IARE

IARE
INSTITUTE OF
AERONAUTICAL ENGINEERING
(An Autonomous Institute affiliated to JNTUH, Hyderabad)
Dundigal, Hyderabad - 500 043

LABORATORY WORK SHEET

Name of the Student : Abdul Basith Khan

Roll Number									
2	3	9	5	1	A	6	6	0	1

Class : 1st Year (CSM-A) Semester : I st

Course Code : AEED01 Course Name : EEE Laboratory

Name of the Course Faculty : Dr. L Rajashekhar Goud Faculty ID : IARE11067

Exercise Number : 05 Week Number : 05 Date : 12/01/2024

DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva - Voce	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	3	4	19

Signature of Faculty

START WRITING FROM HERE : Norton's Theorem :-

AIM :-

To verify Norton's Theorem for electrical circuit theoritically and practically.

Apparatus :-

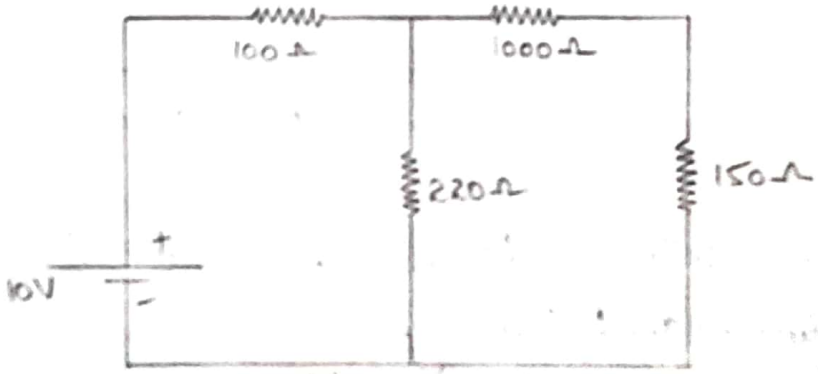
S.No	Equipment	Range	Type	Quantity
1.	Ammeter	(0-200 MA)	Digital	1
2.	Voltmeter	(0-20)V	Digital	1
3.	RPS	(0-30)V	Digital	1
4.	Bread board	–	–	1
5.	Resistor	100Ω, 1000Ω 220Ω, 150Ω	–	4
6.	Connecting wires	–	–	As Required

ROLL NUMBER :

Statement :-

Any linen, bilateral network with current sources, voltages source and resistor can be replaced by one equivalent circuit consisting of a current source in parallel resistor the value of the current source in parallel with a resistor the value of the current source is the current flowing through the short circuit terminals of the network and the resistor is the equevalent resistance measure between the open circuit terminals of the network with all the open circuit with all the energy sources replyed by internal resistor.

Circuit Diagram :-



Given circuit

(1)

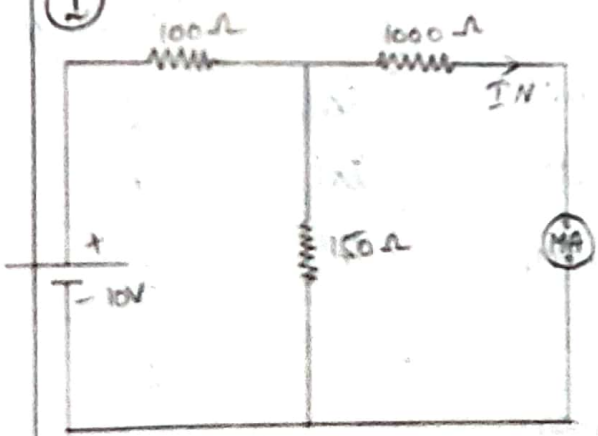


Fig (1)

(2)

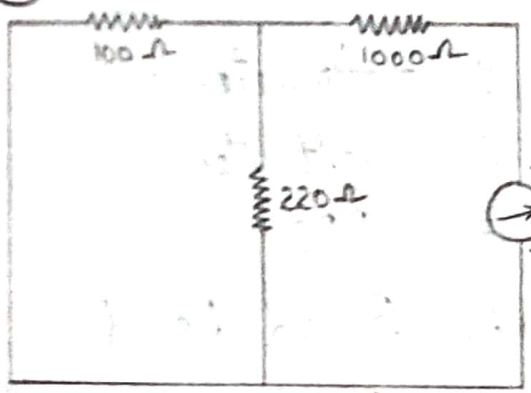
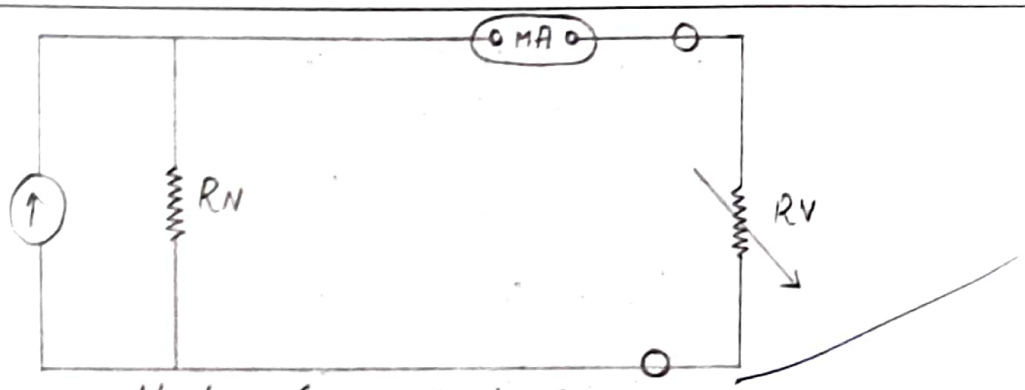


Fig (2)

ROLL NUMBER :



Norton Equivalent Resistance
Fig (3)

Procedure:-

1. Connect the circuit diagram as shown in Fig(1) and Fig(2), measure the current FSC (or) IN through short circuited terminal
2. Find the resistance b/w open circuited terminal by using multimeter.
3. Draw Norton's Equivalent circuit by connecting IN and RN in parallel as shown in fig (3) and find load current.

Tabular Column:-

Parameter	Theoritical Values	Practical Values
FSC (or) IN	6.311 mA	7.0 mA
RN	1068.75 Ω	1048 Ω
I_2	5.534 mA	6.1 mA

Calculations:-

$$R_T = \left[\frac{1}{100} + \frac{1}{220}\right] + 100$$

$$= \frac{1000 \times 220}{1220} + 100$$

$$= 180.32 + 100$$

$$R_T = 280.32\ \Omega$$

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$$R_N = \frac{100 \times 220}{100 + 220} + 100$$

$$= \frac{22000}{320} + 100$$

$$\boxed{R_N = 1068.72\ \Omega}$$

$$I_T = \frac{V}{R} = \frac{10}{280.32}$$

$$I_T = 0.035\ A$$

$$I_N = \frac{I_T \times 220}{220 + 1000}$$

$$= \frac{0.035 \times 220}{1220}$$

$$= 0.066\ A$$

$$\boxed{I_N = 6.311\ mA}$$

$$I_2 = 6.3 \times 1068.75$$

$$I_2 = \frac{6744.88}{1218.75}$$

$$\boxed{I_2 = 5.534\ mA}$$

Result:-

Any linear circuit containing several voltages & resistance can be replaced by just one simple single current source in parallel with a single resistance connected across the load.

Conclusion:-

We can solve any example complex circuit with just a single current source and parallel resistance connected to a load.