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Course Code

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Third Semester B.E. Degree Examinations, March/April 2023
ELECTRIC CIRCUIT ANALYSIS

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO: PI)</u>
MODULE – 1			
1.	a. Define (i) active and passive elements (ii) Distributed and Lumped networks with examples.	06	(2 :1: 1.3.1)
	b. Explain how to measure AC and DC quantities using Oscilloscope.	06	(2 :1: 1.3.1)
	c. Derive three star connected impedances into its equivalent delta connected impedances.	08	(3 :2: 1.3.1)
(OR)			
2.	a. Reduce the network shown in fig.2 (a) into its equivalent single source network.	06	(3 :2: 1.3.1)
	b. Determine currents i_1, i_2, i_3 for the circuit shown in fig. 2 (b) using mesh analysis.	06	(3 :2: 1.3.1)
	c. Obtain node voltages V_1, V_2 , for the network shown in fig. 2 (c) using node analysis.	08	(3 :2: 1.3.1)

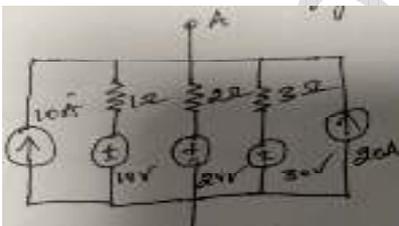


Fig. 2 (a)

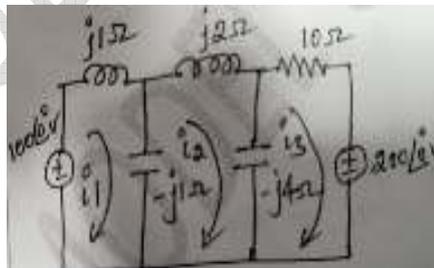


Fig. 2 (b).

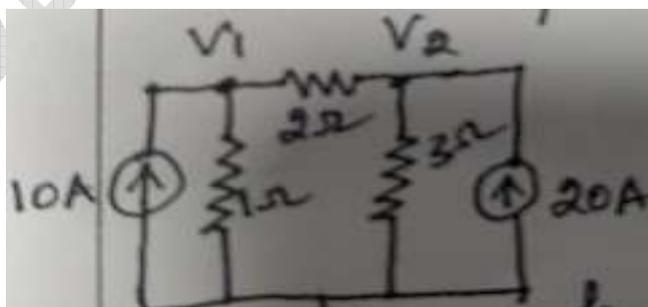


Fig. 2 (c).

MODULE – 2			
3.	a. State and prove Superposition theorem. Also verify the theorem.	10	(3:2: 1.3.1)
	b. State and prove maximum power transfer theorem for resistive loads.	10	(3 :2: 1.3.1)

(OR)

4. a. Show that Norton's theorem is dual of Thevenin's theorem. 10 (3 :2: 1.3.1)
b. Find current through load resistance for the network shown in fig.4 (b) 10 (3 :2: 1.3.1) using Millman's theorem.

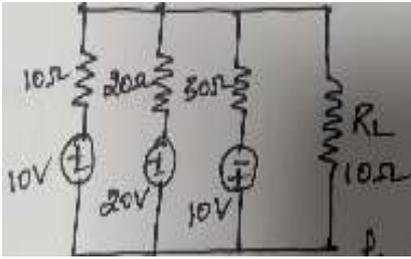


Fig. 4 (b)

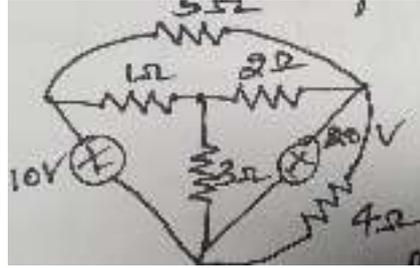


Fig. 5 (b)

MODULE – 3

5. a. Define Graph, tree, co-tree and incidence matrix with examples. 08 (2 :3: 1.3.1)
b. Obtain tie-set schedule and find all the branch currents for the network shown in fig. 5(b). 12 (3 :3: 1.3.1)

(OR)

6. a. Derive resonant frequency for both series and parallel RLC circuit. 10 (3 :3: 1.3.1)
b. Show that resonant frequency is geometric mean of two half power frequencies. 10 (3 :3: 1.3.1)

MODULE – 4

7. a. For the circuit shown in fig.7 (a). Switch 'S' is changed from 1 to 0 at $t=0$. Find $i(t)$, and $di(t)/dt$ at $t=0^+$. 10 (3 :4: 1.3.1)

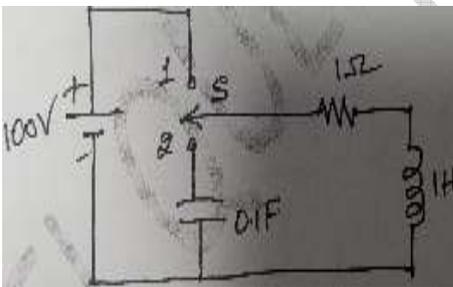


Fig. 7(a)

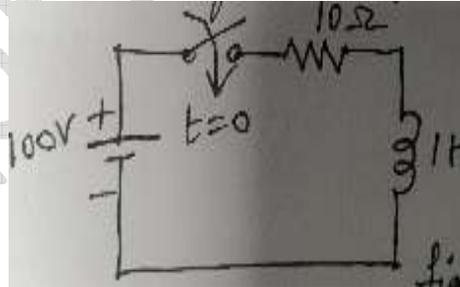


Fig. 8(a)

- b. State and prove initial and final value theorem. 10 (2 :4: 1.3.1)

(OR)

8. a. Find the values of $i(t)$, $di(t)/dt$, $d^2i(t)/dt^2$ at $t=0^+$ for the network shown in fig. 8(a). 10 (3 :4: 1.3.1)
b. Find Laplace transform of following functions: 10 (3 :4: 1.3.1)
(a) t^2e^{at} (b) $e^{-nat} \text{Sin}bt$ (c) $e^{-at} \text{Sin}ht$

MODULE – 5

9. a. Determine Z and Y parameters for the network shown in fig.9 (a) 10 (2 :5: 1.3.1)
- b. Determine ABCD parameters of given network as shown in fig. 9(b) 10 (3 :5: 1.3.1)

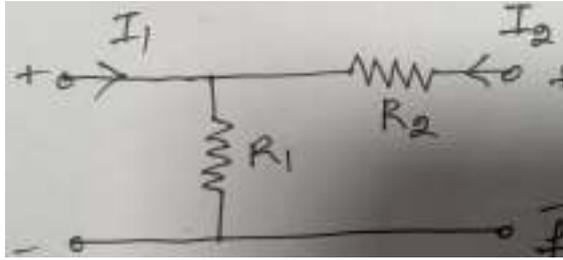


Fig. 9 (a).

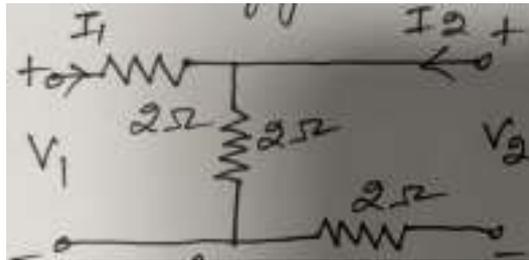


Fig. 9 (b)

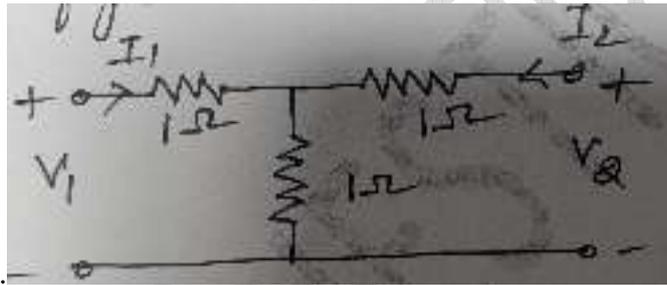


Fig.10 (b)

(OR)

10. a. Obtain Y-parameters in terms of Z-parameters. 10 (2 :5: 1.3.1)
- b. Two identical networks as shown in fig. 10 (b) are connected in cascade. Determine the overall transmission parameters of combined network. 10 (3 :5: 1.3.1)

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