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

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

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

Course Code : AEE001 Course Name : EEE Laboratory

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

Exercise Number : 07 Week Number : 07 Date : 13/01/2024

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	4	4	20

Signature of Faculty

START WRITING FROM HERE : Reciprocity Theorem:-

AIM:-

To verify and the combination of reciprocity for electric network theoritically and practically.

Apparatus:-

S.No	Name of the Equipment	Range	Type	Quantity
1.	Ammeter	(0-200)mA	Digital	01
2.	Voltmeter	(0-30) V	Digital	01
3.	RPS	(0-30) V	Digital	01
4.	Resistors	100Ω, 150Ω 1KΩ, 220Ω, 82Ω	-	05
5.	Bread Board	-	-	01
6.	Connecting Wires	-	-	As Required

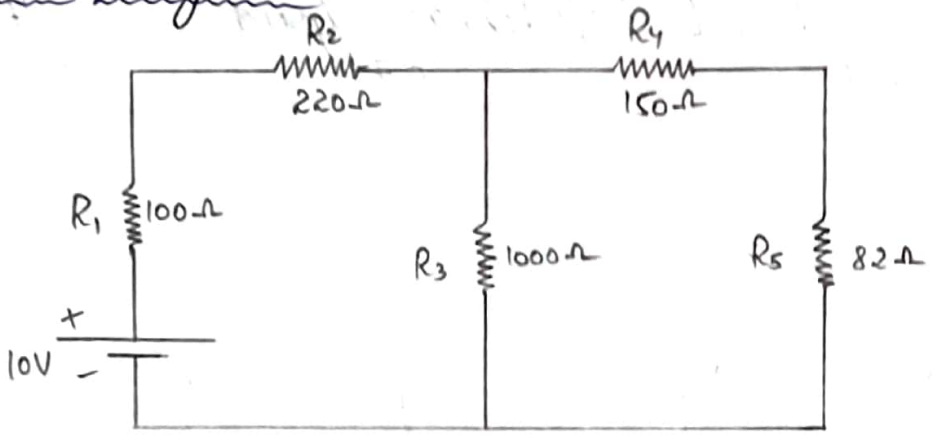
ROLL NUMBER :

Statement :-

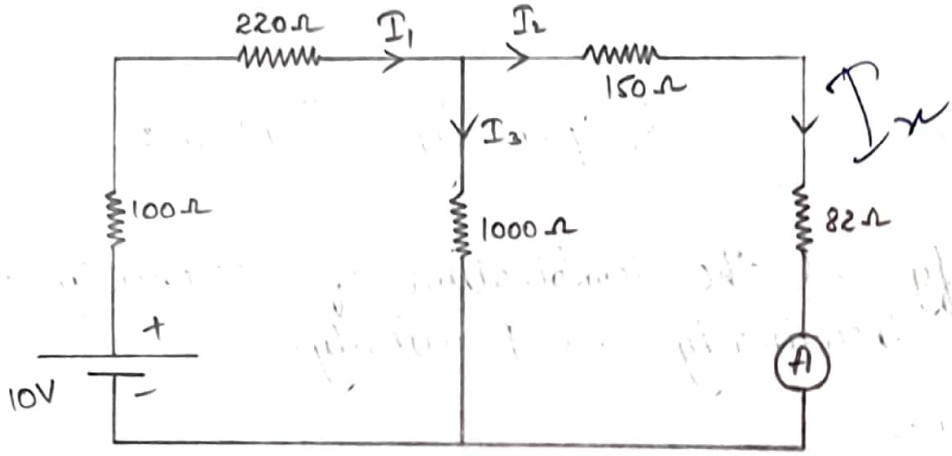
In any linear bilateral signal i.e. source at work the ratio of excitation to response is constant even there positive

Circuit Diagram :-

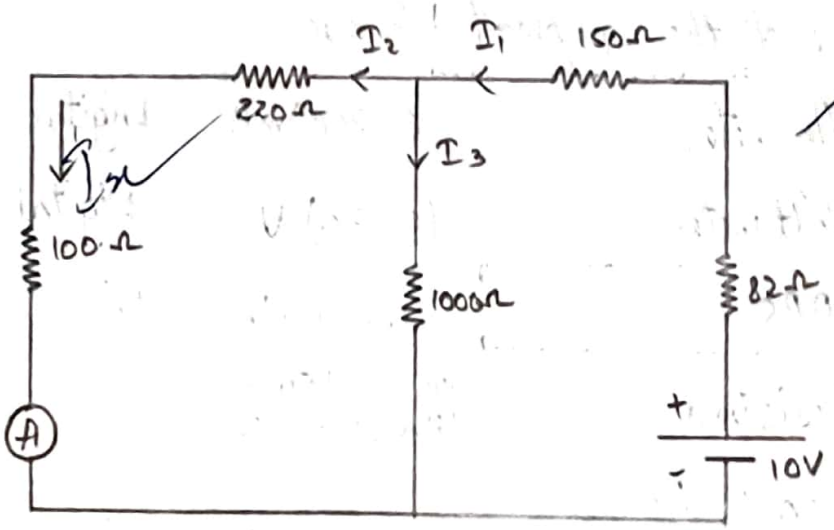
(1)



(2)



(3)



ROLL NUMBER :

Procedure:-

1) Connect the circuit as shown in fig (1)
2) Measure the current I_1 in the branch
3) Laster change voltage source and response as shown in fig (2) and note down the current I_2.
4) Observe that the currents I_1 and I_2 should be same.
5) Measure the ratio of exitation and response and check whether they are equal in both cases.

Calculations:-

Theoritical Calculations:-

Case (i):-

$$R_{eq} = \frac{232 \times 1000}{1000+23} + 220 + 100$$

$$= \frac{232000}{1232} + 320$$

$$= 188.311 + 320$$

$$R_{eq} = 508.311\ \Omega$$

$$I_1 = \frac{10}{508.31}$$

$$\boxed{I_1 = 0.018\ A}$$

$$I_2 = 0.018 \times \frac{1000}{1232}$$

$$= 0.018 \times 0.811$$

$$\boxed{I_2 = 0.015\ A}$$

$$I_3 = I_2 - I_1$$

$$= 0.018 - 0.015$$

$$\boxed{I_3 = 0.003\ A}$$

Case (ii):- $R_{eq} = \frac{320 \times 1000}{1320} + 82 + 150$

$= \frac{320000}{1320} + 232$

$R_{eq} = 474.424\ \Omega$

$I_1 = \frac{10}{474.42} \Rightarrow \boxed{I_1 = 0.021\ A}$

$I_2 = 0.021 \times \frac{1000}{1320} \Rightarrow \boxed{I_2 = 0.015\ A}$

$I_3 = 0.021 - 0.015 \Rightarrow \boxed{I_3 = 0.006\ A}$

Tabular Column:-

Parameter	Theoritical Values	Practical Values
Case (i)	0.018 A	0.019 A
Case (ii)	0.015 A	0.019 A

Precautions:-

Check for proper connections before switching on the supply make sure of proper colour coding of resistor the terminal of the resistance should be properly connected.

Result:-

Hence the Reciprocity theorem is an electric circuit network verified both theoritically and practically.