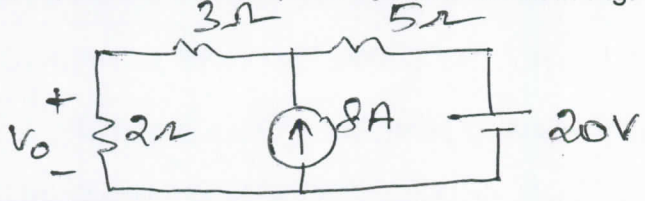
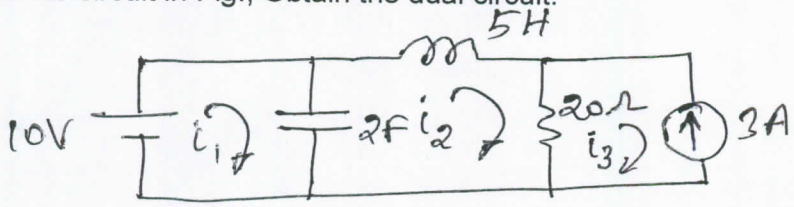
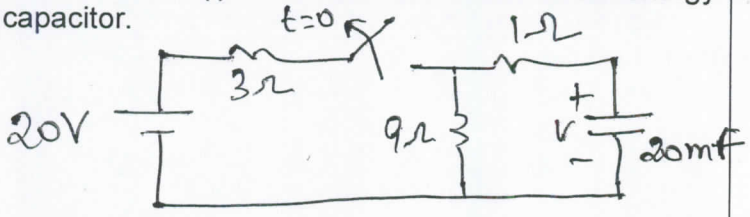
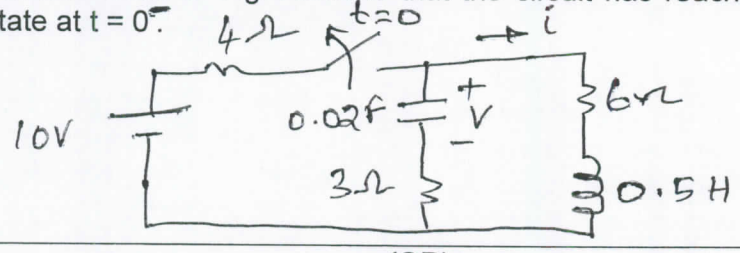
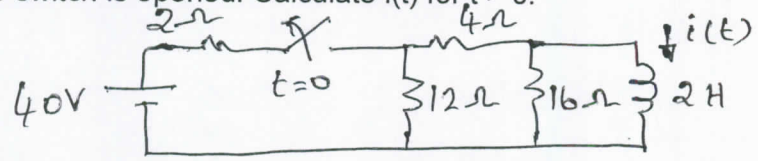
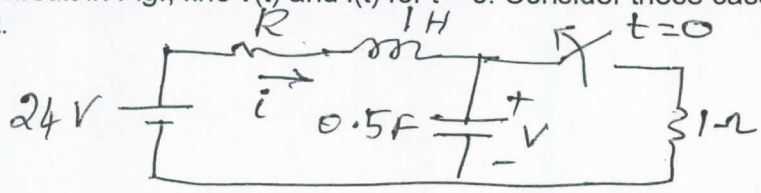
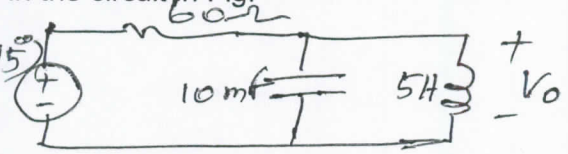
BL – Bloom's Taxonomy Levels
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

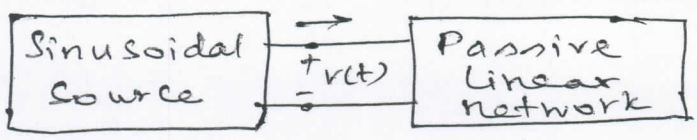
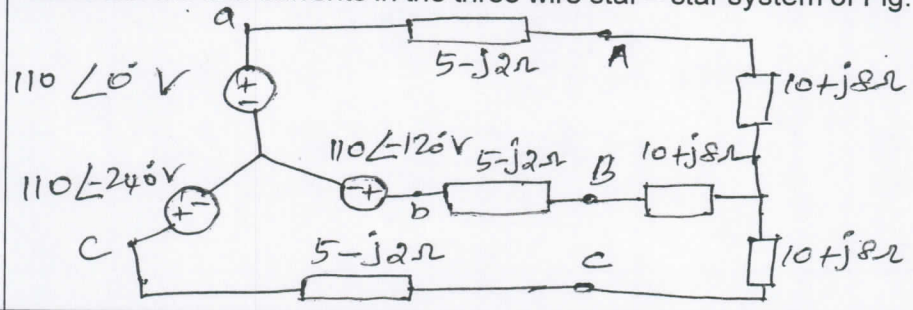
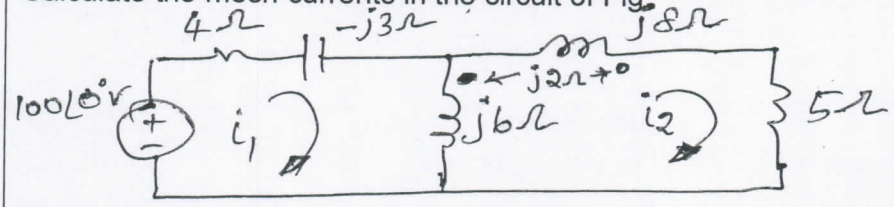
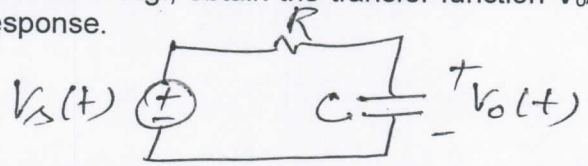
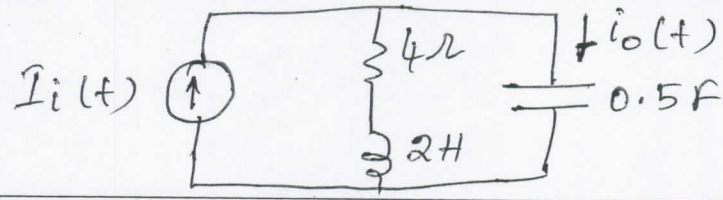
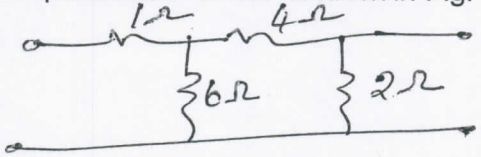
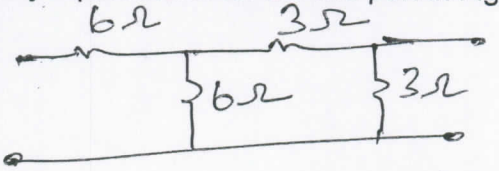
PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

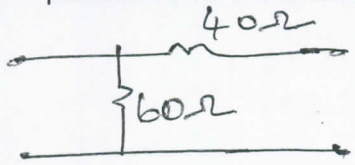
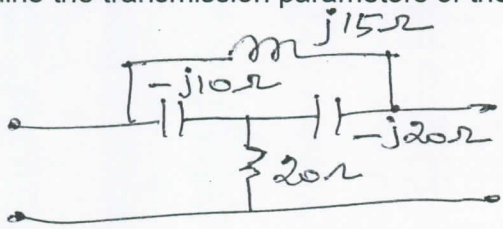
Q. No	Questions	Marks	CO	BL
1	Compare independent sources with dependent sources.	2	1	1
2	State Maximum Power Transfer Theorem.	2	1	1
3	Define time constant of RL circuit.	2	2	2
4	What you mean by transient state response?	2	2	2
5	Sketch the impedance diagram of RLC circuit.	2	3	2
6	List the features of ideal transformer.	2	3	2
7	What is poles and zeros in transfer function.	2	4	1
8	Draw the variation of circuit current against supply frequency in series resonance circuit.	2	4	1
9	Mention the significance of two port network.	2	5	2
10	Write the importance of interconnections of two port networks.	2	5	2

PART- B (5 x 13 = 65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks	CO	BL
11 (a) (i)	Determine V_o and i in the circuit shown in Fig. 	7	1	3
(ii)	Calculate the node voltages in the circuit shown in Fig. 	6	1	3
	(OR)			

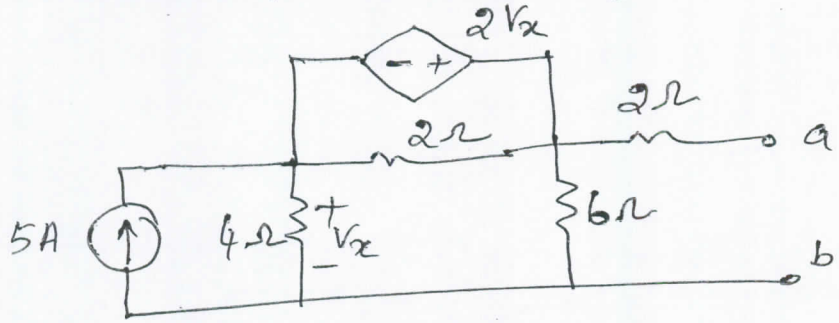
11 (b) (i)	Using Superposition theorem, find V_o in the circuit in Fig. 	7	1	3
(ii)	For the circuit in Fig., Obtain the dual circuit. 	6	1	3
12 (a) (i)	The switch in the circuit in Fig., has been closed for a long time, and it is opened at t = 0. Find V(t) for t ≥ 0. Calculate the initial energy stored in the capacitor. 	7	2	3
(ii)	Find i(t) in the circuit in Fig. Assume that the circuit has reached steady state at t = 0⁻. 	6	2	3
	(OR)			
12 (b) (i)	The switch in the circuit of Fig. has been closed for a long time. At t = 0, the switch is opened. Calculate i(t) for t > 0. 	7	2	3
(ii)	For the circuit in Fig., fine v(t) and i(t) for t > 0. Consider these case: R = 5 Ω. 	6	2	3
13 (a) (i)	Determine $V_0(t)$ in the circuit in Fig. 	7	3	4
(ii)	Given that, v(t) = 120 cos(377t + 45°) V and i(t) = 10 cos (377t - 10°) A. Find the instantaneous power and the average power absorbed by the passive linear network shown below.	6	3	4

				
	(OR)			
13 (b) (i)	Calculate the line currents in the three wire star – star system of Fig. 	7	3	4
(ii)	Calculate the mesh currents in the circuit of Fig. 	6	3	4
14 (a) (i)	For the RC circuit in Fig., obtain the transfer function V_o/V_s and its frequency response. 	7	4	4
(ii)	A parallel resonant circuit has R = 100 kΩ, L = 20 mH and C = 5 nF. Calculate resonant frequency, quality factor and band width.	6	4	4
	(OR)			
14 (b) (i)	A series connected circuit has R = 4 Ω and L = 25 mH. (a) Calculate the value of C that will produce a quality factor of 50. (b) find lower and upper cut-off frequency.	7	4	4
(ii)	For the circuit in Fig., calculate the gain $I_o(\omega)/ I_i(\omega)$ and its poles and zeros. 	6	4	4
15 (a) (i)	Obtain the z – parameter for the network in Fig. 	7	5	4
(ii)	Calculate the y – parameter for the two port in Fig. 	6	5	4
	(OR)			

15 (b) (i)	Find the h – parameter for the network in Fig. 	**7**	5	4
(ii)	Determine the transmission parameters of the circuit in Fig. 	**6**	5	4

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16.	Find the Thevenin equivalent of the circuit in Fig. 	**15**	5	5