

(A Constituent College of Somaiya Vidyavihar University) **Department of Sciences and Humanities**



Course Name:	Elements of Electrical and Electronics Engineering	Semester:	I
Date of Performance:	12-09-23	Batch No:	C5_3
Faculty Name:		Roll No:	16010123325 (53)
Faculty Sign & Date:		Grade/Marks:	/ 25

Experiment No: 3

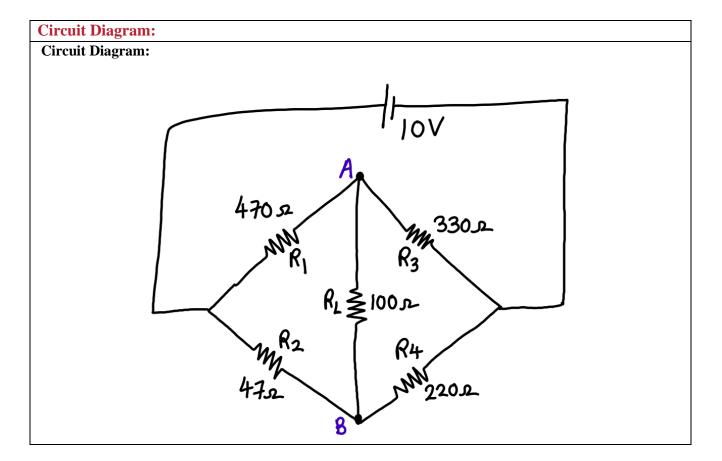
Title: Thevenin's Theorem & Norton's Theorem.

Aim and Objective of the Experiment:

- To Verify for Thevenin's Theorem for the circuit
- To Verify Norton Theorem for the Circuit.

COs to be achieved:

CO1: Analyze resistive networks excited by DC sources using various network theorems.



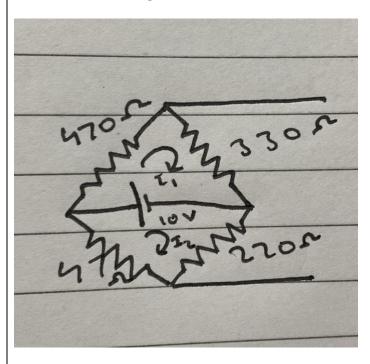
EEEE Semester: I Academic Year: 2023-24



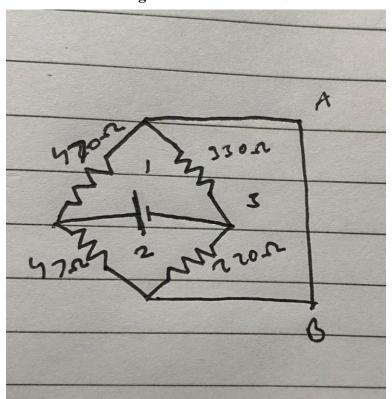
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Task 1: Circuit Diagram to measure R_{TH}/R_{N} :



Task 2: Circuit Diagram to measure V_{TH}:



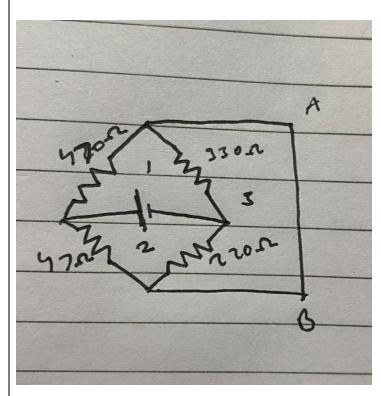
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Task 3: Circuit Diagram to measure Isc:



Stepwise-Procedure:

Thevenin's Theorem:

- 1. Connect the circuit as shown in the circuit diagram.
- 2. Set 10V and measure open circuit voltage V_{Th} across load terminals A and B.
- 3. Replace all voltage sources by Short circuit and measure R_{Th} across terminals A and B as per the circuit diagram shown in the figure.
- 4. Draw Thevenin's equivalent circuit and determine the value of load current from it.
- 5. Verify the results theoretically.

Norton's Theorem:

- 1. Connect the circuit as shown in the circuit diagram.
- 2. Set the voltages 10V
- 3. Remove the load resistance and measure the short circuit current I_{SC} through A and B terminals.
 4. Replace all the voltage sources by Short circuit and measure R_{Th} across terminals A and B as per the circuit diagram shown in the figure.
- 5. Draw Norton's equivalent circuit and determine the value of load current.
- 6. Verify the results theoretically

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Sample Calculations:

Sample Calculations:
V11 ->
-470I, -330I, +10=0 -> I, =0.0125A
-220 Ez -47 Ez-10=0-7 Ez=-0.037A
$VA_8 = 330 I_1 + 220 I_2$ = $4.125 - 8.14$ = $-4.015V$
Rm = -> Rx -> 470 113302 -> 193.8751 Ry -> 47112201 -> 38.7261 Rx = Fx try = 232.6011
$I_{N} = -7$ $-470I_{1} - 330(I_{1} - I_{3}) + 10 = 0$ $-800I_{1} + 330I_{3} = -10$ $\therefore 80I_{1} - 33I_{3} = 19 - (I)$
$-47I_{z} - 10 - 220(I_{z} - I_{z}) = 0$ $-267I_{z} + 220I_{z} = 10(II)$
330 I, - 550[3+220]2=0 :- 3+, +22 I 2 - 55[3=0
IN= I3 = -0.018A

Learnt and verified Thevenin's Theorem & Norton's Theorem



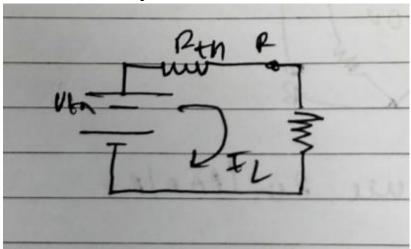
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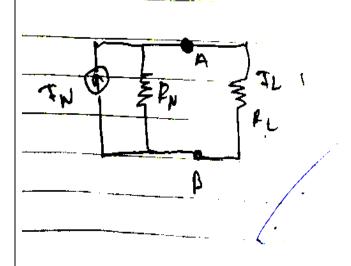
Observation Table:

	V _{TH} (V)	$R_{\mathrm{TH}} / R_{\mathrm{N}} \ (\Omega)$	I _N (mA)	I _L (mA)
Theoretical value	4.1	232.6	0.017	12.6
Practical value	4.15	228	0.015	12

Draw Thevenin's Equivalent circuit



Draw Norton's Equivalent circuit





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Concl	lusion:
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We learned the practical application of Thevenin's and Norton's theorems and also got to connec	et
and verify the correct values of voltages, currents and resistances.	

Signature of faculty in-charge with Date:

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